ENTOMOLOGISKE MEDDELELSER

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ENTOMOLOGISK FORENING

KØBENHAVN

KØBENHAVN 1969

ENTOMOLOGISK FORENINGS FORLAG

N. T. KRØYERS BOGTRYKKERI — KGS. LYNGBY

Udgivet med støtte fra Statens almindelige Videnskabsfond,
og Rask-Ørsted fondet.

Redaktion: dr. phil. Børge Petersen

Some Pipunculidae (Diptera) from Southern Spain, with description of a new species.

By
The late R. L. Coe
British Museum (Natural History), London.

This small collection of Pipunculidae from Southern Spain has made an interesting study. It is the result of two collecting trips to this area, the one in 1960 by Dr. J. R. Vockeroth, Ottawa, the second in 1966 by Dr. Leif Lyneborg, Copenhagen and his assistants. I am particularly pleased to find among the material three examples of the hitherto unknown male of *Alloneura nigronitida* Collin (1958: 96—97), described from a unique female taken by myself on the shrub-covered island of Korcula in the Southern Adriatic. Also included is an apparently undescribed species of *Alloneura* which resembles the common *sylvatica* Meigen, but has the legs almost completely black among other distinguishing characters.

Five specimens of *Eudorylas* spp. (2 ♂, 3 ♀) and two specimens of *Alloneura* (1 ♂, 1 ♀) have not been specifically named. Three of these are headless and a fourth greasy. None agree with British species that I have studied, and pending more material becoming available I would not attempt to determine these more precisely.

The specimens dating from 1960 are in the Canadian National Collection, Ottawa, those from 1966 in the Zoological Museum, Copenhagen.

Chalarus spurius Fallén, 1816.

Material. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 1 ♀, 5 April 1966.

Distribution. — *C. spurius* is the commonest British *Chalarus*. I have also taken it in Northern Jugoslavia, and in the British Museum there is further material from Germany and Northern Italy.

Remarks. — In my recent Handbook dealing with the British species of Pipunculidae (1966) I separate *spurius* primarily from the other eight species of *Chalarus* that I recognize by its having the posteroventral fringe along the mid femora black or brownish instead of white (or very pale golden in a single species, *griseus*).

Chalarus ?pughi Coe, 1966.

Material. — GRANADA: Granada, 700 m, 1 ♀, 13 July 1960.

Distribution. — Originally described on British material.

Alloneura palliditarsis Collin, 1931.
(= *flavitarsis* Collin, preocc.)

Material. — ALMERIA: Albufera, 0—50 m, 1 ♀, 23 March 1966.

Distribution. — This is the first example of *A. palliditarsis* Collin that I have seen from the European Continent. It occurs uncommonly in Britain.

Remarks. — The species is distinct from other British *Alloneura* in having the humeri black instead of yellow.

Alloneura lyneborgi sp. n.

Material. — ALMERIA: Tabernas 8 km N, 200—500 m, 1 ♂ holotype, 14 March 1966. — GRANADA: Sierra de Contraviesa 5 km SE Orgiva, 500 m, 1 ♀ paratype, 18 April 1966. (A further ♀ without abdomen is probably this species). Types in Zoological Museum, Copenhagen.

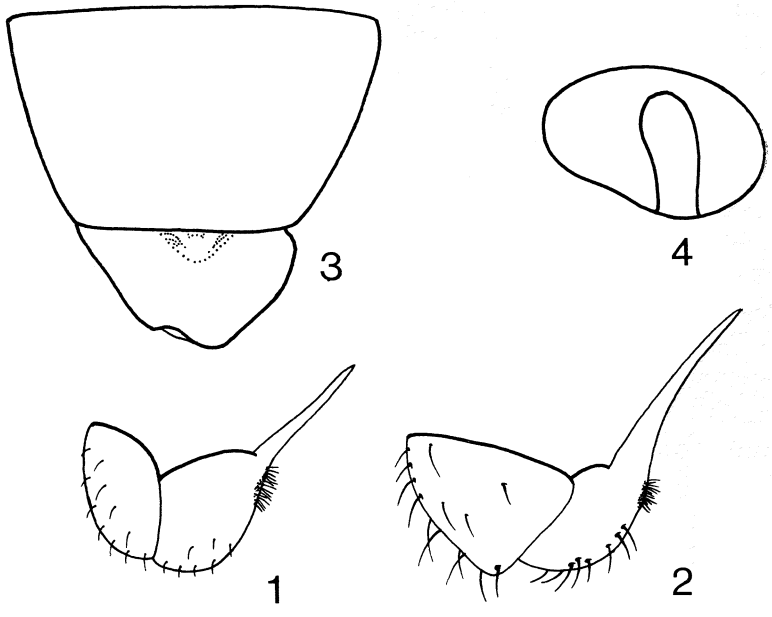
Description. ♂ ♀. — Most obviously differ from *A. sylvatica* as follows: Legs black apart from the narrowly yellow knees. In *sylvatica* the tibiae are broadly yellow towards base and the tarsi yellow except at most for last segment. Hind trochanters with only two tiny black spines ventrally instead of the three to six present in *sylvatica*. Besides, the third antennal segment in *lyneborgi* is distinctly darker and the body pubescence mainly shorter, more obviously so in ♀. Wing length 3.25—4 mm.

♂, Holotype. Hind tibiae strongly and abruptly bent towards middle, these being nearly straight in *sylvatica* ♂. Abdominal segment 8 (pregenital) with the membraneous area almost as slit-like as in *sylvatica* ♂.

♀, Paratype. Viewed from in front, thorax with less obvious

brownish dusting anteriorly than in *sylvatica* ♀. Ovipositor (Fig.1) somewhat smaller, the base more globular and piercer proportionately shorter than in *sylvatica* (Fig. 2).

Closely related to the common *A. sylvatica,* which is widely distributed in Europe.



Figs. 1—4. 1. *Alloneura lyneborgi* sp. n., ♀ paratype, ovipositor; 2. *A. sylvatica* Meigen, ♀ ovipositor; 3. *A. nigronitida* Collin, ♂, abdominal tergite 5 and segment 8, from above; 4. Same, segment 8, from behind, showing apical membraneous depression.

Alloneura nigritula Zetterstedt, 1844.

Material. — ALMERIA: Cabo de Gata, 0—50 m, 1 ♂, 24 March 1966; Rioja 10 km N, 200—500 m, 1 ♂, 12 March 1966. — GRANADA: Torrenueva E Motril, 0—50 m, 1 ♂ 1 ♀, 12—14 April 1966; Barranco de Miranda 8 km SW Orgiva, 300 m, 1 ♂ 1 ♀, 23 April 1966; Rio Guadalfeo, Orgiva, 300 m, 1 ♂ 1 ♀, 4 and 11 April 1966.

Distribution. — *A. nigritula* Zett. is widespread in Europe. I have taken it in Macedonia, and there are specimens in the Bri-

tish Museum from the Dolomites. Mr. J. E. Collin has seen specimens from Scandinavia.

Remarks. — ♂ ♀: Humeri yellow. ♂: Eyes touching for a fairly long distance, thorax absolutely without whitish grey dusting, abdominal segment 8 (pregenital) roundish, sternites clothed with brown, velvet-like pile.

♀: Tergites with dark hairs, frons brightly shining on upper part; front and mid femora without a ventral pair of short spines soon after base; claws small; ovipositor with piercer almost straight, considerably longer than base.

Alloneura sp. near **nigritula** Zetterstedt.

Material. — ALMERIA: Rioja 10 km N, 200—500 m, 1 ♀, 12 March 1966.

Remarks. — This single ♀ without antennae differs from *nigritula* in having the tibiae yellow apart from a black band at the middle, and tarsi entirely yellow; in *nigritula* the legs are entirely black apart from the more or less broadly yellow knees. The ovipositor is smaller than in *nigritula,* the base roundish instead of oval and the piercer shorter.

Alloneura nigronitida Collin, 1958.

Material. — ALMERIA: Alhama 5 km W, 200—500 m, 1 ♂, 28 March 1966. — GRANADA: Barranco de Miranda 8 km SW Orgiva, 300 m, 1 ♂, 20 April 1966; Mecina Bombarón, 800 m, 1 ♂, 8 May 1966.

Remarks. — Previously known from ♀ only, see above.

♂. As in the female, very distinct by reason of its shining black colour and black knobbed halteres. Eyes actually in contact for a distance greater than the length of the long narrow shining black vertex. Frons quite long, nearly twice as long as antennae, silvery as seen from above, but greyish from front view. Face silvery. Antennae silvery grey from most viewpoints, with quite long pointed whitish tip; arista long, black, considerably thickened for about basal quarter, then thread-like. Postocular orbits shining black, broadly silvery below as in female, but differing from that sex in also having a short narrow silvery strip against eyes towards vertex. Thorax shining black, rugulose, with a transverse prescutellar silvery patch as in female, but viewed from in front the anterior part appears greyish yellow dusted; humeri

very pale yellow as in female; scutellum shining black, rugulose, its base narrowly silvery. Pleurae scarcely dusted, rugulose, moderately shining. Tergites black, moderately shining; tergites 1 and 2 with a more or less narrow light band just after base, this appearing obscurely greyish from above, but distinct and silvery from in front; sublaterally, at least from front view, the tergites are slightly dusted brownish grey or grey; body hairs short, fine, scanty, brownish; abdominal segment 8 (pregenital) (Fig. 3) slightly less than half as long as tergite 5; the posteroventrally directed apical membraneous depression (Fig. 4) extending rather obliquely down from left to right, rather narrow, occupying considerably less than right half of segment. Legs black, obscurely and narrowly pale at knees, extensively shining; front and mid femora with a conspicuous silvery patch behind towards tip; hind femora with a posteroventral row of hairs, which become very long and more numerous towards tip; all tibiae appear extensively silvery from some angles; claws quite small, pulvilli pale yellow, about as long as last tarsal segment. Wings narrower and more pointed than in female. Halteres with brown stalk and black silver tinged knob. Wing length 3.5 mm.

Alloneura kuthyi Aczel, 1944.

Material. — GRANADA: N. slope Veleta, Sierra Nevada, 2800—3000 m, 1 ♂, 20 July 1960.

Distribution. — Central and South Europe, Great Britain.

Alloneura ?minima Becker, 1897.

Material. — GRANADA: N. slope Veleta, Sierra Nevada, 2400 m, 1 ♀, 30 July 1960.

Remarks. — The specimen is damaged and cannot be identified with certainty.

Eudorylas montium Becker, 1897.

Material. — ALMERIA: Alhama 5 km W, 200—500 m, 1 ♂, 17 March 1966. — GRANADA: Barranco de Miranda 8 km SW Orgiva, 300 m, 1 ♂, 16 April 1966.

Distribution. — Apart from three males from Germany, the only material that I have previously seen of *E. montium* Becker is from Great Britain, where it occurs from the Scottish Highlands southwards to Central England.

Summary

10 species of Pipunculidae collected in Southern Spain in 1960 and 1966 are listed. *Alloneura lyneborgi* sp. n. is described on both sexes, and the hitherto unknown male of *A. nigronitida* Collin, 1958, is described.

References.

Coe, R. L., 1966: Pipunculidae, in Handbooks for the Identification of British Insects. Vol. 10, part 2 (c). Royal Entom. Soc. London.

Collin, J. E., 1958: Pipunculidae collected by Mr. Ralph L. Coe in Yugoslavia in 1955, with descriptions of two new species. — Entomologists, 91 (No. 1139): 96—99.

Some Phoridae (Diptera) from Southern Spain and Majorca, with descriptions of two new species.

By
Charles N. Colyer, F.R.E.S., F.Z.S.
56 Lyonsdown Road, New Barnet, Herts., England.

The material from Southern Spain was collected in 1960 by Dr. J. R. Vockeroth and in 1966 by Dr. Leif Lyneborg and his associates, and is kept in the Canadian National Collection, Ottawa, and in the Zoological Museum, Copenhagen, respectively. These collections comprise 58 species, of which 18 have been previously recorded from Spain, and 40 are new to the Spanish list. The results of a short collecting trip by the author in Majorca in 1967 are also summarized. This material comprises 29 species, 14 of which are represented in the material from Southern Spain, 11 are previously recorded from Spain, and an additional 10 are new to the Spanish list, making 50 additions in all. Two species new to science occur in the combined material, one from Southern Spain and one from Majorca, and are described. The species listed, with a few exceptions, are widely represented in the Palaearctic Region, but it is particularly noteworthy that several northern mountain species, some occurring as far north as the Arctic Circle, and as far west as Greenland, are represented from the Sierra Nevada area.

The author is indebted to Dr. Leif Lyneborg of the Copenhagen Zoological Museum, and Dr. J. F. McAlpine of the Ottawa Entomology Research Institute, for the opportunity to study the material from Southern Spain.

1. SPECIES FROM SOUTHERN SPAIN

Megaselia (Aphiochaeta) affinis (Wood), 1909

Material. — ALMERIA: Almeria, 0—50 m, 1 ♂, 22 March 1966.

Distribution. — Europe. New to Spain.

Megaselia (Aphiochaeta) basispinata (Lundbeck), 1920

Material. — GRANADA: N. slope Veleta, Sierra Nevada, 2400 m, 1 ♂, 30 July 1960.

Distribution. — Europe, Canary Islands, Azores, Mexico, U.S.A. Previously recorded from Spain by Schmitz (1940, 1941).

Megaselia (Aphiochaeta) cirriventris Schmitz, 1929

Megaselia (Aphiochaeta) piliventris Schmitz, 1937, n.n. for *Megaselia (Aphiochaeta) pilifera* Schmitz, 1936, nec Brues, 1936.

Material. — GRANADA: Granada, 700 m, 1 ♂, 19 July 1960; N. slope Veleta, Sierra Nevada, 2550 m, 7 ♂, 25 July 1960.

Distribution. — Greenland, Swedish Lapland, Spain, Austria, Jugoslavia. Previously recorded from Spain by Schmitz (1958).

Megaselia (Aphiochaeta) hirticrus (Schmitz), 1918

Material. — GRANADA: N. slope Veleta, Sierra Nevada, 2800—3000 m, 1 ♂, 20 July 1960.

Distribution. — Europe. New to Spain.

Megaselia (Aphiochaeta) ignobilis (Schmitz), 1919

Material. — GRANADA: Maitena, 900 m, 1 ♂, 11 July 1960.

Distribution. — Finland, Holland, England. New to Spain.

Megaselia (Aphiochaeta) involuta (Wood), 1910

Material. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 1 ♂, 2 April 1966; Granada, 700 m, 1 ♂ 6 ♀, 19 July 1960; Maitena, 900 m, 1 ♂, 10 July 1960.

Distribution. — Europe. New to Spain.

Megaselia (Aphiochaeta) manicata (Wood), 1910

Megaselia (Aphiochaeta) evecta Schmitz, 1957.

Material. — ALMERIA: Almeria, 0—50 m, 1 ♂, 27 March 1966. — GRANADA: Rio Lanjaron 9 km NW Orgiva, 1600 m, 1 ♀, 15 April 1966; Granada, 700 m, 1 ♀, 9 July 1960; N. slope Veleta, Sierra Nevada, 2300—2550 m, 1 ♀, 22 July 1960.

Distribution. — Europe. New to Spain.

Megaselia (Aphiochaeta) nasoni (Malloch), 1914

Aphiochaeta coaequalis Schmitz, 1919.

Material. — GRANADA: Granada, 700 m, 3 ♀, 19 July 1960.

Distribution. — Europe, U.S.A. Previously recorded from Spain by Schmitz (1940, 1941).

Megaselia (Aphiochaeta) pusilla (Meigen), 1830

Phora clavipes Wood, 1910.

Material. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 3 ♂, 11—18 April 1966; Rio Lanjaron near Lanjaron, 600 m, 1 ♂, 26 April 1966; N. slope Veleta, Sierra Nevada, 2300—2550 m, 10 ♂ 1 ♀, 22—30 July 1960.

Distribution. — Europe, China, North Africa, U.S.A. New to Spain.

Megaselia (Aphiochaeta) sordida (Zetterstedt), 1838

Aphiochaeta alaskensis Malloch, 1919.
Aphiochaeta scaura Schmitz, 1921.

Material. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 1 ♀, 11 April 1966; N. slope Veleta, Sierra Nevada, 2200 m, 1 ♂ 4 ♀, 30 July 1960.

Distribution. — Europe, Iceland, Faroe Islands, Siberia, U.S.A. New to Spain.

Megaselia (Aphiochaeta) verralli (Wood), 1910

Material. —GRANADA: Rio Guadalfeo, Orgiva, 300 m, 1 ♂, 19 April 1966; Granada, 700 m, 3 ♂ 1 ♀, 19 July 1960.

Distribution. — Europe, Palestine. New to Spain.

Megaselia (Aphiochaeta) xanthozona (Strobl), 1892

Material. — GRANADA: Granada, 700 m, 1 ♂, 10 July 1960; Sierra Nevada Highway, 2800—3000 m, 1 ♀, 20 July 1960; N.slope Veleta, Sierra Nevada, 2300—3000 m, 1 ♂ 2 ♀, 20—22 July 1960.

Distribution. —Europe, Egypt, Tunis. Previously recorded from Spain, Schmitz (1940, 1941).

Megaselia (Megaselia) albicaudata (Wood), 1908

Material. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 1 ♂, 19 April 1966; Granada, 700 m, 1 ♀, 19 July 1960.

Distribution. — Europe, Canary Islands. New to Spain.

Megaselia (Megaselia) angusta (Wood), 1909

Material. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 1 ♂,

11 April 1966; Pampineira, 900 m, 1 ♀, 9 April 1966; N. slope Veleta, Sierra Nevada, 2300—2550 m, 1 ♀, 22 July 1960.

Distribution. — Europe, Russia. Previously recorded from Spain, Schmitz (1940, 1941).

Megaselia (Megaselia) angustina Schmitz, 1936

Material. — GRANADA: N. slope Veleta, Sierra Nevada, 2300—2550 m, 1 ♂, 22 July 1960.

Distribution. — Canary Islands, Madeira. New to Spain.

Megaselia (Megaselia) ardua Schmitz, 1940

Material. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 1 ♂, 2 April 1966; N. slope Veleta, Sierra Nevada, 2300—2550 m, 1 ♀, 22 July 1960.

Distribution. — Azores, Madeira. New to Spain.

Megaselia (Megaselia) arquata Schmitz, 1935

Material. — GRANADA: Rio Lanjaron near Lanjaron, 600 m, 1 ♂, 15 April 1966; Granada, 700 m, 1 ♀, 19 July 1960.

Distribution. — Germany (Berlin), Saar. New to Spain.

Megaselia (Megaselia) berndseni (Schmitz), 1919

Megaselia (Megaselia) rieli Schmitz, 1937.

Material. — GRANADA: N. slope Veleta, Sierra Nevada, 2800—3000 m, 1 ♂, 20 July 1960.

Distribution. — Europe. New to Spain.

Megaselia (Megaselia) brevicostalis (Wood), 1910

Aphiochaeta fuscopedunculata Malloch, 1912.
Megaselia (Megaselia) frequens Borgmeier, 1962.

Material. — GRANADA: Maitena, 900 m, 2 ♂ 1 ♀, 10—11 July 1960; N. slope Veleta, Sierra Nevada, 2300—2550 m, 1 ♂ 2 ♀, 22—26 July 1960; Sierra Nevada Highway, 1200 m, 1 ♀, 27 July 1960.

Distribution. — Europe, N. & S. America. Previously recorded from Spain, Schmitz (1940, 1941).

Megaselia (Megaselia) brevior (Schmitz), 1924

Material. — ALMERIA: Rioja, 50—200 m, 3 ♀, 1—26 April 1966.

Distribution. — Azores, Germany, Austria. New to Spain.

Megaselia (Megaselia) coaetanea Schmitz, 1929

Material. — GRANADA: Granada, 700 m, 1 ♂, 19 July 1960.
Distribution. — Finland, Austria. New to Spain.

Megaselia (Megaselia) collini (Wood), 1909

Material. — GRANADA: Granada, 700 m, 2 ♀, 19 July 1960.
Distribution. — Europe. New to Spain.

Megaselia (Megaselia) curvivenia Schmitz, 1928

Material. — GRANADA: Granada, 700 m, 7 ♀, 19 July 1960.
Distribution. — Finland, England. New to Spain.

Megaselia (Megaselia) devia Schmitz, 1936

Material. — GRANADA: Granada, 700 m, 1 ♂, 9 July 1960.
Distribution. — Holland. New to Spain.

Megaselia (Megaselia) flavicans Schmitz, 1935

Material. — GRANADA: Granada, 700 m, 2 ♂ 6 ♀, 19 July 1960.
Distribution. — Europe. New to Spain.

Megaselia (Megaselia) giraudii (Egger), 1862

Phora rata Wood, 1908.
Aphiochaeta dyari Malloch, 1912.

Material. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 2 ♂, 11 April 1966; Granada, 700 m, 5 ♂ 8 ♀, 9—19 July 1960.
Distribution. — Europe, Iceland, U.S.S.R. (Sakhalin), N. America. New to Spain.

Megaselia (Megaselia) halterata (Wood), 1910

Aphiochaeta plurispinosa Lundbeck, 1920.

Material. — ALMERIA: Almeria, 0—50 m, 2 ♂, 27 March 1966.
Distribution. — Europe, Azores, Egypt. Previously recorded from Spain, Schmitz (1940, 1941).

Megaselia (Megaselia) hybrida Schmitz, 1939

Material. — GRANADA: Granada, 700 m, 1 ♀, 19 July 1960; N. slope Veleta, Sierra Nevada, 2300—2550 m, 1 ♀, 22 July 1960.
Distribution. — Portugal. New to Spain.

Megaselia (Megaselia) intersecta Schmitz, 1935

Material. — ALMERIA: Almeria, 0—50 m, 1 ♀, 21—31 March 1966.

Distribution. — Palestine. New to Spain.

Megaselia (Megaselia) largifrontalis Schmitz, 1939

Material. — GRANADA: Granada, 700 m, 1 ♂ 1 ♀, 9—19 July 1960.

Distribution. — Europe. New to Spain.

Megaselia (Megaselia) longiseta (Wood), 1909

Material. — GRANADA: Granada, 700 m, 1 ♂ 3 ♀, 19 July 1960.

Distribution. — Europe. New to Spain.

Megaselia (Megaselia) melanocephala (v. Roser), 1840

Material. — GRANADA: Barranco de Miranda 8 km SW Orgiva, 300 m, 1 ♂, 16 April 1966; Rio Lanjaron near Lanjaron, 600 m, 1 ♀, 26 April 1966.

Distribution. — Europe, N. Africa (Tunis). Previously recorded from Spain, Schmitz (1940, 1941).

Megaselia (Megaselia) minor (Zetterstedt), 1848 — ssp. **politifrons** Schmitz, 1952

Material. — CADIZ: La Linea, 4 ♂ 6 ♀, 2 August 1960.

Distribution. — Europe, N. Africa (Tunis). New to Spain.

Megaselia (Megaselia) nigrescens (Wood), 1910

Material. — GRANADA: Granada, 700 m, 9 ♂ 13 ♀, 19 July 1960; Maitena, 900 m, 1 ♀, 11 July 1960; N. slope Veleta, Sierra Nevada, 1 ♀, 22 July 1960.

Distribution. — Europe. New to Spain.

Megaselia (Megaselia) pallidizona (Lundbeck), 1920

Material. — ALMERIA: Almeria, 0—50 m, 2 ♂, 22 March 1966.

Distribution. — Europe. New to Spain.

Megaselia (Megaselia) picta (Lehmann), 1822

Phora interrupta Zetterstedt, 1838.
Megaselia calaniensis Brues, 1936.

Material. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 1 ♀, 18 April 1966.

Distribution. — Europe, N. & S. America. New to Spain.

Megaselia (Megaselia) plurispinulosa (Zetterstedt), 1860

Phora giraudii auctt.
Aphiochaeta submeigeni Wood, 1914.

Material. — ALMERIA: Almeria, 0—50 m, 1 ♀, 21 March 1966; GRANADA: Granada, 700 m, 1 ♀, 19 July 1960.

Distribution. — Europe, Russia, China. Previously recorded from Spain, Schmitz (1940, 1941).

Megaselia (Megaselia) pygmaea (Zetterstedt), 1848

Phora brachyneura Egger, 1862.

Material. — GRANADA: Granada, 700 m, 1 ♀, 19 July 1960.

Distribution. — Europe. New to Spain.

Megaselia (Megaselia) pygmaeoides (Lundbeck), 1921

Material. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 1 ♀, 2 April 1966.

Distribution. — Europe, U.S.A. New to Spain.

Megaselia (Megaselia) rufipes (Meigen), 1804

Material. — ALMERIA: Almeria, 0—50 m, 1 ♀, 21—31 March 1966. — GRANADA: Granada, 700 m, 2 ♂, 10—19 July 1960.

Distribution. — World wide. Previously recorded from Spain, Schmitz (1940, 1941).

Megaselia (Megaselia) rupestris Schmitz, 1934

Material. — GRANADA: Granada, 700 m, 1 ♂ 1 ♀, 19 July 1960; Maitena, 900 m, 1 ♂ 2 ♀, 11 July 1960.

Distribution. — Austria. New to Spain.

Megaselia (Megaselia) scutellaris (Wood), 1909

Material. — GRANADA: Granada, 700 m, 1 ♀, 19 July 1960.

Distribution. — Europe, Russia. Previously recorded from Spain, Schmitz (1940, 1941).

Megaselia (Megaselia) spinicincta (Wood), 1910

Material. — GRANADA: Granada, 700 m, 4 ♂, 19 July 1960.

Distribution. — Europe. New to Spain.

Megaselia (Megaselia) subtumida (Wood), 1909

Material. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 1 ♂, 11 April 1966; Granada, 700 m, 1 ♂, 19 July 1960.

Distribution. — Europe. Previously recorded from Spain, Schmitz (1940, 1941).

Megaselia (Megaselia) sulphuripes (Meigen), 1830

Phora minutissima Wood, 1910.
Aphiochaeta fuscohalterata Schmitz, 1919.

Material. — GRANADA: Granada, 700 m, 1 ♂ 1 ♀, 19 July 1960.

Distribution. — Europe. New to Spain.

Megaselia (Megaselia) tarsalis (Wood), 1910

Material. — GRANADA: Maitena, 900 m, 1 ♀, 11 July 1960.

Distribution. — Europe. New to Spain.

Megaselia (Megaselia) tumida (Wood), 1909

Material. — GRANADA: Rio Lanjaron near Lanjaron, 600 m, 1 ♂, 26 April 1966; Pampineira, 900 m, 1 ♂, 9 April 1966.

Distribution. — Europe, Russia, N. Africa (Tunis). New to Spain.

Megaselia (Megaselia) verna Schmitz, 1932

Material. — GRANADA: Granada, 700 m, 1 ♂, 9 July 1960.

Distribution. — Europe. Previously recorded from Spain, Schmitz (1940, 1941).

Megaselia (Megaselia) villicauda Schmitz, 1927

Material. — GRANADA: Rio Lanjaron near Lanjaron, 600 m, 1 ♂, 26 April 1966.

Distribution. — Scotland, England, Silesia, Tyrol. New to Spain.

Metopina nevadae Schmitz, 1957

Material. — GRANADA: Granada, 700 m, 2 ♂, 14 July 1960.

Distribution. — Spain, previously recorded by Schmitz (1957). Also England, in the author's collection.

Borophaga femorata (Meigen), 1830

Material. — GRANADA: N. slope Veleta, Sierra Nevada, 2400 m, 1 ♀, 25 July 1960.

Distribution. — Europe, N. Africa (Algiers), U.S.S.R. (Sakhalin). Previously recorded from Spain, Schmitz (1940, 1941).

Conicera (Tritoconicera) fallens Schmitz, 1948

Material. — GRANADA: Granada, 700 m, 1 ♂, 19 July 1960.

Distribution. — Europe, U.S.A. New to Spain.

Diplonevra nitidula (Meigen), 1830

Material. — GRANADA: Rio Lanjaron near Lanjaron, 600 m, 1 ♀, 26 April 1966.

Distribution. — Europe, U.S.A., Canada. Previously recorded from Spain, Schmitz (1940, 1941).

Diplonevra pilosella Schmitz, 1927

Material. — GRANADA: Sierra Nevada Highway, 1650 m, 1 ♂, 27 July 1960.

Distribution. — Europe. New to Spain.

Phora aterrima (Fabricius), 1794

Material. — GRANADA: Pampineira, 900 m, 1 ♀, 9 April 1966; Sierra Nevada near Padul, 1300 m, 1 ♂, 4 May 1966.

Distribution. — Europe, N. Africa (Algiers), Russia, U.S.A. Previously recorded from Spain, Schmitz (1940, 1941).

Phora holosericea Schmitz, 1920

Material. — GRANADA: Maitena, 900 m, 1 ♂, 11 July 1960.

Distribution. — Europe, N. America. New to Spain.

Phora limpida Schmitz, 1935

Material. — GRANADA: Barranco de Miranda 8 km SW Orgiva, 300 m, 4 ♂, 20 April—5 May 1966.

Distribution. — France, Italy, Spain. Previously recorded from Spain, Schmitz (1940, 1941).

Spiniphora lyneborgi n. sp. (Figs. 1—4)

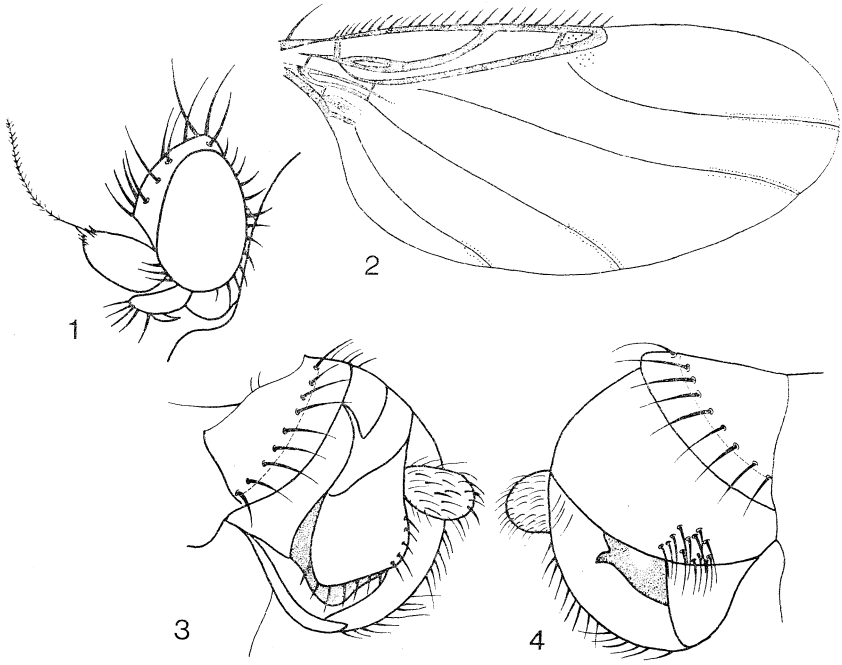
Material. — ALMERIA: Almeria, 0—50 m, 1 ♂ holotype, 22 March 1966. In Zoological Museum, Copenhagen, Denmark.

Description. Holotype, male. — Frons much wider than high (about 5:3), black with greyish-white dusting, dull, with reddish areas from the insertions of l_2 to l_3 widening posteriorly. The thinly scattered fine hairs only clearly evident at the anterior part of the frons. The row of bristles l_1, po, po, l_1 strongly convex posteriorly. Frons strongly produced between the foveae, on the middle line about $^7/_8$ths of the width of the frons. Third antennal segment (Fig. 1) large, lemon-shaped, basally clear reddish, darkened at the upper edge, and over the apical half; longer than half the height of the eye; antennal foveae deeply recessed, ex-

tending upward for rather more than half the height of the eye. Arista as long as the width of the frons, dorsally inserted near the apex, and clearly pubescent. Palpi (Fig. 1) yellow, about $^2/_3$rds of the length of the third antennal segment, the greatest width about one third of the length of the palp; with five moderately strong black bristles of approximately equal length.

Thorax, including the scutellum, greyish-black, dull, the fine pubescence black; two pairs of dorsocentrals; the pleura somewhat brownish and less dull; a paler brownish-yellow patch around the anterior spiracle. Scutellar bristles strong, a little unequal, the anterior pair slightly shorter than the middle pair.

Abdomen narrowed posteriorly, blackish, dull. Tergites with pale greyish-white to yellowish hindmarginal seams; on I widened at the middle, on II—V narrow, on VI wider overall, and in the middle about as wide as 1/5th of the length of the tergite. Tergite I also with an anterior pale narrow seam. A row of long bristles at the lateral margins of tergite II and on the hind margin of VI,



Figs. 1—4. *Spiniphora lyneborgi* n. sp., holotype ♂. — 1. Head in profile; 2. Wing; 3. Hypopygium, left; 4. Hypopygium, right.

the latter at the sides more than half as long as the tergite. Venter greyish-black. Hypopygium (Figs. 3 & 4) paler than the abdomen, brownish-grey to reddish, the claspers paler. Anal tube short, reddish-yellow.

Legs greyish-brown, the fore coxae a little paler; t_1 with an anterodorsal bristle just above the middle; t_2 with the usual anterior and dorsal near the base, and an anteroventral at the apical fourth; and one long ventral spur; t_3 with an anterior at the basal third, an anteroventral at the middle, an anterior subapically, a long ventral and posteroventral spur; and one of the end-comb bristles posteriorly somewhat elongated to give the impression of a tiny posterior spur. The bristle s_3 of Schmitz (1941) is wanting.

Wings (Fig. 2) faintly greyish-tinged, with a very faint suggestion of a darker area in and just posterior to the fork. Costal index 0.55. Ratios of costal segments 40:23:12. Angle at fork relatively large, the anterior branch joining the costa at a fairly steep angle, and much shorter than the posterior branch. Costal cilia fairly short. Fourth vein arising just beyond the fork, origin obscured, and no indication of an S-curve; well curved in the first part, thereafter more or less straight and only slightly divergent from the fifth vein. Halteres pale.

Length, 2¼ mm.

Remarks. — In Schmitz' (1941) key, *lyneborgi* n. sp. would run down to Couplet No. 5. containing the Mediterranean species *brevipalpis* Schmitz, *punctipennis* Zetterstedt, and *signata* Schmitz, from all of which it differs, *inter alia,* in the relative size and shape of the palpi, the relative positions of the praeocellars and anterolaterals, and the characters of the hypopygium.

2. SPECIES FROM MAJORCA

Megaselia (Aphiochaeta) basispinata (Lundbeck), 1920

Material. — Formentor, 1 ♂, 6 May 1967.

Distribution. — Europe, Canary Islands, Azores, Mexico, U.S.A. Recorded from Southern Spain.

Megaselia (Aphiochaeta) brevipes (Lundbeck), 1920

Material. — Cala san Vicente, 1 ♂, 13 May 1967; Formentor, 2 ♂, 15 May 1967.

Distribution. — Denmark. New to Spain.

Megaselia (Aphiochaeta) involuta (Wood), 1910

Material. — Cala san Vicente, 1 ♀, 13 May 1967; Formentor, 2 ♀, 8—16 May 1967; Puerto de Pollensa, 2 ♂ 8 ♀, 7—17 May 1967.

Distribution. — Europe. Recorded from Southern Spain.

Megaselia (Aphiochaeta) manicata (Wood), 1910

Material. — Formentor, 2 ♂, 15—16 May 1967; Puerto de Pollensa, 2 ♂, 10—14 May 1967.

Distribution. — Europe. Recorded from Southern Spain.

Megaselia (Aphiochaeta) pleuralis (Wood), 1909

Material. — Lluc, 1500 m, 1 ♂, 11 May 1967.

Distribution. — Europe, Azores, Madeira, Canary Islands, China, U.S.S.R. (Sakhalin), Iceland, N. America. New to Spain.

Megaselia (Aphiochaeta) stichata (Lundbeck), 1920

Material. — Formentor, 1 ♂, 8 May 1967.

Distribution. — Europe, Faroe Islands, Canary Islands. New to Spain.

Megaselia (Aphiochaeta) xanthozona (Strobl), 1892

Material. — Cala san Vicente, 3 ♂ 1 ♀, 13 May 1967; Formentor, 4 ♂ 7 ♀, 8—16 May 1967; Puerto de Pollensa, 29 ♂, 17 ♀, 7—18 May 1967, Cala Boca, 1 ♂ 1 ♀, 9 May 1967; Lluc, 1500 m, 1 ♂, 11 May 1967; Porto Cristo, 1 ♀, 12 May 1967.

Distribution. — Europe, Egypt, N. Africa (Tunis). Recorded from Southern Spain.

Megaselia (Megaselia) brevicostalis (Wood), 1910

Material. — Formentor, 1 ♀, 6 May 1967; Puerto de Pollensa, 2 ♀, 10 May 1967.

Distribution. — Europe, N. & S. America. Recorded from Southern Spain.

Megaselia (Megaselia) discreta (Wood), 1909

Material. — Formentor, 1 ♀, 8 May 1967.

Distribution. — Europe. New to Spain.

Megaselia (Megaselia) giraudii (Egger), 1862

Material. — Cala san Vicente, 2 ♂ 3 ♀, 13 May 1967; Formentor, 1 ♂, 16 May 1967; Puerto de Pollensa, 1 ♀, 14 May 1967; Porto Cristo, 1 ♀, 12 May 1967.

Distribution. — Europe, Iceland, U.S.S.R. (Sakhalin), N. America. Recorded from Southern Spain.

Megaselia (Megaselia) halterata (Wood), 1910

Material. — Formentor, 3 ♂ 1 ♀, 8—15 May 1967; Puerto de Pollensa, 2 ♂, 10—14 May 1967.

Distribution. — Europe, Azores, Egypt. Recorded from Southern Spain.

Megaselia (Megaselia) hilaris Schmitz, 1927

Material. — Puerto de Pollensa, 1 ♂, 7 May 1967.

Distribution. — Europe. New to Spain.

Megaselia (Megaselia) impolluta (Schmitz), 1920

Megaselia (Megaselia) engelberti Schmitz, 1936.

Material. — Formentor, 1 ♀, 15 May 1967.

Distribution. — Europe, Russia. Previously recorded from Spain, Schmitz (1940, 1941).

Megaselia (Megaselia) lata (Wood), 1910

Material. — Puerto de Pollensa, 1 ♀, 7 May 1967.

Distribution. — Europe, Madeira. New to Spain.

Megaselia (Megaselia) nigra (Meigen), 1830

Phora albidohalteris Felt, 1896.
Phora derasa Wood, 1909.

Material. — Formentor, 1 ♀, 16 May 1967.

Distribution. — Europe, Azores, Canary Islands, Madeira, Faroe Islands, Russia, U.S.A. Previously recorded from Spain, Schmitz (1940, 1941).

Megaselia (Megaselia) pygmaea (Zetterstedt), 1848

Material. — Formentor, 1 ♂, 16 May 1967; Puerto de Pollensa, 3 ♂, 6 May 1967.

Distribution. — Europe. Recorded from Southern Spain.

Megaselia (Megaselia) pygmaeoides (Lundbeck), 1921

Material. — Puerto de Pollensa, 2 ♀, 7—14 May 1967.

Distribution. — Europe, U.S.A. Recorded from Southern Spain.

Megaselia (Megaselia) rufipes (Meigen), 1804

Material. — Formentor, 1 ♂, 15 May 1967; Puerto de Pollensa, 2 ♂ 2 ♀, 6—18 May 1967.

Distribution. — World wide. Recorded from Southern Spain.

Megaselia (Megaselia) scutellariformis (Schmitz), 1925

Material. — Formentor, 2 ♂ 1 ♀, 15 May 1967.

Distribution. — Europe. Previously recorded from Spain, Schmitz (1940, 1941).

Megaselia (Megaselia) spinicincta (Wood), 1910

Material. — Formentor, 1 ♀, 8 May 1967.

Distribution. — Europe. Recorded from Southern Spain.

Megaselia (Megaselia) sulphuripes (Meigen), 1830

Material. — Formentor, 3 ♂, 15 May 1967.

Distribution. — Europe. Recorded from Southern Spain.

Megaselia (Megaselia) sylvatica (Wood), 1910

Material. — Formentor, 2 ♀, 8—15 May 1967; Puerto de Pollensa, 1 ♂, 17 May 1967.

Distribution. — England, Portugal, Germany. New to Spain.

Megaselia (Megaselia) tarsalis (Wood), 1910

Material. — Formentor, 1 ♂ 4 ♀, 15 May 1967.

Distribution. — Europe. Recorded from Southern Spain.

Megaselia (Megaselia) tenebricola Schmitz, 1934

Material. — Puerto de Pollensa, 1 ♀, 7 May 1967.

Distribution. — England, Ireland, Belgium, Carinthia, Silesia. New to Spain.

Megaselia (Megaselia) verna Schmitz, 1932

Material. — Formentor, 1 ♀, 8 May 1967; Lluc, 1500 m, 2 ♀, 10 May 1966.

Distribution. — Europe. Recorded from Southern Spain.

Plastophora balearica n. sp. (Fig. 5)

Material. — Formentor, 1 ♀ holotype, 8 May 1967. In the author's collection.

Holotype, female. — Frons higher, at the middle line, than broad (about 6:5), black with faint greyish dusting and a weak shine; the fine hairs thickly distributed, somewhat thicker in the area of the supra-antennals. Frontal bristles, except the supra-antennals, very robust; antials set very much below the antero-laterals, and nearer to the upper supra-antennals, about midway

between the eye-margin and the middle line; antero-laterals near the eye-margin and much nearer to the anterior margin of the frons than to the medio-laterals. Supra-antennals very weak, the upper less than half the length of the antials, and much less stout; much closer together than the praeocellars; the lower minute, less than half the length of the upper, and a little closer together. Ocellar triangle somewhat raised. Antennae small, globose, dark brown; arista barely longer than the height of the frons at the median line, almost bare. Palpi short-oval, not much longer than wide (about 5:4), greyish-yellow, with five short, stout bristles, the longest, at the apex, barely longer than the width of the palp.

Thorax and dorsal pubescence black, shining; pleura dull greyish-black, except for shining areas on the lower half of the mesopleura, and most of the sternopleura. Mesopleura bare. Scutellum dull, greyish-black; two robust inner scutellar bristles and two outer fine hairs, about one quarter of the length of the inner bristles.

Abdomen dull greyish-black, with only a very faint suggestion of a shine on the posterior tergites; almost devoid of fine hairs, these only visible at the sides and ends of the hind margins of the tergites. Venter black. Tergites I—IV with a paler, brownish, hind-marginal seam. Tergites II and IV somewhat longer than III, V somewhat longer still, and VI about twice as long as IV, trapezoid, about half as wide at the posterior margin as at the anterior; VII membranous, brownish, dull; Segment VIII, long-tubular, with a narrow parallel-sided, chitinised, somewhat shining, tergite, and the ventral part with shining, chitinised, longitudinal strips; IX withdrawn, the apex dull black; cerci small, black, with a long apical hair.

Legs; fore coxae yellowish, femora, tibiae and tarsi smoky brown; tibiae with a row of clearly visible posterodorsal setulae; all segments of tarsi longer than wide, the apical the narrowest. Mid coxae dull greyish-black, femora, tibiae and tarsi blackish-brown; tibiae with a row of about 8 strong posterodorsal cilia, anterior hairs shaggy and erect, the anterodorsal rather stronger, setula-like. Hind coxae and legs shining with a fatty gloss, black, only the trochanters and extreme base of femora paler, brownish-yellow; femora very dilated, maximum width about three-eighths of the length, dorsal edge greatly curved, the ventral edge somewhat less; femora with 8—9 moderately long, strong basiventral

hairs, posteriorly curved and extending somewhat beyond the middle. Hind tibiae stout, well arched, the dorsal seam evenly curved; ten moderately long, strong posterodorsal cilia, of which three or four in the middle third rather longer than the remainder; metatarsus and two succeeding segments stout.

Wings (Fig. 5) narrow, maximum width to length about 2:5; heavily tinged with brownish-grey; veins brownish-grey, the thin veins well pigmented. Costal index 0.42—3; ratios of segments 26:15:10, i.e. 1 almost equal to 2 + 3; costal cilia short (0.061 mm), about 22—23 from humeral cross-vein onward, of which

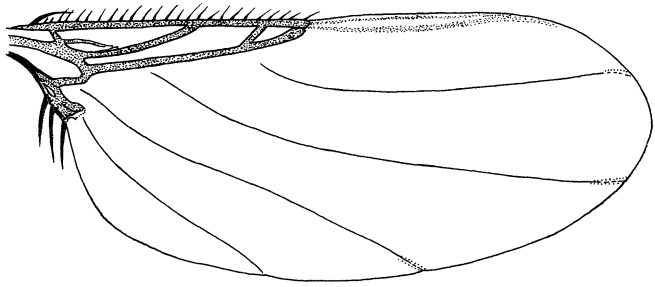


Fig. 5. *Plastophora balearica* n. sp., holotype, ♀, wing.

10 on 2 + 3. Fork somewhat acute, and longish, the outer branch barely curved. Vein 4 obliterated at origin, evenly curved throughout. Halteres black, but with pale yellowish margin and base, the peduncle dark dorsally and yellowish ventrally.

Length 1.8 mm.

The holotype was taken by the author, sweeping beneath pines close to the sea.

Remarks. — The new species shows very close affinities with *Megaselia (Megaselia) oblongifrons* Schmitz (1939), a species of the *angustifrons-minor* group, but with dark halteres. Schmitz, in his description of the female, states "Terminalia wahrscheinlich normal, aber kurz, bei der Holotype fast ganz eingezogen", and makes no special comment about his probable male, so it is reasonable to assume that *oblongifrons* has been correctly assigned to *Megaselia*; whereas in the new species the ovipositor is clearly of the *Plastophora*-type, and it can be assumed that the male, when it is eventually recognised, will generally conform to the generic concept as outlined by the present writer (Colyer, 1957). The

species also differs from *oblongifrons* in its shorter costa, the relatively different location of the anterolaterals, the different relative lengths of the abdominal tergites, the greater number of basiventral hairs of f_3, the more darkly tinged wings, and the greater number of costal cilia. Nevertheless the superficial resemblance is striking.

Since the publication of my key to world species of *Plastophora* (Colyer, 1957, *loc.cit.),* which dealt with some 17 species, a further 30 are now known to me, which, with the exception of one species I have not yet described, have been added to the list by Borgmeier, Beyer and myself. Of all these, the new species, *balearica,* comes nearest to *afra* Beyer (1959) which is a reddish-yellow species from Angola, Africa; (Beyer links *afra,* in his description, with *furcilla* Schmitz, 1956, and *elongata* (Wood), 1914, the latter evidently a *lapsus calami;* he clearly must have intended *emarginata* (Wood), 1908). From *afra* the new species differs, apart from the striking disparity in general coloration, by the closely-set upper supra-antennals, the relative position of the antials, dark antennae, shorter arista, oval shape of the palpi, stronger posterodorsal cilia of t_3, darker wings, longer fork of vein 3, dark halteres, and the relative length of the abdominal tergites, especially VI.

Borgmeier (1963) considers that a satisfactory definition of the generic boundaries of *Plastophora* will not be possible until fresh material of the genotype *beirne* Brues, 1905, is forthcoming, the type material having been lost in the Hungarian revolution; and in this I quite follow him.

Phora aterrima (Fabricius), 1794

Material. — Cala san Vicente, 1 ♀, 13 May 1967.

Distribution. — Europe, N. Africa (Algiers), Russia, U.S.A. Recorded from Southern Spain.

Phora limpida Schmitz, 1935

Material. — Porto Cristo, 1 ♂, 12 May 1967.

Distribution. — France, Italy, Spain. Recorded from Southern Spain.

Spiniphora bergenstammi (Mik), 1864

Phora domestica Wood, 1906.

Material. — Puerto de Pollensa, 1 ♂, 14 May 1967.

Distribution. — Europe, Egypt, U.S.A., Uruguay. New to Spain.

Summary

58 species of Phoridae are listed from Southern Spain and 29 species from Majorca. A total of 50 species are new to the Spanish list. *Spiniphora lyneborgi* n. sp. from Almeria and *Plastophora balearica* n. sp. from Majorca are described.

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Some Micropezidae, Psilidae, Platystomidae, Otitidae, Pallopteridae, Odiniidae, Aulacigasteridae, Asteiidae and Milichiidae (Diptera) collected in Southern Spain, with descriptions of six new species.

By
Leif Lyneborg
Zoological Museum, Copenhagen, Denmark.

The material on which the present paper is based was mainly collected by the author and his assistants in March—May 1966 in the provinces Almeria and Granada, Spain. A few specimens were collected by Dr. W. Hackman, Helsinki in the same period. Further a valuable collection made by Dr. J. R. Vockeroth in July—August 1960 has been included. 29 species are listed below. Of these, 6 are described as new to science, and further 6 are recorded from Spain for the first time. The major part of the 1966-material is deposited in the Zoological Museum, Copenhagen; the specimens collected by W. Hackman yet in the Zoological Museum, Helsinki, and the specimens collected in 1960 by J. R. Vockeroth in the Canadian National Collection, Ottawa.

MICROPEZIDAE

Micropeza corrigiolata Linné, 1776.

Material. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 5 ♂ 5 ♀, 2—21 April 1966.

Distribution. — Widely distributed in Europe. Earlier recorded from Spain by Strobl (1906: 361) and Czerny & Strobl (1909:261).

Paracalobata octoannulata Strobl, 1899.

Material. — GRANADA: Rio Lanjaron near Lanjaron, 600 m, 5 ♂ 2 ♀, 26—28 April 1966; Rio Lanjaron 9 km NW Orgiva, 1600 m, 1 ♀, 7 May 1966.

Distribution. — Described on basis of 2 ♂ 2 ♀ collected by Strobl in 1898 near Lanjaron (Strobl, 1898: 294). This is, so far, the only known locality for the species.

PSILIDAE

Psila nigricornis Meigen, 1826.

Material. — ALMERIA: Alhama 5 km W, 200—500 m, 1 ♂, 28 March 1966. — GRANADA: Rio Lanjaron 9 km NW Orgiva, 1600 m, 1 ♂, 7 May 1966.

Distribution. — Widely distributed in Europe; also in North Africa. Recorded from Spain by Strobl (1899: 229; 1906: 362) and Czerny & Strobl (1909: 262).

Remarks. — Most of the females recorded below as *Psila* spp. certainly belong to *nigricornis* Meig. The genitalia of both males agree with the figure by Lyneborg (1964: 379).

Psila sardoa Rondani, 1876.

Material. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 1 ♂ 1 ♀, 2—3 April 1966.

Distribution. — Sardinia, Spain, France, Italy, Tunesia.

Remarks. — The two specimens are conspecific with *schineri* Strobl (1906: 361) which was described on Spanish material. Hennig (1941: 24) treated it as a synonym to *sardoa* Rond. without having seen Rondani's types.

Psila spp., of **rosae-nigricornis**-group.

Material. — ALMERIA: Alhama 5 km W, 200—500 m, 4 ♀, 17 March 1966 (also W. Hackman) — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 4 ♀, 5—19 April 1966.

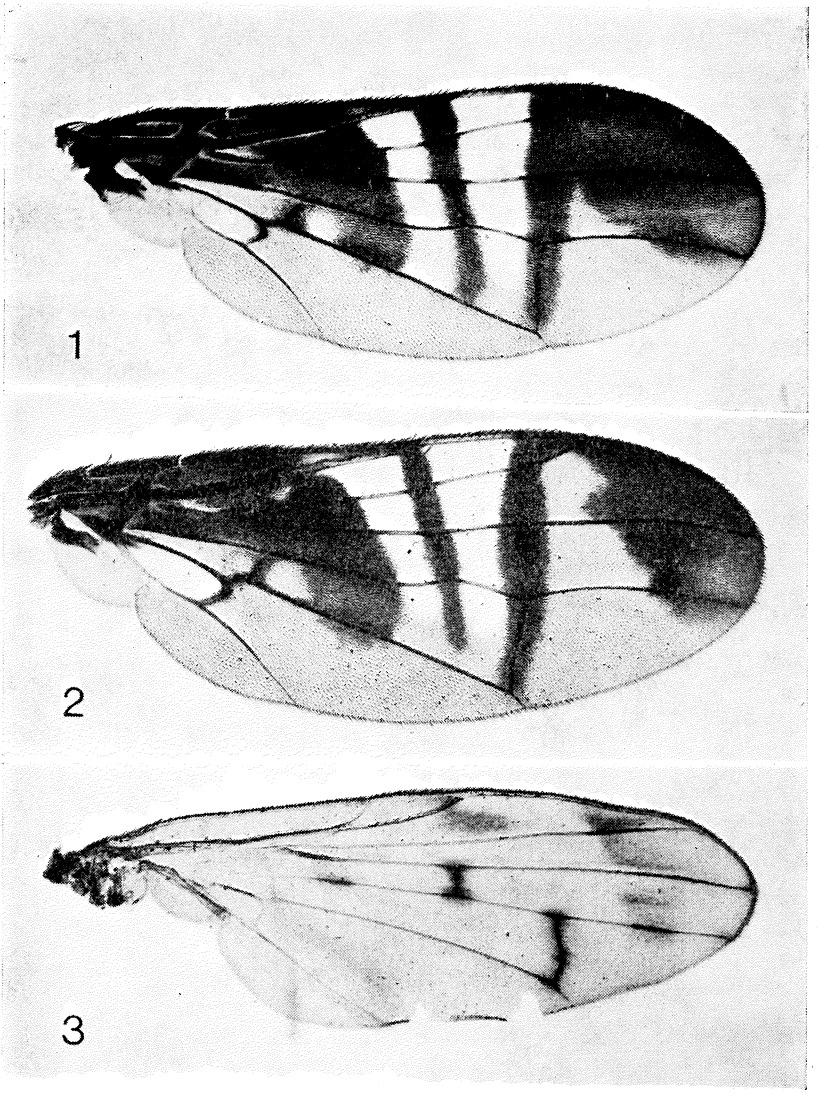
PLATYSTOMIDAE

Rivellia hispanica n. sp. (Figs. 1—2 and 7—9).

Material. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 1 ♂ holotype, 4 April 1966, and 8 ♂, 5 ♀ paratypes, same locality, 4 April—3 May 1966; Rio Lanjaron near Lanjaron, 600 m, 2 ♂ paratypes, 28 April 1966. All types in Zoological Museum, Copenhagen.

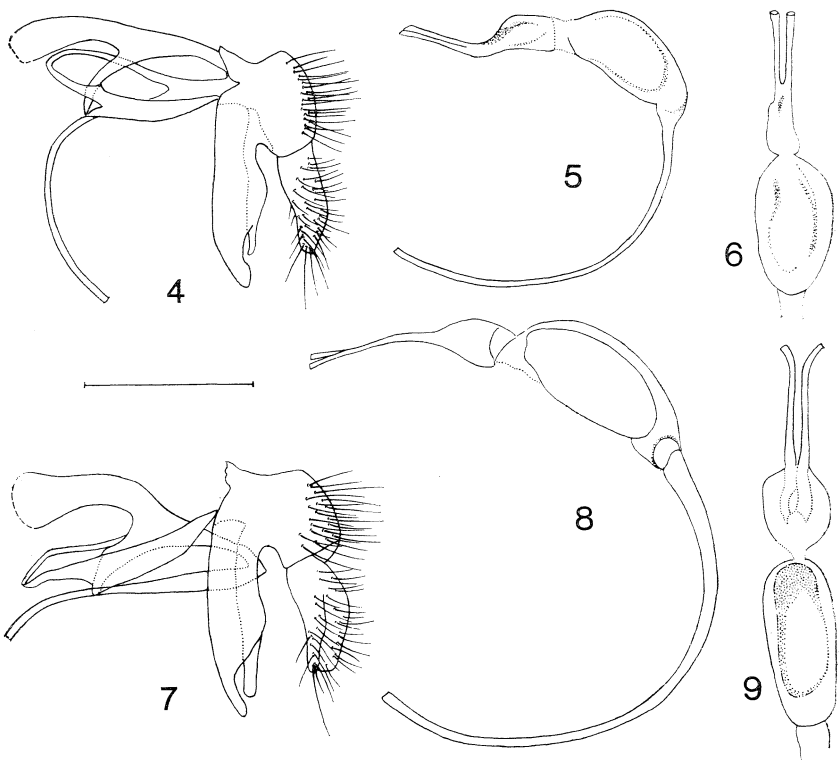
Description. Holotype, male.

A species which resembles the common and hitherto single European species of this genus: *syngenesiae* Fabricius, 1781, but



Figs. 1—3. Wings of 1. *Rivellia hispanica* n. sp., ♂ paratype, Spain, Granada: Rio Guadalfeo, Orgiva, 4 April 1966. ×35; 2. *R. hispanica* n. sp., ♀ paratype, same locality, 5 April 1966. ×35; 3. *Hypochra albufera* n. sp., ♂ paratype, Spain, Almeria: Albufera, 29 March 1966. ×24.

differs from this in coloration of wings and tarsi, and in the genitalia. Both species agree closely with the diagnosis given by Namba (1956: 24—25) of *Rivellia* R.-D. In the following, *hispanica* will be compared with *syngenesiae,* the latter being known to the present author by Danish material and by a series of 7 ♂ and 21 ♀ collected by Dr. J. R. Vockeroth on 6th July 1960 at Irun in North Spain. On the head, thorax and abdomen there are no real differences between the two species, neither in morphology nor in coloration. There is perhaps a small difference in the coloration of second and third antennal joints, these being paler (more yellowish on second and inner side of third joint) in *hispanica* than in *syngenesiae.* The best distinguishing character lies in the



Figs. 4—9. Male genitalia of 4—6. *Rivellia syngenesiae* F., N. Spain: Irun, 6 July 1960; 7—9. *Rivellia hispanica* n. sp., ♂ paratype, Spain, Granada: Rio Guadalfeo, Orgiva, 4 April 1966. Figs. 4 and 7 show the genitalia in lateral view; 5 and 8 the aedeagus in lateral view; and 6 and 9 the apex of the aedeagus in dorsal view. Scale: 0.25 mm.

coloration of the wings. In the male of *hispanica* (Fig. 1) the brownish area at base of wing (first band of Namba, l.c.) is larger, and terminates in a broad band over the basal end of discal cell, this part being narrower in *syngenesiae*. The band over posterior cross-vein (m-m) (third band of Namba, l.c.) is broadly confluent with the spot at apex of wing, leaving the entire apical end of cell R_{2+3} brownish. In *syngenesiae* this band is widely separated from the apical spot, i.e. a large hyaline area is present in cell R_{2+3} between the band and the spot.

The genitalia are clearly different in the two species (cf. figs. 4—6 and figs. 7—9), the main differences being found in the appendages to ninth tergite (Figs. 4 and 7) and in the apex (glans) of the aedeagus (Figs. 5—6 and 8—9). There is also a marked difference in coloration of the tarsi. In *hispanica* all tarsal joints are yellowish, only the two terminal joints are slightly darkened. *Syngenesiae* has the tarsi predominately blackish, at most metatarsi of p_2 and p_3 somewhat yellowish.

Paratypes, males. All male paratypes agree with the holotype in the above mentioned features. Some of them show a tendency to a small hyaline area below end of vein r_{2+3}, sometimes more in the one wing than in the other. One of the paratypes from Rio Lanjaron has a rather large hyaline area here, reaching from vein r_{2+3} to vein r_{4+5} and half as wide as the width of the third band. This third band is yet still distinctly connected with the apical spot along the costa. The coloration of the tarsi may also vary, as in some specimens more than the two terminal joints can be darkened, but in all specimens the metatarsi of all legs are clearly yellowish.

Paratypes, females. Similar to male in most respects, but with an interesting sexual difference in the coloration of the wings, which is normally not found in the genus. The female wing (Fig. 2) has large hyaline areas in cells R_{2+3} and R_{4+5}, separating the third band from the apical spot, though these coloured areas are still in connection along the costa. All five female paratypes show this feature.

Remarks. As demonstrated above, both *hispanica* and *syngenesiae* occur in Spain. Earlier records from Spain of *syngenesiae*: (Strobl, 1899: 226), (Strobl, 1906: 355), (Czerny & Strobl, 1909: 251) must then be taken with reservation, until the original material has been revised. Dr. G. Morge, Eberswalde, has kindly in-

formed me (in litt. 5th February 1968) that Spanish specimens of *syngenesiae* F. are not present in Coll. Strobl in Admont, Austria.

OTITIDAE (incl. ULIDIIDAE)

Otites maculipennis Latreille, 1811.

Material. — GRANADA: Sierra de Contraviesa near Rabite, 1300 m, 1 ♂, 2 May 1966; Pinus Puente 15 km NW Granada, 500—1000 m, 1 ♀, 27 April 1966.

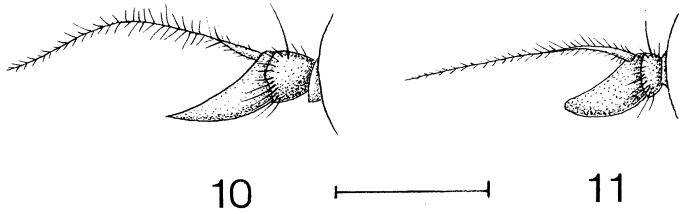
Distribution. — Spain, S. France, Italy. Recorded from Spain by Strobl (1906: 355), and Czerny & Strobl (1909: 249) as *Ortalis aspersa* Loew. Further localities by Hennig (1949: 34).

Hypochra albufera n. sp. (Figs. 3 and 10).

Material. — ALMERIA: Albufera, 0—50 m, 1 ♂ holotype, 8 March 1966; same locality, 12 ♂ 4 ♀ paratypes, 8—29 March 1966 (also W. Hackman). — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 1 ♂ paratype, 19 April 1966. Holotype and 15 paratypes in Zoological Museum, Copenhagen. One male paratype in Zoological Museum, Helsinki. One male paratype in Deutsches Entomologisches Institut, Eberswalde.

Description. — Holotype, male.

Head. Gena exactly one-third of height of eye. One distinct orbital seta and in front of this, one shorter seta. Third antennal joint ending in a sharp point, and arista with comparatively long hairs (fig. 10). Head totally yellowish; occiput with slight whitish dust which also surrounds the eye in a narrow band. Mouth-parts yellow. Antennae yellowish-brown. Thorax uniformly pale yellowish-grey, humeri and scutellum yellowish translucent. Only two pairs of long dorsocentral setae; the hairs in front of these being



Figs. 10—11. Antennae of 10. *Hypochra albufera* n. sp., ♂ holotype, Spain, Almeria: Albufera, 8 March 1966; 11. *H. albipennis* Loew. Scale: 0.5 mm.

not much longer than the adjacent thoracic hairs. Acrostical hairs in six irregular rows; a prescutellar pair of acrostical setae is not present. Only one long supraalar seta. Abdomen of same colour as thorax; no darker bands. Legs entirely yellowish. Wing as in fig. 3. Halteres whitish. Length. Total: 4.1 mm.

The thirteen male paratypes agree with the holotype in all essential characters. Instead of one short additional orbital seta some specimens show two short setae, either on one or on both sides. Three paratypes also have a small (but distinctly longer then normal hairs) anterior supraalar seta present on one or both sides. Length. Total: 3.5—4.5 mm. Average: 4.1 mm.

Female. Agrees with the male in all characters mentioned above. A little larger: 4.0—4.8 mm (without ovipositor).

Remarks. This new species of *Hypochra* can only be compared with *albipennis* Loew, 1846, and *subappenina* Rondani, 1869. Through the kindness of Dr. Morge of the Deutsches Entomologisches Institut in Eberswalde I was able to compare it with good series of these two species. *H. albufera* differs from both species in having a yellowish-grey (not dark greyish) appearance, and in having all setae comparatively shorter. It has like *albipennis* only two pairs of distinct dc setae, but differs from that species in the absence of a pair of prescutellar setae and in having a more pointed third antennal joint (cf. figs. 10 and 11). *H. albufera* is also distinctly larger than *albipennis,* being of about intermediate size between this species and *subappenina.* The latter can be easily separated from *albufera* in having additional shorter dc setae in front of the two pairs of long dc setae, and shows like *albipennis* a distinct pair of prescutellar setae. Moreover, there are differences in wing-pattern (cf. fig. 3 with Taf.III, figs. 35—36 in Hennig, 1939).

Ceroxys urticae Linné, 1758.

Material. — ALMERIA: Albufera, 0—50 m, 1 ♀, 23 March 1966.

Distribution. — Widely distributed in Europe. Also West and Central Asia, Egypt. Not earlier recorded from Spain.

Remarks. — The specimen agrees well with North European specimens. The only difference is that tergite 4 has a transverse greyish band. In North European specimens there are two well separated lateral spots on this tergite.

Myennis octopunctata Coquebert, 1798.

Material. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 3 ♂, 11 April — 3 May 1966.

Distribution. — Central and South Europe, Asia. New to Spain.

Ulidia apicalis Meigen, 1826.

Material. — GRANADA: Barranco de Miranda 8 km SW Orgiva, 300 m, 1 ♂, 21 April 1966; Sierra de Contraviesa near Rabite, 1300 m, 11 ♂ 9 ♀, 2 May 1966; Guadix 20 km E, 1000—1500 m, 1 ♀, 23 April 1966 (W. Hackman); N. slope Veleta, Sierra Nevada, 2200 m, 1 ♀, 30 July 1960 (J. R. Vockeroth).

Distribution. — Spain, Portugal, S. France, Corse, Sicily, Tunesia, Morocco. Earlier records from Spain are summarized by Hennig (1940: 14).

Physiphora demandata Fabricius, 1798.

Material. — ALMERIA, 1 ♂ 1 ♀, 21 April 1966 (W. Hackman). — GRANADA: Torrenueva E Motril, 0—50 m, 2 ♂, 12—17 April 1966; Rio Guadalfeo, Orgiva, 300 m, 2 ♂ 3 ♀, 2—18 April 1966; Rio Lanjaron near Lanjaron, 600 m, 1 ♀, 28 April 1966; Granada, 700 m, 5 ♂ 1 ♀, 10—13 July 1960 (J. R. Vockeroth); Iznalloz, 1 ♂ 1 ♀, 9 July 1960 (J. R. Vockeroth); Almunecar, 0—30 m, 1 ♂ 1 ♀, 16 July 1960 (J. R. Vockeroth). — GIBRALTAR: 1 ♂, 4 August 1960 (J. R. Vockeroth).

Distribution. — Europe, Asia, Africa, North America. Encobet (1912: 92) summarizes the distribution in Spain.

PALLOPTERIDAE

Palloptera muliebris Harris, 1782.

Material. — GRANADA: Rambla de Aculas 10 km E Orgiva, 400 m, 1 ♀, 27 April 1966; Rio Lanjaron near Lanjaron, 600 m, 4 ♂ 6 ♀, 28 April 1966; Granada, 700 m, 3 ♂ 5 ♀, 10—19 July 1960 (J. R. Vockeroth).

Distribution. — Europe, mainly in the southern parts.

Palloptera scutellata Macquart, 1835.

Material. — GRANADA: Rio Lanjaron 9 km NW Orgiva, 1600 m, 2 ♀, 6 April 1966.

Distribution. — England, France, Spain. Rare.

Remarks. — The specimens were kindly identified by Dr. G. Morge, Eberswalde.

ODINIIDAE

Odinia sp.

Material. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 1 ♂, 11 April 1966.

Remarks. — The specimen does not exactly fit any of the descriptions given by Collin (1952) in his paper on the European species of *Odinia*. In this paper he recognized six species and one variety of which four species and the variety were described as new. The Spanish specimen was also examined by Mr. C. W. Sabrosky, Washington, who came to the same conclusion.

AULACIGASTERIDAE

Aulacigaster leucopeza Meigen, 1830.

Material. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 1 ♂ 1 ♀, 2 April 1966.

Distribution. — Widely distributed in the Palaearctic Region. New to Spain.

ASTEIIDAE

Asteia algeriensis Sabrosky, 1956.

Material. — GRANADA: Granada, 700 m, 1 ♂, 14 July 1960 (J. R. Vockeroth).

Distribution. — Hitherto only known from Algeria. New to Spain.

Remarks. — The identifications of this and the following species were kindly confirmed by Mr. C. W. Sabrosky, Washington.

Asteia amoena Meigen, 1830.

Material. — ALMERIA: Rioja, 50—200 m, 1 ♂ 4 ♀, 7—25 March 1966. — CADIZ: La Linea, 1 ♂, 2 August 1960 (J. R. Vockeroth).

Distribution. — Europe and Asia. Recorded from Spain by Strobl (1906: 373) and Czerny & Strobl (1909: 279).

Asteia inanis n. sp. (Figs. 13 and 16).

Material. — ALMERIA: Almeria, 0—50 m, 1 ♂ holotype, 22 March 1966. In Zoological Museum, Copenhagen.

Description. — Holotype, male.

Head. About as long as high (41:40). Eye longer than high (36:27). Width of gena one third of height of eye (i.e. 9). Two

pairs of vertical setae, the outer pair slightly longer than the inner pair. Small, hairlike postvertical setae. Ocellar setae stronger than postverticals. A distinct orbital seta on each side. The frons is entirely yellowish-brown. The linear interfrontal stripes are possible more dark brownish, but are difficult to see due to the fact that the frons is somewhat shrunken. The entire frons bears rather numerous black hairs, and at anterior margin a convergent pair of longer hairs. Ocellar tubercle dark brownish. The area in front of eye is blackish-brown. Gena, face and mouth-parts whitish-yellow; the face with a narrow, black band. A pair of short, whitish vibrissae. Antenna (Fig. 16) with basal joints and ventral part of third joint yellowish-brown, upper part of third joint blackish. Arista blackish, distinctly zig-zag, with rather long hairs. The occiput is yellowish-brown to dark brownish.

Thorax. Mesonotum with an index of 59: 43. It has an "empty" appearence, as the coloration is predominantly yellowish with four pale brownish stripes which do not strongly contrast to the ground coloration. Also lateral parts of mesonotum (incl. a supraalar stripe) is pale brownish. The middle pair of stripes reaches to level of anterior dorsocentrals. Chaetotaxy: 2 pairs of dorsocentral setae, in front of anterior dc some much shorter hairs. Moreover, 2 notopleural and 2 sternopleural setae. Scutellum whitish, with a pair of strong, apical setae, and a subapical, hairlike pair. Pleura whitish-yellow, on lower parts of sternopleuron and hypopleuron a blackish stripe. Also more dorsally, i.e. over lower part of mesopleuron and pteropleuron a darker, but more indistinct, stripe is present.

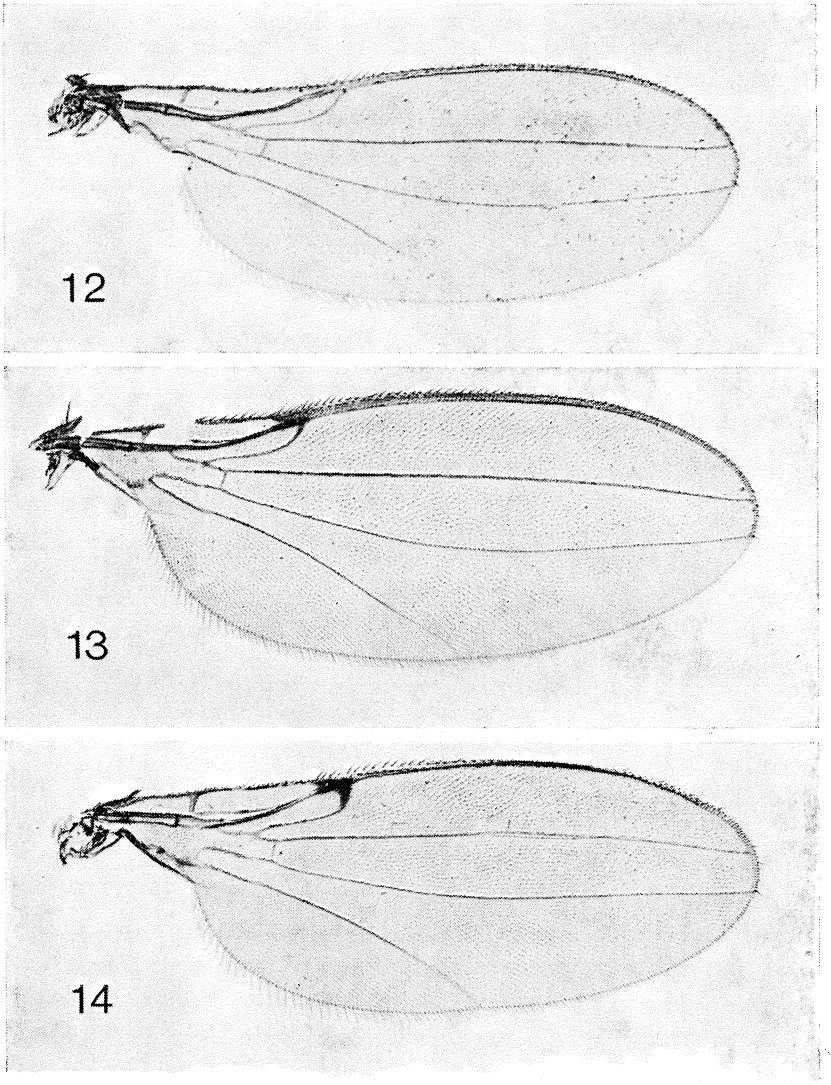
Wing. Length: 2.2 mm. Colour hyaline, veins pale yellowish. Second vein ends in a gently curve (Fig. 13) and reaches first vein where this joins the costa. The joining area is slightly infuscated. Knob of halteres large and mainly blackish.

Legs. Yellowish-white, middle and hind tibiae with two dark rings.

Abdomen. Chiefly membranous, and yellowish-white. Tergites small and partly dark brownish.

Length. Total: 1.7 mm.

Remarks. *A. inanis* n. sp. and the following new species can, among the Palaearctic species of *Asteia,* only be confused with *A. ibizana* Enderlein, 1935. This species was reviewed by Sabrosky (1956: 228) who designated a lectotype. Through the kindness



Figs. 12—14. Wings of 12. *Asteia ibizana* End., ♂ lectotype, Ibiza. ×56; 13. *A. inanis* n. sp., ♂ holotype, Spain, Almeria: Almeria, 22 March 1966. ×41. 14. *A. caesia* n. sp., ♀ holotype, Spain, Almeria: Almeria, 21—31 March 1966. ×47.

of Dr. H. Schumann, Berlin, I was able to borrow the lectotype and a paratype to *ibizana* which is only known from Ibiza. The three species is question form a natural group clearly separated from other Palaearctic *Asteia* species by the elongated head, which makes the eyes distinctly longer than high (Fig. 15). *A. ibizana* is most nearly related to *inanis*. Both have the arista distinctly pubescent (Figs. 16—17) whereas *caesia* n. sp. has a naked arista (Fig. 15). Also in colour-pattern *ibizana* and *inanis* come near to each other. *A. ibizana* differs, however, from *inanis* in size and a few other characters as will appear from the following (compare with the above description): Index of head 30: 24; of eye 27: 18; gena 6; third antennal joint more triangular and darkened all over; aristal hairs shorter; mesonotal stripes darker and mesonotum distinctly dusted; index of mesonotum 38:30; second vein (Fig. 12) ends as in *inanis* but joining area not infuscated; t_2 and t_3 without dark rings; total length: 1.1 mm.

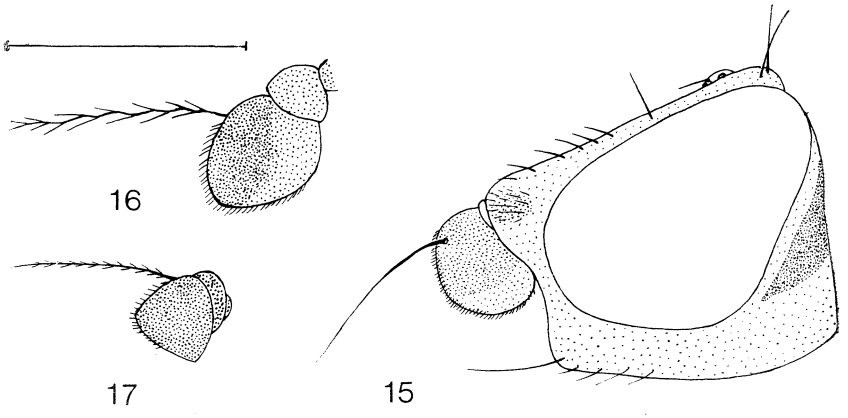
Asteia caesia n. sp. (Figs. 14—15).

Material. — ALMERIA: Almeria, 0—50 m, 1 ♀ holotype, 21—31 March 1966 (W. Hackman). In Zoological Museum, Helsinki.

Description. — Holotype, female.

Head. The length is equal to the height (37:37). Eye longer than high (28:25). Width of gena 8. Two pairs of vertical setae of equal size. Small, hairlike postvertical setae. Ocellar setae stronger than postverticals. A distinct orbital seta on each side. Middle stripe of frons yellowish-brown, becoming gradually darker towards ocellar tubercle. The linear, blackish, interfrontal stripe reaches to orbital seta. Parafrontalia (orbits) whitish, with a few blackish hairs anterior to orbital seta. Middle stripe with a more dense cover of blackish hairs. Ocellar tubercle blackish-brown. The area in front of eye orange. Gena, face and mouth-parts whitish-yellow. A pair of short, whitish vibrissae. Antenna (Fig. 15) yellowish, third joint darkened on dorsal part. Arista blackish, absolutely bare. The occiput dark brownish, ventrally with blackish wedges following lower eye-margin.

Thorax. Mesonotum with an index of 47: 42. Seen dorsally the mesonotum is bluish-grey pollinose, with two narrow darker (less pollinose) stripes which are narrowly separated. Laterally the mesonotum becomes gradually dark brownish. Chaetotaxy: 2 pairs of dorsocentral setae, in front of anterior dc a row of five



Figs. 15—17. 15. Head in profile of *Asteia caesia* n. sp., ♀ holotype, Spain, Almeria: Almeria, 21—31 March 1966; 16. Right antenna from inside of *A. inanis* n. sp., ♂ holotype, Spain, Almeria: Almeria, 22 March 1966; 17. Right antenna from inside of *A. ibizana* End., ♂ lectotype, Ibiza. Scale: 0.25 mm.

distinct hairs. Moreover, 2 notopleural and 2 sternopleural setae. Scutellum whitish with central area orange; a pair of strong apical setae, and a subapical, hairlike pair. Pleura extensively darkened. The palest area is the dorsal part of sternopleuron which is yellowish; rest of pleura yellowish-brown to dark brownish.

Wing. Length: 1.8 mm. Colour hyaline, veins pale yellowish. Second vein ends in an abruptly curve (Fig. 14) and reaches first vein where this joins the costa. The joining area is distinctly infuscated. Knob of halteres large and darkened.

Legs. Yellowish-white; hind tibiae with two indistinctly darkened rings.

Abdomen yellowish-white, the small tergites not darkened.

Length. Total: 1.5 mm.

MILICHIIDAE

Milichia albomaculata Strobl, 1900.

Material. — Granada: Rio Guadalfeo, Orgiva, 300 m, 2 ♂, 5—19 April 1966; Rio Sucio 5 km NW Orgiva, 700 m, 1 ♀, 3 April 1966; Sierra de Contraviesa near Rabite, 1300 m, 4 ♂, 2 May 1966.

Distribution. — Only known from Spain. Further localities gives Encobet (1912:68).

Milichia speciosa Meigen, 1830.

Material. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 2 ♀, 2—18 April 1966.

Distribution. — Mediterranean subregion, East Asia. Earlier recorded from Spain by Encobet (1912:154) and Séguy (1934:49).

Desmometopa m-nigrum Zetterstedt, 1848.

Material. — ALMERIA: Almeria, 0—50 m, 7, 6—22 March 1966 (also W. Hackman); Albufera, 0—50 m, 3, 29 March 1966; Cabo de Gata, 0—50 m, 3, 26 March 1966; Rioja 10 km N, 200—500 m, 2, 12 March 1966; Alhama, 200—500 m, 1, 22 March 1966. — GRANADA: Torrenueva E Motril, 0—50 m, 8, 10—14 April 1966; Rio Guadalfeo, Orgiva, 300 m, 1, 14 April 1966; Sierra de Contraviesa near Rabite, 1300 m, 1, 8 April 1966; Granada, 700 m, 1, 10—14 July 1960 (J. R. Vockeroth); N. slope Veleta, Sierra Nevada, 2200—3000 m, 5, 20—30 July 1960 (J. R. Vockeroth); Sierra Nevada Highway, 2000 m, 1, 27 July 1960 (J. R. Vockeroth); Almunecar, 0—30 m, 1, 16 July 1960 (J. R. Vockeroth).

Distribution. — The main distribution lies in the Mediterranean subregion. Also in Central Europe up to Central Sweden, in North America etc. Localities from Spain are summarized by Encobet (1912:126).

Leptometopa niveipennis Strobl, 1900.

Material. — GIBRALTAR: 1 ♀, 4 August 1960 (J. R. Vockeroth).

Distribution. — Central and South Europe, North Africa, Central Asia. Recorded from Spain by Czerny & Strobl (1909: 278).

Madiza glabra Fallén, 1820.

Material. — ALMERIA: Rioja 10 km N, 200—500 m, 1 ♂, 12 March 1966. — GRANADA: Maitena, 900 m, 1 ♀, 10 July 1960 (J. R. Vockeroth); N. slope Veleta, Sierra Nevada, 2800—3000 m, 1 ♂, 20 July 1960 (J. R. Vockeroth).

Distribution. — Widely distributed in the Palaearctic Region. Encobet (1912: 105) summarizes the distribution in Spain.

Meoneura Rondani, 1856.

At least five species are represented in the Spanish material. Two of them are easily identified as *obscurella* Fallén, 1823, and *seducta* Collin, 1937. One of the remaining three species is obviously conspecific with *freta* Collin, 1937, the other two are apparently undescribed. The first of these, *M. nevadensis* n. sp., seems by its

brownish halteres and other characters related to the Palaearctic *elongella* Zetterstedt, 1838, and the Nearctic *wirthi* Sabrosky, 1959, and *nigrifrons* Malloch, 1915. As *elongella* is only known in the female type specimen from Lapland, it seems unjustifiable to adopt the Zetterstedt name for the Spanish specimen. The two Nearctic species are quite different in their male genitalia. The second new species, *M. granadensis* n. sp., is very distinct from any other Palaearctic species. It shows most affinity to the Nearctic *polita* Sabrosky, 1959. The genitalia of actual Spanish specimens of *nevadensis* n. sp., *granadensis* n. sp., *freta* Coll. and *seducta* Coll. are figured. A few additional female specimens of the genus are listed as *Meoneura* spp.

Meoneura nevadensis n. sp. (Figs. 20—21)

Material. — GRANADA: N. slope Veleta, Sierra Nevada, 2400 m. 1 ♂ holotype, 25 July 1960; 1 ♀ paratype, 30 July 1960; Same locality, 2800—3000 m, 1 ♂ paratype, 20 July 1960 (J. R. Vockeroth). Holotype and ♀ paratype in Canadian National Collection. Ottawa; ♂ paratype in Zoological Museum, Copenhagen.

Description. — Holotype, male.

Head absolutely black, only extreme anterior margin of frons a little brownish. Ocellar triangle only little differentiated from rest of frons, being less dulled by microscopic punctation. Tip of ocellar triangle situated a little more than half-way of the distance from anterior ocellus to anterior margin of frons.

Thorax black, slightly covered by brownish dust. Only one pair of distinct dorsocentral setae.

Wings as normal for the genus, not milky. Halteres with a "dark" knob; its colour being dirty yellowish-brown, not the luminous whitish-yellow as is normal in the genus.

Legs blackish. Fore femora with two anteroventral setae at tip.

Abdomen dull blackish with normal pubescence. Basal shell of hypopygium (Figs. 20—21) short, with short setulose hairs only. Anal lamellae (Lamellen 3 of Hennig, 1937) very small, not visible in a lateral view, and finely pubescent. Side lamellae (Lamellen 1+2 of Hennig, l.c.) shaped like a boxing-glove, the anterior part being larger than the posterior part. The aedeagus has a very stout apical part.

Length. Total: 1.2 mm.

The female paratype agrees closely with the holotype except

for the usual sexual differences in the end of abdomen. The male paratype has the frons entirely black (without brownish anterior margin), and the thorax seems a little more dusted. However, the genitalia are identical with those of the holotype.

Meoneura freta Collin, 1937. (Figs. 22—23)

Material. — GRANADA: Maitena, 900 m, 1 ♂ 2 ♀, 10—11 July 1960 (J. R. Vockeroth).

Distribution. — In fact, hitherto only known in the type-series (4 ♂ 2 ♀) from Blackeney Point on the Norfolk coast of England. New to Spain.

Remarks. — The specimens agree closely with Collin's description, and the genitalia of the single Spanish male specimen (Figs. 22—23) are practically identical with those figured by Collin of one of the type-specimens.

Meoneura granadensis n. sp. (Figs. 24—25)

Material. — GRANADA: Granada, 700 m, 1 ♂ holotype, 10 July 1960 (J. R. Vockeroth). In Canadian National Collection, Ottawa.

Description. — Holotype, male.

Head. Frons yellowish-brown with blackish ocellar triangle. The tip of the latter nearly reaches anterior margin of frons. Both parts slightly dulled by microscopic punctation. Frontal setae (2 ors and 2 ori) much shorter than usual in the genus, especially the anterior ors very short and not longer than the postvertical hairs. Face and a wedged-formed area below eyes also yellowish-brown. Rest of gena and whole occiput black. Basal joints of antennae brownish, third joint blackish.

Thorax shining black, absolutely undusted, but slightly dulled by punctation. Thoracic pubescence very scanty and short. Only one distinct pair of dorsocentral setae.

Wings not milky. Halteres with a whitish knob.

Legs blackish, fore femora brownish at base and tip, and with two anteroventral setae at tip. All tarsi annulated.

Abdomen coloured as thorax. Hypopygium (Figs. 24—25) with a basal shell shaped as in *freta,* but with three pairs of setae. Anal lamellae (Lamellen 3) distinctly visible in a lateral view, though very weakly sclerotized. Side lamellae (Lamellen 1+2) simple as in *freta,* but of quite different shape. The aedeagus is very slender compared with that of *freta,* the inner copulatory complex on the other hand much larger.

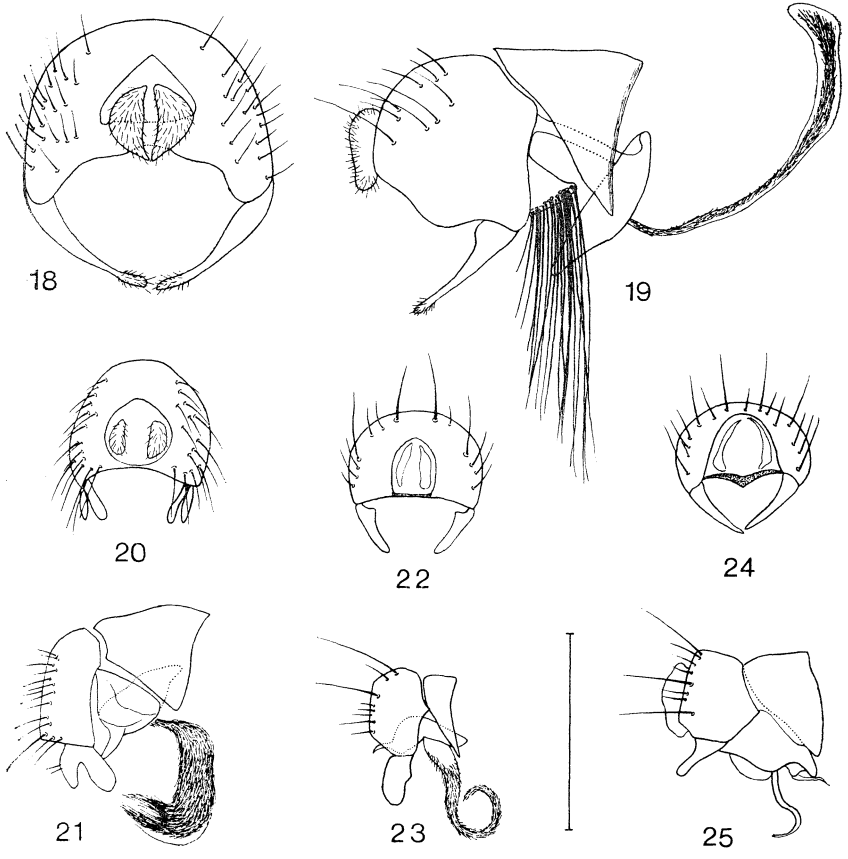
Length. Total: 1.3 mm.

Meoneura obscurella Fallén, 1823.

Material. — ALMERIA: Almeria, 0—50 m, 1 ♂, 22 March 1966.

Distribution. — From South Sweden and Great Britain through Central Europe to Greece. Also recorded from Spain.

Remarks. — The female specimens recorded below as *Meoneura* spp. and collected in the same house (on windows) in Almeria as the male above may belong to *obscurella*.



Figs. 18—25. Male genitalia of Spanish *Meoneura*. 18—19. *M. seducta* Coll., Granada: Rio Lanjaron near Lanjaron, 28 April 1966; 20—21. *M. nevadensis* n. sp., ♂ holotype, Granada: N. slope Veleta, Sierra Nevada, 25 July 1960; 22—23. *M. freta* Coll., Granada: Maitena, 11 July 1960; 24—25. *M. granadensis* n. sp., ♂ holotype, Granada: Granada, 10 July 1960. Figs. 18, 20, 22 and 24 show the genitalia in caudal (ventral) view; figs. 19, 21, 23 and 25 in lateral view. Scale: 0.25 mm.

Meoneura seducta Collin, 1937. (Figs. 18—19)

Material. — GRANADA: Rio Lanjaron near Lanjaron, 600 m, 3 ♂, 26—28 April 1966.

Distribution. — Originally described from four pairs, all taken on Grasholm Island off the Pembrokeshire coast, England. Sabrosky (1959a: 23) records it from several states of the U.S.A., and from Greece and Jordan. New to Spain.

Remarks. — The Spanish specimens agree well with Collin's description. The genitalia of one of them are figured (Figs. 18—19), and correspond to the figures given by Collin, except for the side lamellae which seem more straight in the Spanish than in the English specimen.

Meoneura spp.

Material. — ALMERIA: Almeria, 0—50 m, 7 ♀, 4—22 March 1966 (also W. Hackman); Rioja, 50—200 m, 1 ♀, 7—14 March 1966 (W. Hackman).

Remarks. — The seven females from Almeria were taken on windows in a house together with a male of *obscurella* Fall. They may all belong to the same species. The single female from Rioja is certainly not conspecific with any of the five species recorded above.

Summary

The paper brings records of 2 species of Micropezidae, 2 species of Psilidae, 1 species of Platystomidae (*Rivellia hispanica* n. sp.), 6 species of Otididae (incl. *Hypochra albufera* n. sp.), 2 species of Pallopteridae, 1 species of Odiniidae, 1 species of Aulacigasteridae, 4 species of Asteiidae (incl. *Asteia inanis* n. sp. and *A. caesia* n. sp.), and 10 species of Milichiidae (ncl. *Meoneura nevadensis* n. sp. and *M. granadensis* n. sp.), all collected in the southern provinces of Spain in 1960 and 1966. Besides the 6 new species mentioned above, further 6 species have not earlier been recorded from Spain.

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(Noona Dan Papers No. 84.)

Lycaenidae (Lepidoptera) of the Noona Dan Expedition to the Philippines, Bismarcks, and Solomons.

By
G. E. Tite
British Museum (Natural History) Tring, Herts.

The list that follows is made at the request of Dr. Børge Petersen of the Zoological Museum, Copenhagen, to whom full acknowledgements and thanks are made for the privilege of examining the specimens brought home by the Noona Dan Expedition (See Petersen 1966: 283—304) and comparing them with the series in the collection of the British Museum (Natural History) henceforth referred to as the "B.M.".

As would be expected, it has been found that the general trend of the Palawan insects is to form a connecting link between the races of the more northern Philippine islands of Mindoro, and Luzon with those of north Borneo; while those from the Sulu Islands occupy a similar position with regard to the southern Philippines — especially the island of Basilan, and north Borneo. The Bismarck material, though exhibiting affinities with that of New Guinea, and with that of the Solomons, does tend to produce races having often well marked characters, which are not to be found in material from any other area. Where specimens in the B.M. are mentioned, the place-names are cited in accordance with the data labels; they are not necessarily in strict conformity with those used for the Noona Dan labels.

1. PHILIPPINES

Logania marmorata faustina Fruhstorfer

Logania marmorata faustina Fruhstorfer (5) 1914: 23, Mindanao.

TAWI TAWI: Tarawakan, 3.ix.1961, 1♂.

The single specimen exhibits some similarity with *L. marmorata*

staudingeri from Kina Balu in the extension of the grey-white patch on the fore wing.

Logania marmorata palawana Fruhstorfer

Logania marmorata palawana Fruhstorfer (5) 1914: 23, Palawan.

PALAWAN: Makagwa, 22.viii.1961, 1 ♀. — BALABAC: Dalawan Bay, 10—12.x.1961, 2 ♀.

These three specimens and other specimens in the B.M. only differ from *L. marmorata faustina* by the reduced extent of the whitish area on the fore wing. Palawan males in the B.M. are indistinguishable from the only other Philippine male, an example from Leyte. The range of *marmorata* and its races extends over Burma, Siam, Malaya, Sumatra, Borneo, Java to Flores, Celebes, and the Philippines.

Allotinus fallax dotion Fruhstorfer

Allotinus fallax dotion Fruhstorfer (3) 1913: 343, Basilan.

TAWI TAWI: Tarawakan, 23.x.1961, 1 ♀.

Agrees well with the only Basilan female in the B.M.

A. fallax ranges in often well marked races over Malaya, Sumatra, Borneo, Celebes, and the Philippines.

Miletus symethus hierophantes (Fruhstorfer)

Gerydus symethus hierophantes Fruhstorfer (13) 1915: 822, Sulu Islands.

TAWI TAWI: Tarawakan, 23—26.x.1961, 2 ♂, 1 ♀.

There are no examples of this race in the B.M. The species occurs from Burma and Malaya to the Philippines and Lombok, but has not been found in Celebes.

Miletus symethus edonus (Fruhstorfer)

Gerydus symethus edonus Fruhstorfer (3) 1913: 244, Palawan.

PALAWAN: Pinigisan, 600 m., 3—23.ix.1961, 1 ♂, 3 ♀.

Miletus drucei drucei (Semper)

Gerydus drucei Semper, 1889: 162, Pl. 31 figs. 8—9, Bohol.

BALABAC: Dalawan Bay, 8.x.1961, 1 ♀.

M. drucei drucei is found throughout the Philippines, and is replaced in north Borneo by spp. *metrovius* Fruhstorfer. Eliot (1961: 167) reduces the names *philippus* Staudinger, *jacchus* Fruhstorfer, *paianus* Fruhstorfer, and *epidurus* Fruhstorfer to synonyms of *drucei drucei.*

Miletus gopara eustatius (Fruhstorfer)

Gerydus biggsi eustatius Fruhstorfer (3) 1913: 308, North Borneo (lowlands).

TAWI TAWI: Tarawakan, 30.x.1961, 1 ♀.

M. gopara is found in Borneo, Malaya, Sumatra, and Java.

Megisba malaya rosanna Fruhstorfer

Megisba malaya rosanna Fruhstorfer (13) 1922: 858, Luzon, Mindanao, Mindoro.

BALABAC: Dalawan Bay, 13.x.1961, 1 ♀. — TAWI TAWI: Tarawakan, 3.xi.1961, 2 ♂.

The material available is insufficient for exact definition. In the B.M. specimens from north Borneo are placed to *rosanna;* they do however differ from examples from Luzon and Mindanao in that the white spot on the upperside fore wing is wider. One female from Sandakan has this character even further developed, so that the white area occupies approximately a quarter of the wing surface. The Balabac female is very similar; both it and the Tawi Tawi males show closer affinity with the north Borneo examples than with those from Luzon and Mindanao.

Celastrina puspa bazilana (Fruhstorfer)

Cyaniris puspa bazilana Fruhstorfer (1) 1910: 286, Basilan.

TAWI TAWI: Tarawakan, 29.x.—7.xi.1961, 2 ♂, 2 ♀.

C. puspa spreads eastwards from Ceylon and India to the Philippines and the Key Islands. The Philippine races have been named *ottonis* Fruhstorfer (Palawan), *cagaya* Felder (Luzon), *georgi* Fruhstorfer (Mindanao), and *sabis* Fruhstorfer (Mindoro). *C. puspa bazilana* scarcely differs from the north Bornean *tymbria* Fruhstorfer.

Pithecops corvus corax (Fruhstorfer)

Pithecops hylax corax Fruhstorfer (12) 1919: 79, Java.

PALAWAN: Pinigisan, 600 m., 31.vii.1961, 1 ♀.

The nomenclature, subspeciation, and distribution is fully dealt with by Cowan (1965: 241—245).

Neopithecops zalmora colutha (Fruhstorfer)

Pithecops zalmora colutha Fruhstorfer (12) 1919: 84, Luzon, Palawan.

TAWI TAWI: Tarawakan, 10—13.xi.1961, 4 ♂, 1 ♀.

The three males all exhibit a rather more extensive clouded white patch on the fore wing than do males from Luzon and

Palawan. The white patch on the fore wing of the female is even more extensive, but exact definition of its limits is not possible, owing to the poor condition of the specimen. Three females from Mt. Mulu, north Borneo (Everett) in the B.M. have a well marked white elliptical area on the fore wing, occupying the basal halves of areas 1—3, part of 4, and just infringing into the lower part of the cell. Owing to its tattered state, it is not possible to decide if the Tawi Tawi female is the same. Other races range from Ceylon eastwards to New Guinea.

Spalgis epius strigatus Semper.

Spalgis strigatus Semper, 1889: 160, pl. 31 fig. 1, Cebu.

TAWI TAWI: Tarawakan, 22.x. —3.xi.1961, 1 ♂, 2 ♀.

This wide-spead species has some tendency to individual variation; the two females in question are markedly different as regards the extent of the creamy white areas on the fore wing. The subspecies *strigatus* is only represented by one female from Palawan in the B.M. Other Philippine races are *semperi* Fruhstorfer (Luzon), and *georgi* Fruhstorfer (Bohol).

Castalius ethion ulysses (Staudinger)

Lycaena (Castalius) ulysses Staudinger, 1889: 95, Pl. 1. fig. 5, Palawan.

TAWI TAWI: Tarawakan, 13.xi.1961, 1 ♂.

C. ethion occurs in a number of subspecies from Ceylon, South India, Assam, Burma, Malaysia, Celebes, and the Philippines.

Castalius roxus angustior (Staudinger)

Lycaena (Castalius) roxus var. angustior Staudinger, 1889: 95, Palawan.

PALAWAN: Makagwa, 22.viii.1961, 1 ♂.

This subspecies is represented in the B.M. from Palawan, Mindanao, Mindoro, and Cebu. The Palawan series is unlike the north Borneo *roxus manovus* Fruhstorfer (10) 1918: 34, which is remarkable for its greatly expanded white band on both wings. Other races of the collective species occur from Assam to Celebes, and the Lesser Sunda Islands.

Castalius elna elvira Fruhstorfer

Castalius elna elvira Fruhstorfer (10) 1918: 37, NE. Sumatra, Perak, Borneo.

PALAWAN: Pinigisan, 600 m. 9.ix.61, 1 ♂.

Probably a new record for Palawan. The specimen agrees well with examples from north Borneo. *C. elna* is represented in the

B.M. by series ranging from Sikkim, Burma, and Malaya to the Andamans, Sumatra, Java, and Borneo.

Lampides boeticus (L.)

Papilio boeticus Linneus, 1767: 789, Barbaria.

TAWI TAWI: Tarawakan, 10.xi.1961, 1 ♂. — MINDANAO: Sapamoro, 18.xii.61, 1 ♂.

This species occurs widely in the old world, without obvious subspeciation.

Jamides bochus georgi (Fruhstorfer)

Lampides bochus georgi Fruhstorfer (9) 1916: 38, Mindanao.

MINDANAO: Sapamoro, 20.xii.1961, 1 ♂.

This agrees well with a male from Davao in the B.M. Fruhstorfer differentiated this race from the Luzon subspecies (*herodicus* Fruhstorfer 1916:38) on a difference in the width of the dark margin of the fore wing. Luzon examples in the B.M. do exhibit considerable variation in this character, and more Mindanao examples are needed to decide on the correct status of the two names. The collective species is found over most of the Indo-Australian region.

Jamides bochus nabonasser (Fruhstorfer)

Lampides bochus nabonasser Fruhstorfer (9) 1916: 36, Borneo.

TAWI TAWI: Tarawakan, 25—30.ix.1961, 2 ♂.

These specimens cannot be differentiated from examples from Kina Balu, and Sandakan in the B.M.; they contrast with the Philippine races by the great extension of the marginal black, which covers most of the fore wing, restricting the deep metallic blue colour to the basal half of area 1, and to small adjoining portions of area 2 and the cell. A single male from Balabac (ex. Fruhstorfer coll.) appears to be intermediate between *nabonasser* and *herodicus*.

Jamides cleodus potidalon (Fruhstorfer)

Lampides cleodus potidalon Fruhstorfer (9) 1916: 7, Basilan.

TAWI TAWI: Tarawakan, 23.x. — 26.xi.1961, 12 ♂; Lapid Lapid, 19—22.xi.1961: 2 ♂, 3 ♀.

A mainly Philippine species, but comes also from north Borneo, and Formosa.

Jamides cleodus trichonis (Fruhstorfer)

Lampides cleodus trichonis Fruhstorfer (9) 1916: 7, Palawan, North Borneo.

PALAWAN: Pinigisan, 600 m. 23.ix.1961, 1 ♂; Uring Uring, 18.viii.—2.ix.1961, 2 ♂, 1 ♀. — BALABAC: Dalawan Bay, 13.x. 1961, 1 ♂.

Jamides elpis gerra (Fruhstorfer)

Lampides kondulana gerra Fruhstorfer (9) 1916: 11, Palawan.

PALAWAN: Pinigisan, 600 m., 10.ix.1961, 1 ♂; Uring Uring, 16.viii.1961, 1 ♀.

Wide-spread from Sikkim to Timor, the species appears to be rare in the Philippines.

Jamides alecto manilana (Toxopeus)

Lampides alecto (dromicus) manilana Toxopeus, 1930: 140, Manila.

PALAWAN: Pinigisan, 600 m., 14.ix.1961. 1 ♀; Uring Uring, 19.viii.1961, 1 ♀.

A common species ranging from Ceylon to the Moluccas in many subspecies.

Jamides aratus nausiphanes (Fruhstorfer)

Lampides aratus nausiphanes Fruhstorfer (9) 1916: 22, Palawan.

PALAWAN: Uring Uring, 27.ix.1961, 1 ♀.

The nominate subspecies was described from Amboina; the collective species is represented in the B.M. from Borneo, Palawan. the Celebes region, the lesser Sunda Islands, and eastwards to New Guinea and the Solomons.

Jamides philatus andrus (Fruhstorfer)

Lampides philatus andrus Fruhstorfer (9) 1916: 25, Basilan.

TAWI TAWI: Lapid Lapid, 22.xi.1961, 1 ♀.

The dark marginal band on the fore wing is narrower than that of the females of *philatus amphyssina* Stgr. (Palawan), or of *philatus armatheus* Fruhstorfer (Borneo). This is another wide-spread species, ranging from Mergui to Kapaur in former Dutch New Guinea.

Jamides philatus amphyssina (Staudinger)

Lycaena amphyssina Staudinger, 1889: 100, Palawan.

PALAWAN: Uring Uring, 18.viii.1961, 1 ♂.

Nacaduba sericina thaumas Fruhstorfer

Nacaduba sericina thaumas Fruhstorfer (8) 1916: 111, Basilan, and Mindanao.

TAWI TAWI: Tarawakan, 29.x.1961, 1 ♀.

Fruhstorfer mentions 2 ♂, 1 ♀ from Basilan. A female from this locality in the B.M. is probably the original; it agrees well with the present specimen. The same author quoted Mindanao (Semper) as an additional locality. He was followed in this by Seitz (1924: 914) who mentioned Mindanao before Basilan, and figured (152h.) a male which appears to have originated from Mindanao. In fact, a male and two females from Mindanao in the B.M. are heavily darkened on both surfaces, being very different from both *sericina sericina* Felder (Luzon) and *sericina thaumas* (Bazilan). This rare species is poorly represented in the B.M., and for this reason it is not deemed advisable to name the Mindanao race at present. The species is apparently confined to the Philippines.

Nacaduba sanaya elioti Corbet

Nacaduba sanaya elioti Corbet, 1938: 133, Singapore.
Nacaduba sanaya thalia Corbet, 1938: 134, Borneo.
Nacaduba sanaya elioti Corbet; Eliot, 1955: 157.

TAWI TAWI: Tarawakan, 13.xi.1961, 1 ♀.

N. sanaya occurs from Burma, Siam, Malaya to Bali, Celebes, and the Philippines.

Nacaduba berenice zygida Fruhstorfer

Nacaduba berenice zygida Fruhstorfer (8) 1916: 128, Basilan, Palawan.

TAWI TAWI: Tarawakan, 24.x. — 13.xi.1961, 1 ♂, 1 ♀.

The specimens are unfortunately in poor condition, and it is not posible to decide with certainty whether they are referable to this race or to *berenice akaba* Druce (1873: 350). The species ranges from Ceylon to the Solomons, and north Australia.

Prosotas nelides (de Niceville)

Nacaduba nelides de Niceville, 1895: 280, Pl. 0, fig. 24, NE. Sumatra.

PALAWAN: Pinigisan, 600 m., 21.ix.1961, 2 ♂.

The two examples are in very poor condition, which renders their certain identification a matter of some difficulty. The male genitalia in the genus *Prosotas* are all very similar, but in most species, slight deviations in the shape of the claspers are observ-

able. In the two examples under consideration, these organs are similar to those of preparations made from Malayan *nelides*. The species is represented in the B.M. only from Malaya and Sumatra. Should this occurrence in Palawan be substantiated, it will indicate a marked extension of the known distribution.

Prosotas aluta philiata (Fruhstorfer)

Nacaduba aluta philiata Fruhstorfer (8) 1916: 119, Philippines.

PALAWAN: Uring Uring, 24.viii.1961, 1 ♂.

The species extends from Assam eastwards to the Philippines, Borneo and Bali.

Ionolyce helicon helicon (Felder)

Lycaena helicon Felder, 1860: 457, Amboina.

PALAWAN: Pinigisan, 600m., 31.viii.1961, 1 ♀.

Wide-spread in the Indo-Australian region.

Catopyrops ancyra almora (Druce)

Cupido almora Druce, 1873: 349, Borneo.

PALAWAN: Pinigisan, 600m., 10—23.ix.1961, 3 ♂; Uring Uring, 18.viii.1961, 1 ♂. — MINDANAO: Sapamoro, 19.xii.1961, 1 ♂.

Occurs in many subspecies from Burma to the Solomons.

Catochrysops strabo luzonensis Tite

Catochrysops strabo luzonensis Tite, 1959: 204, Philippines.

MINDANAO: Sapamoro, 16.xii.1961, 2 ♀. — PALAWAN: Uring Uring, 22.viii.—23.ix.1961, 2 ♀.

The species occurs in a number of subspecies from Ceylon, South India, Burma, Malaya, Sumatra, Java, Borneo, Philippines, Celebes, the Moluccas, and New Guinea.

Catochrysops panormus exiguus (Distant)

Everes exiguus Distant, 1886: 455, Pl. 44, fig. 17, Malaya.

PALAWAN: Pinigisan, 600m., 12—16.ix.1961, 2 ♂; Uring Uring, 2.viii.1961, 1 ♀.

This race extends over Assam, Burma, Malaya, Sumatra, Borneo, Java, Lombok, Hainan, Formosa and the Philippines. Other races are found from Ceylon, and eastwards to Guam, the Solomons, New Hebrides, and Loyalty Islands.

Euchrysops cnejus luzonicus (Röber)

Plebeius luzonicus Röber, 1886: 60, Luzon.

PALAWAN: Uring Uring, 7.ix.1961, 1 ♀. — TAWI TAWI:

Lapid Lapid, 21.xi.1961, 1 ♀; Tarawakan, 25.x.1961, 1 ♀.

Another wide-spread species; it occurs from India to Fiji, and the New Hebrides.

Everes lacturnus (Godart)

Polyommatus lacturnus Godart, 1824: 660, Timor.

PALAWAN: Uring Uring, 25—27.ix.1961, 2 ♀. — TAWI TAWI, Tarawakan, 13.ix.1961, 1 ♀; Lapid Lapid, 22.xi.1961, 1 ♂, 1 ♀ (in copula). — MINDANAO: Sapamoro, 18.xii.1961, 1 ♂.

E. lacturnus ranges from Ceylon to Australia and the Solomons.

Zizeeria knysna karsandra (Moore)

Polyommatus karsandra Moore, 1865: 505, Pl. 31, fig. 7, NW. India.

PALAWAN: Uring Uring, 22—28.viii.1961, 1 ♂, 2 ♀.

The nominate subspecies occurs in Africa, Asia Minor, and Spain. Subspecies *karsandra* replaces it in the Indo-Australian region.

Zizina otis oriens (Butler)

Zizera otis oriens Butler, 1883: 417, Mindanao.

PALAWAN: Uring Uring, 18.viii. — 1.ix.1961, 1 ♂, 2 ♀.

Another widely distributed species, inhabiting most of the Indo-Australian region, Africa and Madagascar.

Narathura abseus oghatinna (Fruhstorfer)

Arhopala abseus oghatinna Fruhstorfer (4) 1914: 130, Basilan.

TAWI TAWI: Tarawakan, 26.x.1961, 1 ♀.

The range of the species includes Ceylon, India, Burma, Malaya, Sumatra, Borneo, and the Philippines.

Narathura mindanensis (Bethune-Baker)

Arhopala mindanensis Bethune-Baker, 1903: 62, Pl. 1, fig. 24, Mindanao.

MINDANAO: Sapamoro, 16.xii.1961, 1 ♂.

As far as is known, this species is confined to Singapore, Sumatra, Borneo, and the Philippines.

Flos apidanus palawanus (Staudinger)

Amblypodia apidanus palawanus Staudinger, 1889: 130, Palawan.

BALABAC: Dalawan Bay, 10—13.ix.1961, 2 ♀.

The species occurs in Assam, Burma, Malaya, the Sunda Islands, Celebes, and the Philippines.

Hypolycaena sipylus tharrytas Felder.

Hypolycaena tharrytas Felder, 1862: 294, Luzon.

PALAWAN: Uring Uring, 10.viii.1961, 1 ♀. — BALABAC: Dalawan Bay, 8.x.1961, 1 ♂.

H. sipylus and its races range from the Philippines, Celebes, and Java to New Guinea.

Drina maneia (Hewitson)

Myrina maneia Hewitson, 1863: 29, Pl. 12, figs. 14—15, Singapore.

TAWI TAWI: Tarawakan, 7.xi.1961, 1 ♂.

Represented in the B.M. from Mergui, Thailand, Malaya, and Borneo. The series does not show any marked evidence of subspeciation, except for three males from Labuan which exhibit on the fore wing a reduction of the specialized scales on the veins, and a narrower dark margin.

Deudorix epijarbas coriolanus Fruhstorfer

Deudorix epijarbas coriolanus Fruhstorfer (2) 1911 : 266, Palawan.

PALAWAN: Pinigisan, 600m., 8—11.ix.1961, 4 ♂; Uring Uring, 18. and 31.viii.1961, 2 ♀.

The species occurs over most of the oriental region from Ceylon to the Bismarcks.

Rapala alcetas alcetina Semper.

Rapala alcetas alcetina Semper, 1890: 225, Bohol, Mindanao.

MINDANAO: Sapamoro, 19.xii.1961, 1 ♀.

R. alcetas comes only from the Philippine area, being represented in the B.M. from Leyte, Mindoro, and Mindanao (*alcetina*) and as *a. alcetas* from Palawan.

2. BISMARCKS AND SOLOMONS

Thysonotis danis dispar Smith & Kirby

Thysonotis dispar Smith & Kirby, 1895: 23, Pl. iv, figs. 1—4, New Britain.

Danis danis dispar (Smith & Kirby); Toxopeus, 1930: 130.

DYAUL: Sumuna, 7.iii.1962, 1 ♂. — LAVONGAI: Banatam, 21—22.iii.1962, 1 ♂, 2 ♀. — MUSSAU: Boliu, 13.ii.1962, 1 ♀.

Thysonotis dispar occurs in many subspecies from the Moluccas to the Bismarcks and north Australia. Toxopeus (1930: 128—133) deals with the subspeciation in detail.

Thysonotis danis latifascia Rothschild. Comb. nov.

Thysonotis dispar latifascia Rothschild, 1915: 394, Manus, Admiralty Islands, ♂.

Thysonotis subsuleima Strand, 1916: 18, Admiralty Islands, ♀. SYN. NOV.

MANUS: Lorengau, 19—21.vi.1962, 1 ♂, 2 ♀.

The types of both *latifascia* and *subsuleima* are in the B.M. There is no doubt that they represent the sexes of the same subspecies. Toxopeus does not mention these names.

Thysonotis caelius hanno Grose Smith

Thysonotis hanno Grose Smith, 1894: 25, New Britain.

Thysonotis caelius hanno Grose Smith; Fruhstorfer (6) 1915: 43.

NEW BRITAIN: Valoka, 7—12.vii.1962, 4 ♂; Rabaul, 25.vii. 1962, 1 ♂. — DYAUL: Kollepine, 12.iii.1962, 1 ♂.

Subspecies *hanno* is represented in the B.M. from New Britain, French Island, Feni Island, New Ireland and New Hannover. Other races occur from the Moluccas, New Guinea to north Australia. The Admiralty Islands race has been named *manusi* Rothschild (1915: 394).

Thysonotis cyanea hamilcar Grose Smith

Thysonotis hamilcar Grose Smith, 1894: 25, New Britain.

Thysonotis cyanea hamilcar Grose Smith; Fruhstorfer (6) 1915: 44.

NEW BRITAIN: Valoka, 13.vii.1962, 1 ♀; S. of Cape Hoskins Aerodrome, 6.vii.1962, 1 ♂. — NEW IRELAND: Danu, Kalili Bay, 28.iv.1962. — LAVONGAI: Banatam, 24.iii.1962, 1 ♀. — MANUS: Lorengau, 18.vi.1962, 1 ♀.

The species is distributed from Flores and Timor to the Solomons and north Australia. The subspecies *hamilcar* is in the B.M. from all the main Bismarck Islands and the Admiralty Islands. In the Solomons it is replaced by *chromia* Druce (1891: 365).

Thysonotis browni Druce & Bethune-Baker

Thysonotis brownii Druce & Bethune-Baker, 1893: 547, New Ireland.

NEW BRITAIN: Valoka, 13.vii.1962, 1 ♀. — NEW IRELAND: Danu, Kalili Bay, 30.iv.1962, 1 ♂. — LAVONGAI: Banatam, 21—25.iii.1962, 1 ♂, 4 ♀.

Only known from the Bismarck Archipelago, the species is represented in the B.M. from Rook Island, New Britain, New Hanover, Witu (or French I.) and New Ireland.

Epimastidia ariensis bornemanni (Pagenstecher)

Cupido bornemanni Pagenstecher, 1894; 77, Neu Pommern.

NEW BRITAIN: Yalom, 1000m., 18—21.v.1962, 1 ♂, 1 ♀.

The species is confined to the Solomons (*a. ariensis*) and to the Bismarcks (*a. bornemanni*). Two females from Rook Island in the B.M. differ from other Bismarck examples of that sex in the delicate grey-blue colour of the upperside.

Hypochrysops scintillans (Butler)

Miletus scintillans Butler 1882: 150, New Britain.

DUKE OF YORK: Manuan, 26.vii.1962, 1 ♀. — MUSSAU: Malakata, 10.vi.1962, 1 ♀.

A purely Bismarck species, it is represented in the B.M. from New Britain, New Ireland, New Hanover, and Duke of York Island.

Philiris Rober

Owing to the confusing similarity of the majority of the females in this genus, their accurate identification is a matter of great difficulty, especially when the individuals concerned were not collected in association with males. The names "*intensa*" and "*regina*" are therefore given below as probable identifications only.

Philiris regina (Butler)

Holochila regina Butler, 1882: 150, Duke of York I.

Philiris regina (Butler); Tite 1963: 237.

NEW BRITAIN: Yalom, 1000m., 9.v.1962, 1 ♀. — NEW IRELAND: Lemkamin, 900m., 14.iv.1962, 1 ♀.

Distributed from the Key Islands to the Bismarcks without obvious subspeciation.

Philiris intensa intensa (Butler)

Holochila intensa Butler, 1876: 245, Aru.

Philiris intensa (Butler); Tite 1963: 236.

NEW BRITAIN: Valoka, 5—10.vii.1962, 2 ♀.

This race occurs in Aru, New Guinea, the Louisiades and the Bismarcks. The species is represented in the Moluccas by *P. intensa butleri* (Grose Smith and Kirby) 1897: 8.

Philiris tombara Tite

Philiris tombara Tite, 1963: 244, Bismarcks.

NEW BRITAIN: Valoka, 9.vii.1962, 1 ♀; Yalom, 1000m., 20.v.

1962, 1 ♀.

Only previously known from the type material in the B.M.

Philiris lucescens Tite

Philiris lucescens Tite, 1963: 247, Bismarcks.

NEW BRITAIN: Yalom, 13—20.v.1962, 2 ♀.

Hitherto, only known from the type material in the B.M., Rook I., and New Britain.

Celastrina philippina lychorida (Fruhstorfer)

Lycaenopsis nedda lychorida Fruhstorfer (13) 1922: 875, Bismarcks.
Lycaenopsis philippina lychorida Fruhstorfer; Toxopeus 1926: 375.

NEW BRITAIN: Valoka, 11.vii.1962, 1 ♂.

Toxopeus (1926: 369) deals fully with the synonymy of *philippina* and *nedda*. The collective species ranges from the Philippines, Celebes, Timor, Key Islands, Aru, New Guinea to the Bismarcks.

Pithecops dionisius staphylus, Fruhstorfer

Pithecops dionisius staphylus Fruhstorfer (12) 1919: 81, Neu Pommern.

NEW BRITAIN: Valoka, 5—8.vii.1962, 5 ♂; Vaisisi, 9.vii.1962, 4 ♂; Yalom, 1000m., 17—24.v.1962, 6 ♂; Komgi, 1000m., 14.v. 1962, 2 ♂. — NEW IRELAND: Danu, Kalili Bay, 30.iv.1962, 4 ♂; Lemkamin, 900 m., 11.iv.1962, 1 ♂. — LAVONGAI: Banatam, 21—25.iii.1962, 2 ♂. — MANUS: Lorengau, 19—21.vi.1962, 4 ♂.

The species occurs from the Moluccas to the Solomons, subspecies *staphylus* being restricted to the Bismarcks.

Lampides boeticus (Linn.)

Papilio boeticus Linnaeus, 1767: 637, Barbaria.

NEW IRELAND: Lemkamin, 900m., 7—22.iv.1962, 9 ♂, 5 ♀. — MANUS: Lorengau, 23—25.vi.1962, 2 ♂, 6 ♀.

Anthene paraffinis paraffinis (Fruhstorfer)

Lycaenesthes emolus paraffinis Fruhstorfer (7) 1916: 99, Neu Lauenberg.

Anthene paraffinis paraffinis (Fruhstorfer); Tite 1966: 263.

NEW IRELAND: Danu, Kalili Bay, 28.iv.1962, 3 ♀. — MUSSAU: Talumalaus, 19.i.1962, 1 ♀.

A. paraffinis ranges through New Guinea, the Bismarcks and the Solomons; the nominate subspecies is in the B.M. from New Britain, Feni, Witu, New Ireland, Duke of York, Bougainville, Vella Lavella, Guizo, Choiseul, Alu, Rendova, and Treasury.

Jamides soemias Druce

Jamides soemias Druce, 1891: 367, Pl. 32 figs 4—5, Alu I.

Jamides bochus soemias Druce; Seitz 1924: 902.

NEW BRITAIN: Valoka, 8.vii.1962, 1 ♀; 5 miles E. of Mt. Bango, 6.vii.1962, 1 ♂; S. of Cape Hoskins Aerodrome, 6.vii.1962, 3 ♂; Bita Paka, 10.vii.1962, 1 ♂. — NEW IRELAND: Danu, Kalili Bay, 3.iv.1962, 1 ♀. — MANUS: Lorengau, 25.vi.1962, 1 ♀.

This species is represented in the B.M. from the Bismarcks and most of the Solomon Islands. Its male genitalia do not differ from those of the other taxa included by Seitz under *bochus,* but as a number of these taxa — easily separable on superficial characters — do inhabit the same areas, they are best treated as separate species.

Jamides celeno sundana (Fruhstorfer)

Lampides celeno sundana Fruhstorfer (9) 1916: 6, Banda, Buru, Key Is., New Guinea.

NEW BRITAIN: 5 miles E. of Mt. Bango, 6.vii.1962, 1 ♂; Rabaul, 25.vii.1962, 1 ♂.

Solomons. — GUADALCANAL: Honiara, 7—8.x.1951 (Galathea Exped.) 2 ♂.

J. celeno is wide-spread, occuring from Ceylon to the New Hebrides. Specimens from the Bismarcks exhibit no apparent difference from typical subspecies *bandana* from the Island of Banda. In the New Hebrides the species is represented by *evanescens* Butler (1875: 615).

Jamides aratus caerulina (Mathew). Comb. nov.

Lampides caerulina Mathew, 1887: 46, Ugi.

Lampides aetherialis caerulina (Mathew) Fruhstorfer (9) 1916: 24.

NEW BRITAIN: Valoka, 11—13.vii.1962, 2 ♂, 1 ♀; 5 miles E. of Mt. Bango, 6.vii.1962, 1 ♂, 1 ♀. — DUKE OF YORK: Manuan, 18—20.vii.1962, 3 ♂, 2 ♀.

The types of both *aetherialis* Butler (1884: 195) and *caerulina* are in the B.M.; there can be no doubt that both are conspecific with *aratus*. The collective species ranges from the Philippines and Borneo to the Solomons, *caerulina* being the race from the Bismarcks and Solomons, and *aetheriales* that from the Key Islands.

Jamides nemophila paralectus (Grose Smith & Kirby)

Lampides paralectus Grose Smith & Kirby, 1897: 7 (and 9) New Iireland.

Jamides nemophila paralectus (Smith & Kirby); Tite, 1960: 326.

NEW BRITAIN: Valoka, 5—13.vii.1962, 3 ♂, 2 ♀. — NEW IRELAND: Danu, Kalili Bay, 28—30.iv.1962, 1 ♂, 2 ♀. — DYAUL: Sumuna, 7—8.iii.1962, 1 ♂, 1 ♀. — LAVONGAI: Banatam, 19.iii.1962, 1 ♀.

This purely Papuan area species is represented in the B.M. from New Ireland, New Hanover, and New Britain by *paralectus,* and from Rock Island by *albipatulus* Tite (1960: 326).

Nacaduba pactolus raluana Ribbe.

Nacaduba pactolus raluana Ribbe, 1899: 231, Neu Pommern and Neu Lauenburg.

NEW IRELAND: Danu, Kalili Bay, 3.iv.1962, 1 ♂.

As far as is known this race is confined to the Bismarcks. There are only 4 examples in the B.M. Other races extend westwards to Ceylon and India.

Nacaduba astarte astarte (Butler)

Lampides astarte Butler, 1882: 150, New Britain.

DYAUL: Summa, 7.iii.1962, 1 ♀. — LAVONGAI: Banatam, 22.iii.1962, 1 ♂.

This species comes only from the Bismarcks and Solomons area; its subspeciation is dealt with (Tite, 1963: 76—77.)

Nacaduba berenice apira Fruhstorfer

Nacaduba berenice apira Fruhstorfer (8) 1916: 129, Bismarck Archiepelago.

DYAUL: Sumuna, 7.iii.1962, 2 ♂.

This race is in the B.M. from New Hanover, New Britain, and Nissan. Other races occur from Ceylon to the Solomons and north Australia.

Nacaduba kurava ariitia Fruhstorfer

Nacaduba perusia ariitia Fruhstorfer (8) 1916: 137, Bismarck Archipelago.

Nacaduba kurava ariitia Fruhstorfer; Tite 1963: 82.

NEW BRITAIN: Rabaul, 25.vii.1962, 1 ♂. — DYAUL: Sumuna, 7.iii.1962, 1 ♀.

This race is in the B.M. from New Britain, Witu, Rook I., Matthias, and Squally Island. Other races occur over most of the oriental region from Ceylon to the New Hebrides.

Prosotas nora nora (Felder)

Lycaena nora Felder, 1860: 458, Amboina.

Prosotas nora nora (Felder); Tite, 1963: 92.

NEW BRITAIN: Valoka, 4.vii.1962, 1 ♂; Bita Paka, 10.vii.1962, 1 ♂. — LAVONGAI: Banatam, 25.iii.1962, 1 ♂.

The examples mentioned above and the B.M. series from the Bismarcks show no obvious difference from the Amboina type, and specimens from the Key Islands and New Guinea also belong to this race. Specimens from St. Matthias and Squally islands in the B.M. are smaller and the females exhibit a greater extent of blue on the fore wings. Races of *nora* extend from India to north Australia.

Prosotas dubiosa dubiosa (Semper)

Lampides dubiosa Semper, 1879: 159, Queensland.

Prosotas dubiosa dubiosa (Semper); Tite, 1963: 97.

NEW BRITAIN: Bita Paka, 10.vii.1962, 3 ♂.

Another wide-spread species, ranging from Ceylon to north Australia and the Solomons. Its subspeciation has not yet been fully worked out.

Erysichton lineata uluensis (Ribbe)

Nacaduba meiranganus var. uluensis Ribbe, 1899: 230, Pl. 4, fig. 6, Neu Pommern.

Erysichton lineata uluensis (Ribbe); Tite, 1963: 103.

NEW BRITAIN: Valoka, 12.vii.1962, 1 ♂; Yalom, 1000m., 13—19.v.1962, 2 ♂.

The species is found from the Moluccas and Key Islands to the Bismarcks, Solomons and north Australia. The present race is restricted to the Bismarcks, St. Matthias, and Squally Island.

Ionolyce helicon caracalla (Waterhouse & Lyell)

Nacaduba caracalla Waterhouse & Lyell, 1914: 95, fig. 854, Darnley Island.

Ionolyce helicon caracalla (Waterh. & Lyell); Tite, 1963: 101.

NEW BRITAIN: Valoka, 12—13.vii.1962, 2 ♂; Bita Paka, 10.vii.1962, 1 ♂.

I. helicon occurs from Ceylon to north Australia, the present race being found in the Papuan region.

Catopyrops ancyra complicata (Butler)

Lampides complicata Butler, 1882: 150, Duke of York I.

Catopyrops ancyra (florinda?) complicata (Butler) Toxopeus, 1930: 149.

NEW BRITAIN: Valoka, 11.vii. 1962, 1 ♂. — MUSSAU: Malakata, 15.ii., and 10—11.vi.1962, 3 ♀.

Another wide-spread species, it is represented in the Bismarcks by subspecies *complicata*. Examples are in the B.M. from New Hanover, New Ireland, New Britain, Witu, Rook, and by a single female from Manus, Admiralty Islands.

Catopyrops kokopona (Ribbe)

Nacaduba kokopona Ribbe, 1899: 232, Pl. 4, fig. 7, Neu Pommern.
Catopyrops kokopona (Ribbe); Tite, 1963: 108.

NEW BRITAIN: Valoka, 4.vii.1962, 1 ♂; Yalom, 1000m., 10—24.v.1962, 6 ♂; Komgi, 1000m., 14.v.1962, 1 ♂.

This species is only known from the Bismarcks area, where it appears to be plentiful. Specimens in the B.M. are from Rook I., New Britain, Witu I., and St. Matthias.

Catochrysops amasea Waterhouse & Lyell

Catachrysops amasea Waterhouse & Lyell, 1914: 103, Banks, Darnley, and Murray Islands.

LAVONGAI: Banatam, 16—25.iii.1962, 2 ♂.

Inhabits New Guinea, the Bismarcks, and the Solomons.

Catochrysops panormus papuana Tite

Catochrysops panormus papuana Tite, 1959: 208, British New Guinea.

NEW BRITAIN: S. of Cape Hoskins Aerodrome, 6.vii.1962, 2 ♂; 5 miles E. of Mt. Bango, 6.vii.1962, 2 ♂; Bita Paka, 10.vii. 1962, 1 ♀. — DYAUL: Kollepine, 12.iii.1962, 1 ♂. — MANUS: Lorengau, 23.vi.1962, 1 ♀.

This race is found from Aru, New Guinea, and the Bismarcks. (See p. 54).

Euchrysops cnejus cnidus Waterhouse & Lyell

Euchrysops cnejus cnidus Waterhouse & Lyell, 1914: 100, Cape York.

DUKE OF YORK: Manuan, 20.vii.1962, 1 ♂, 1 ♀. — NEW IRELAND: Lemkamin, 900m., 11—16.iv.1962, 3 ♂; Nago Island near Kavieng, 13.i.1962, 2 ♀. — LAVONGAI: Banatam, 18—25. iii.1962, 3 ♂, 3 ♀. — MUSSAU: Boliu, 13.ii.1962, 1 ♂. — MANUS: Lorengau, 23—24.vi.1962, 3 ♂, 7 ♀.

Everes lacturnus palliensis Ribbe

Everes parrhassius palliensis Ribbe, 1899: 235, Neu Lauenburg.

DYAUL: Sumuna, 2—8.iii.1962, 1 ♂, 1 ♀. — LAVONGAI: Banatam, 19.iii.1962, 2 ♂. — MANUS: Lorengau, 23—24.vi.1962, 7 ♂, 2 ♀.

Zizula hylax dampierensis (Rothschild)

Zizera dampierensis Rothschild, 1915: 389, Dampier Island.

Zizera gaika Trimen; Rothschild (Misidentification) 1915: 389, Manus, Admiralty Islands.

NEW IRELAND: Danu, Kalili Bay, 3—30.iv.1962, 4 ♂, 1 ♀; Nago Island near Kavieng, 13.i.1962, 1 ♂; Lemkamin, 900m., 11iv.1962, 1 ♀. — DYAUL: Sumuna, 5—10.iii.1962, 2 ♂. — MUSSAU: Talumalaus, 19.i.—5.ii.1962, 3 ♂, 3 ♀; Boliu, 4—6. vi.1962, 3 ♂, 2 ♀; Malakata, 9.vi.1962, 1 ♀. — MANUS: Lombrum, 29.vi. 1962, 5 ♂, 4 ♀.

In the B.M., all the specimens from New Guinea, its neighbouring islands, the Bismarcks, the Solomons, and the New Hebrides are placed as *dampierensis*. Rothschild (1915) stated that the type series from Dampier I., and Vulcan I. differed in the greater extent of the dark margins above from what he referred to as *gaika* from the Admiralty Islands. Examination of the long series now in the B.M. reveals that, although there is a tendency in specimens from New Guinea, Dampier, and Vulcan to have wider margins than do those from the Bismarks, Solomons, and New Hebrides, this character is variable over the entire range, and it is not possible to divide the series on a geographical basis.

Subspecies *dampierensis* is distinguished from South Indian *hylax hylax* by its paler less violaceous blue ground, the narrower fuscous margins in the male, and by the female being always mostly blue above, never entirely fuscous.

The collective species is wide-spread in the African and Oriental regions, and is represented in the new world from Texas to Argentina by *cyma* Edwards.

Zizina otis lampra subsp. nov.

♂. All wings above are of a delicate slightly shining silver-blue colour, without a hint of the violaceous tint to be seen in other races of *otis* from the Oriental Region, including the nominate race from South China. There is on the fore wing a shadowy dusky margin of less than 1mm. in width, followed by a conti-

nuous submarginal series of dusky lunules. In some examples, these markings are diffuse, and appear as a single shadowy band of approximately 3mm. in width.

♀. The wings on the upperside are silver-blue, but are rather dingier in appearance than are those of the male, owing to a scattering of dusky scales. On the fore wing, the apical area and distal margin are diffusely darkened with fuscous to an individually variable extent; in this dark area, faint indications of submarginal spots with accompanying lunules can be detected. The hind wings are similar in colour; the whole costal area above vein 6 is dingy fuscous, and below that vein, there is a marginal line, and a series of submarginal spots with lunules similar to, but more clearly defined than, those of the fore wing.

♂♀. The underside does not differ from that of *otis aruensis* Swinhoe from Aru and New Guinea. Both sexes are very variable in size, the length of the fore wing (base to apex) varying from 10 to 14.5mm. in the examples in the B.M.

Holotype ♂. BISMARCK ARCHIPELAGO: Witu = French Island, vi.1925 (A. F. Eichhorn) B.M. Type No. Rh. 17034.

Allotype ♀. As holotype, B.M. Type No. Rh. 17035.

Other material in the B.M. BISMARCK ARCHIPELAGO: as holotype, 6 ♂, 3 ♀; Feni Island, E. of New Ireland, v—vi.1924 (Eichhorn) 7 ♂, 4 ♀; Kavieng, New Ireland, x.1936 (Cheesman) 1 ♂, 1 ♀; New Ireland, (Rev. G. Brown) 1 ♂, 1 ♀; New Ireland, ii.1924 (Eichhorn) 1 ♂; New Hanover, ii.1923, (Meek) 3 ♂, 1 ♀; New Hanover, ii.—iii.1897 (Webster) 1 ♂; New Britain (various collectors) 5 ♂, 1 ♀; Manus, Admiralty Islands, ix.—x.1913 (Meek) 4 ♂, 2 ♀; St. Matthias Island, vi.1923 (Eichhorn) 2 ♂, 1 ♀; Squally Island, viii.1923 (Eichhorn) 2 ♂.

Material of the Noona Dan Expedition:

NEW BRITAIN: Valoka, 4—11.vii.1962, 3 ♂, 3 ♀; Kwalakessi, 3.vii.1962, 2 ♂; S. of Cape Hoskins Aerodrome, 6.vii.1962, 3 ♂, 2 ♀; Yalom, 1000m., 19.v.1962, 1 ♂; Rabaul, 25.vii.1962, 1 ♂; Bita Paka, 10.vii.1962, 12 ♂, 1 ♀. — DUKE OF YORK: Manuan, 20.vii.1962, 1 ♂. — DYAUL: Sumuna, 7—13.iii.1962, 1 ♂, 2 ♀. — NEW IRELAND: Nago Island near Kavieng, 13.i.1962, 1 ♀. — LAVONGAI: Banatam, 16.iii.1962, 1 ♂. — MUSSAU: Talumalaus, 1—9.ii.1962, 3 ♂; Boliu, 13.ii.1962, 2 ♂ and 5—6.vi.1962, 5 ♂; Malakata, 11.vi.1962, 1 ♂.

Luthrodes cleotas cleotas (Guerin)

Polyommatus cleotas Guerin, 1838; 277, Pl. 18 fig. 4, New Ireland.

NEW BRITAIN: Bita Paka, 10.vii.1962, 1 ♂, 1 ♀. — NEW IRELAND: Danu, Kalili Bay, 28.iv.1962, 1 ♂, 1 ♀.

The species occurs from Wetter, South West Islands to Buru, New Guinea, the Bismarcks, and the Solomons. The nominate subspecies is found throughout the Solomons, including St. Matthias and Squally islands.

Narathura araxes eurisus (Druce)

Arhopala eurisus Druce, 1891; 370, Pl. 32 figs. 11—12, Guadalcanar.

Narathura araxes eurisus (Druce) Evans, 1957: 114.

DYAUL: Sumuna, 7.iii.1962, 1 ♀.

This race inhabits the whole of the Bismarcks and the Solomons. Other races extend westward to Sumatra and southwards to north Australia.

Arhopala thamyras phryxus Boisduval

Arhopala phryxus Boisduval, 1832: 75, New Guinea.

Arhopala thamyras phryxus Boisduval: Evans, 1957: 127.

MANUS: Lorengau 19—24.vi.1962, 1 ♂, 2 ♀.

This is the race from Waigeu, Aru, New Guinea, and the Solomons. The collective species is confined to the Moluccan-Papuan area.

Arhopala thamyras minnetta (Butler)

Amblypodia minnetta Butler, 1882: 152, Duke of York Island.

Arhopala thamyras minnetta (Butler) Evans, 1957: 127.

NEW BRITAIN: Valoka, 5.vii.1962, 1 ♂; Bita Paka, 10.vii. 1962, 1 ♀. — LAVONGAI: Banatam, 22.iii.1962, 1 ♂.

This race represents the species in the Bismarcks, but not in the Admiralty Islands.

Bindahara phocides chromis (Mathew). Comb. nov.

Sithon chromis Mathew, 1887: 47, Ugi, Solomons.

MANUS: Lombrun, 29.vi.1962, 1 ♀.

This is the Solomons and Bismarcks race; the collective species ranges from the Hymalayas to northern Australia.

Summary

The material is listed under two headings: (1) The Philippines, with 45 taxa; (2) The Bismarcks and Solomons, with 40 taxa. Brief

indications of the geographic range of each species are given, these being largely founded on the material in the B. M. collection. *Zizina otis lampra* ssp.n. is described from the Bismarck Islands. *Thysonotis danis latifascia* Rothschild, *Jamides aratus caerulina* (Mathew), and *Bindahara phocides chromis* (Mathew) are comb. nov. *Thysonotis subsuleima* Strand is cited as a syn. nov. of *Th. danis latifascia* Rothschild.

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A List of Danish Aphids.

6: *Aphis* L.

By
Ole E. Heie
Skive Seminarium, Skive

Parts 1—5 appeared in Entomologiske Meddelelser 1960 (29: 193—211), 1961 (31: 77—96), 1962 (31: 205—224), 1964 (32: 341—357), and 1967 (35: 125—141).

The author wishes to thank Professor Dr. F. Ossiannilsson, Uppsala, for loan of slides of *Aphis grossulariae* collected on Epilobium in Sweden.

List of the species

141. *Aphis acetosae* L., 1767.
142. *A. brohmeri* Börner, 1952.
143. *A. chloris* Koch, 1854.
144. *A. comosa* (Börner, 1950).
145. *A. confusa* Walker, 1849.
146. *A. corniella* (Hille Ris Lambers, 1935).
147. *A. craccae* L., 1758.
148. *A. craccivora* Koch, 1854.
149. *A. crepidis* (Börner, 1940).
150. *A. cytisorum* Hartig, 1841.
151. *A. diphaga* Walker, 1852.
152. *A. epilobii* Kaltenbach, 1843.
153. *A. fabae* Scop., 1763.
154. *A. farinosa* Gmelin, 1788.
155. *A. forbesi* Weed, 1889.
156. *A. frangulae* Kaltenbach, 1855.
157. *A. galii-scabri* Schrk., 1801.
158. *A. gossypii* Glover, 1854.
159. *A. grossulariae* Kaltenbach, 1843.
160. *A. hederae* Kaltenbach, 1843.
161. *A. hieracii* Schrk., 1801.
162. *A. hypochoeridis* (Börner, 1940).
163. *A. idaei* v. d. Goot, 1912.
164. *A. intybi* Koch, 1855.

165. *A. lambersi* (Börner, 1940).
166. *A. leontodontis* (Börner, 1950).
167. *A. mirifica* (Börner, 1950).
168. *A. nasturtii* Kaltenbach, 1843.
169. *A. origani* Pass., 1860.
170. *A. pilosellae* (Börner, 1952).
171. *A. podagrariae* Schrk., 1801.
172. *A. pomi* Deg., 1773.
173. *A. proffti* (Börner, 1942).
174. *A. psammophila* Szelegiewicz, 1967.
175. *A. ruborum* (Börner, 1931).
176. *A. rumicis* L., 1758.
177. *A. sambuci* L., 1758.
178. *A. schneideri* (Börner, 1940).
179. *A. sedi* Kaltenbach, 1843.
180. *A. subnitida* (Börner, 1940).
181. *A. tormentillae* Pass., 1879.
182. *A. triglochinis* Theobald, 1926.
183. *A. ulmariae* Schrk., 1801.
184. *A. urticata* Fabr., 1781.
185. *A. vaccinii* (Börner, 1940).
186. *A. vandergooti* (Börner, 1939).
187. *A. viburni* Scop., 1763.

Genus **APHIS** Linné, 1758.

141. *Aphis acetosae* Linné, 1767.

Aphis (Doralis) acetosae: Börner 1952, p. 77, no. 215.

This species or complex of species has been recorded from Rumex acetosa and R. acetosella in other countries. Danish samples from A. acetosella display shorter hairs on antennae and tibiae than do specimens from R. acetosa. The explanation of this difference may be that two species or subspecies are involved, but until further studies have been accomplished I prefer to treat them as one species. Jacob (1949) warns against subdivision within the so-called "Black Aphids" solely on the basis of hair length characters because he found that *Aphis sambuci* varied to a large degree in this respect. Subterranean life seems to involve shortening of antennal hairs in *A. sambuci*. In Denmark all colonies of the long-haired form of *A. acetosae* have been found on the aerial parts of Rumex acetosa, whereas all colonies of the short-haired form of *A. acetosae* have been found on the subterranean parts of R. acetosella or in surface level. So it is possible to believe that the morphological difference between these two forms is the result

of non-hereditary modification caused by environment just as seems to be the case in *Aphis sambuci*.

The form on Rumex acetosa:

Distribution: Europe. It is known from Sweden and Finland. It is very common in Northern Europe, but seems to be rather rare in Great Britain (Stroyan 1955).

Occurrence in Denmark: Collected (coll.) or only observed on Rumex acetosa s. lat. (= Rumex acetosa L. s. str. + R. thyrsiflorus Fing.) in Jutland at Hammer Bakker (28-7-65), Jetsmark in Vendsyssel (25-7-64), Haverslev in Han Herred (22-7-60), Vile in Salling (26-7-59), Skive (21-7-61), Krabbesholm Forest at Skive (21-7-57, 29-6-60), Resen at Skive (18-7-57), Lundø in Fjends (7-7-59, coll.), Hald in Fjends (3-8-57), Rebild (3-8-64), Strandkjær at Femmøller (4-8-59, coll.; 4-7-60), and Tulstrup at Knudsø (21-7-59); on Funen north of Fåborg (12-7-57, coll.), at Bjerne (15-7-57, coll.), Glamsbjerg (6-7-58, coll.), and Lumby in northern Funen (2-7-60); on Sealand at Trollesminde near Hillerød (1-8-56, coll.); on other islands at Byrum on Læsø (10-8-57, coll.), Besser on Samsø (10-8-58, coll.), and Onsbjerg on Samsø (12-8-58, coll.).

Rumex acetosa s. str. and R. thyrsiflorus are very similar; they differ in the shape of the leaves, and R. acetosa wears flowers in May-June, whereas R. thyrsiflorus flowers in July-August (Rostrup 1961). The aphid attacks both of them in the same way, feeding especially on the stems, which may be infested by so dense colonies that they look as if they have been tarred. The colonies are often visited by ants.

Measurements in mm: Arithmetical mean of 39 apt. vivip. females collected in July and August: Body 2,24 (observed range (O.R.) = 1,40—2,91, standard deviation (s) = 0,37), antennal segments III—VI 1,23 (O.R. = 0,93—1,59, s = 0,16), siphunculus 0,37 (O.R. = 0,23—0,46, s = 0,05), cauda 0,23 (O.R. = 0,18—0,29, s = 0,02), apical segment of rostrum 0,15 (O.R. = 0,13—0,17, s = 0,01), 2nd segment of hind tarsus 0,13 (O.R. = 0,11—0,16, s = 0,008). Hairs on IIIrd antennal segment longer than basal diameter of that segment. — Measurements of a single specimen (Læsø, August): Body 2,00, ant. segm. III—VI 0,30: 0,20:0,22:(0,13 + 0,33), siph. 0,34, cauda 0,23, 11 caudal hairs, apical segm. of rostrum 0,15, 2nd segm. of hind tarsus 0,13,

basal diameter of IIIrd ant. segm. 0,025, longest hair on IIIrd ant. segm. 0,029, hairs on hind tibia 0,04—0,05.

The form on Rumex acetosella:

Distribution: The short-haired, subterranean form is known from England (Stroyan 1955, p. 309, no. 33: *Aphis acetosae* Fabricius, 1775) and Denmark. Finds on R. acetosella are also recorded from Poland, Norway, and Sweden, but I do not know if they belong to the same short-haired, subterranean form. Börner (1952) does not mention Rumex acetosella as a host plant of *Aphis acetosae*.

Occurrence in Denmark: Collected on Rumex acetosella on subterranean parts and at the surface of the soil in Jutland at Blokhus (9-8-63, al., apt., juv.; 7-8-64, juv.), Strandkjær at Femmøller (5-8-59, al., apt., juv.; 5-7-60, apt., juv., also nymphs with wing pads), Brunshåb near Viborg (12-7-59, al., apt., juv.), and Henne (1-7-58, al., juv.).

The colonies are found on the host in sandy places in ants' nests. This form is paler than the acetosa-form, greenish black. It is mentioned as *Aphis acetosae* Stroyan (1955) pro Fabr. nec L. in Heie (1965, p. 8).

Measurements in mm: Arithmetical mean of 13 apt. vivip. females collected in July and August: Body 1,95 (O.R. = 1,47—2,33, s = 0,23), antennal segments III—VI 1,05 (O.R. = 0,86—1,18, s = 0,10), siphunculus 0,27 (O.R. = 0,20—0,34, s = 0,04), cauda 0,21 (O.R. = 0,18—0,23, s = 0,016), apical segment of rostrum 0,14 (O.R. = 0,13—0,15, s = 0,005), 2nd segment of hind tarsus 0,11 (O.R. = 0,10—0,12, s = 0,007). Hairs on IIIrd antennal segment shorter than half of the basal diameter of that segment. — Measurements of a single specimen (Strandkjær, August): Body 2,07, ant. segm. III—VI 0,27:0,17:0,20: (0,12 + 0,29), siph. 0,29, cauda 0,23, 12 caudal hairs, apical segm. of rostrum 0,13, 2nd segm. of hind tarsus 0,11, basal diameter of IIIrd ant. segm. 0,026, longest hair on IIIrd ant. segm. 0,012, hairs on hind tibia 0,03—0,04.

142. *Aphis brohmeri* Börner, 1952.

Aphis (Doralis) brohmeri Börner, 1952, p. 76 and 246, no. 200.
Aphis brohmeri: Stroyan 1955, p. 310.

Distribution: Germany, Sweden, England, Finland, U.S.S.R., Poland, and Denmark.

Occurrence in Denmark: Collected on Anthriscus silvestris in Jutland at Strandkjær at Femmøller (5-7-60) and on Funen at Bovense near Nyborg (9-7-58) and at Morud (10-7-58). The colonies occur on the lower part of the stem and are attended by ants. The species is monoecious.

143. *Aphis chloris* Koch, 1854.

Cerosipha chloris: Börner 1952, p. 89, no. 289.

Aphis chloris: Stroyan 1955, p. 311.

Distribution: Germany, France, England, Switzerland, Rumania, Italy, Poland, U.S.S.R., Hungary, Sweden, and Denmark.

Occurrence in Denmark: Found on subterranean parts of stems of Hypericum perforatum at Brunshåb near Viborg (12-7-59), Femmøller (6-7-60, not coll.), and Funder (12-7-60), and of H. maculatum at Femmøller (5-8-59), all in Jutland.

144. *Aphis comosa* (Börner, 1950).

Pergandeida (Doralida) comosa: Börner 1952, p. 83, no. 251.

Aphis comosa: Falk 1958, p. 624.

Distribution: Germany, Austria, Finland, Poland, Sweden, and Denmark.

Occurrence in Denmark: In Jutland collected at Blokhus on Lathyrus pratensis (1-7-66, 17-7-66, 10-8-66). The aphids formed large colonies on the stems of the host in a coniferous plantation in the dunes. The last-mentioned find consisted of a colony covered by soil particles in an ants' nest.

145. *Aphis confusa* Walker, 1849.

Aphis scabiosae Schrk., 1801 (not Scop., 1763): Theobald 1927, p. 179.

Cerosipha confusa: Börner 1952, p. 90, no. 299.

Distribution: Europe. It is known from Sweden and Finland.

Occurrence in Denmark: Collected on Knautia arvensis on Funen in Svanninge Bakker (12-7-57), on Læsø at Vesterø (9-8-59), and in Jutland at Hune in Vendsyssel (12-6-60), Blokhus (20-7-60), Hirtshals (26-7-60), Brønderslev (2-8-60), Dronninglund Storskov (22-9-58, ovip.), Løgstør (27-7-59), Ulbjerg in Himmerland (22-7-60), Nr. Vinge at Tjele (13 7-59), Hjarbæk Fjord (16-6-59), Dølby near Skive (19-7-57), Grinderslev in

Salling (21-8-57), Dalgas Plantation (15-10-59, ovip.), Haderup (9-7-59), Bryrup (10-7-58), Strandkjær at Femmøller (3-8-59, 5-7-60), Stubbe Lake in Djursland (6-7-60), and Brund near Horsens (28-6-59).

It is a very variable species with regard to size and colour of for instance the siphunculi. These may be all dark or more or less pale with a dark tip. Therefore I do not agree with Szelegiewicz (1967) when he says that Börner's *Cerosipha confusa* from Knautia arvensis and other Dipsacaceae cannot be identified with Walker's *Aphis confusa,* "denn Walker schreibt über seine *Aphis confusa,* dass "the tubes are pale yellow, with black tips", was gerade *A. thomasi* (Börn.) entspricht und nicht den Tieren von Knautia arvensis (L.) Coult." Szelegiewicz for this reason reduces *thomasi* Börner to a synonym of *confusa* Walker, and *confusa* Börner to a synonym of *ochropus* Koch. This is not obvious as Börner (1952) says that *thomasi* feeds on Scabiosa columbaria and ochroleuca only, whereas Walker (see Doncaster 1961, p. 46) found his *confusa* on Scabiosa arvensis (= Knautia arvensis), and as own observations show that it is possible to find large, dark-green specimens with dark siphunculi as well as smaller, paler specimens with pale, dark-tipped siphunculi on Knautia arvensis. The last-mentioned specimens do not fit in with Börner's diagnosis of *thomasi.*

146. *Aphis corniella* (Hille Ris Lambers, 1935).

Comaphis corniella: Börner 1952, p. 78, no. 217.

Distribution: Europe. It is known from Finland, Sweden, and Norway.

Occurrence in Denmark: Collected (coll.) or only observed in Jutland on Cornus at Skive (coll. 29-6-57, 17-5-59, 24-5-59, 11-5-61) and Oddense in Salling (24-6-67), and on Chamaenerium angustifolium at St. Vildmose (3-8-60, coll.), Blokhus (30-7-63, 15-9-63, 6-10-63 (coll., alate males and viviparous females), 14-8-64), Hammer Bakker (29-7-64, 24-7-67), Dronninglund Storskov (17-8-64), Rebild (3-8-64), Madum Lake (24-8-59), Hvalpsund (27-8-66), Krejbjerg in Salling (25-8-66), Fur (11-8-59, 25-8-60), Haderup (9-7-59, coll.), north of Aulum (9-7-59, coll.), Råsted (1-9-66), Brunshåb near Viborg (12-7-59), Hald Lake at Viborg (27-8-64), Brassø at Silkeborg (12-7-60, coll.), Himmelbjerget (28-8-64), Strandkjær at Femmøller (8-8-59),

Ahl Strand at Ebeltoft (6-8-59), Lyngballe Forest near Århus (21-7-59), and Gesten Forest near Lunderskov (20-8-65); on Sealand in yellow Moericke-tray at Ørslev (27-7-56, coll).

Cornus (alba and sanguinea) is the primary host, the leaves of which are curled up. Chamaenerium angustifolium is the secondary host; the aphids gather round the mid rib on the undersides of the middle and lower leaves which turn reddish or yellow-reddish. They are attended by ants.

147. *Aphis craccae* Linné, 1758.

Pergandeida craccae: Börner 1952, p. 83, no. 240.

Distribution: Europe, Asia, North America (Russell 1966). It is known from Sweden, Finland, and Norway.

Occurrence in Denmark: Found on Vicia cracca in Jutland at Blokhus (July and August, 1963—66), Hammer Bakker (14-8-63), Vodskov (14-8-63), Tambohus in Thy (23-7-63), Jegindø (23-7-63), Handbjerg near Struer (16-7-59), Skive (15-9-56, alate male, ovip., juv.), Frammerslev in Salling (26-7-63), near Legind Bjerge on Mors (19-5-65), and Nr. Vinge at Tjele (13-7-59).

148. *Aphis craccivora* Koch, 1854.

Pergandeida (Doralida) craccivora: Börner 1952, p. 83, no. 250.

Pergandeida (Doralida) loti: Börner 1952, p. 83, no. 248.

Aphis craccivora: Falk 1958, p. 620.

Distribution: Nearly all over the world (Europe, Asia, Africa, Australia, Pacific Islands, North and South America). It is known from Norway, Finland, and Sweden.

Occurrence in Denmark: In Jutland collected at Jebjerg in Salling on Caragana arborescens (26-7-58), at Skive on Lotus (6-7-63), and at Strandkjær at Femmøller on Lupinus luteus (5-8-59) and Capsella bursa-pastoris (6-7-60).

149. *Aphis crepidis* (Börner, 1940).

Cerosipha crepidis Börner, 1940, p. 4.

Toxopterina (Tuberculaphis) crepidis: Börner 1952, p. 93, no. 322.

Aphis crepidis: Stroyan 1955, p. 312.

Distribution: Germany, England, Poland, and Denmark.

Occurrence in Denmark: Collected on Crepis capillaris at Madum Lake in Jutland (3-9-58, 1 ovip., 1 nymph, 2 larvae). The reddish brown aphids sat on the stem and in the inflorescence.

150. *Aphis cytisorum* Hartig, 1841.

Aphis cytisorum: Falk 1958, p. 624.

Distribution: Europe. It is known from Sweden.

Occurrence in Denmark: The Laburnum-form (= *A. cytisorum* s. str. = *Pergandeida cystisorum:* Börner 1952, p. 81, no. 238) has been collected on Laburnum anagyroides (= vulgare) in Jutland at Skive (7-8-58) and on Samsø at Tranebjerg (10-8-58). It is also recorded from Vihøjgård in Jutland by Henriksen (1944, p. 125), where it was found by Sofie Rostrup in 1886.

The Sarothamnus-form (= A. *cytisorum* subsp. *sarothamni* (Franssen, 1928) = *Pergandeida sarothamni:* Börner 1952, p. 81, no. 236) has been collected on Sarothamnus scoparius in Jutland at Blokhus (24-7-61), Strandkjær at Femmøller (4-8-59), Himmelbjerget (21-7-59), and Juelsminde (28-6-59), and on Funen at Hylkedam (6-7-58).

151. *Aphis diphaga* Walker, 1852.

Aphis diphaga: Theobald 1927, p. 120.

Cerosipha diphaga: Börner 1952, p. 87, no. 282.

Distribution: England, Germany, Austria, Poland, U.S.S.R., Sweden, and Denmark.

Occurrence in Denmark: Collected in Jutland at Flyndersø on Epilobium hirsutum (22-7-57, apt., juv.).

152. *Aphis epilobii* Kaltenbach, 1843.

Aphis epilobii: Theobald 1927, p. 111.

Aphidula praeterita: Börner 1952, p. 79, no. 222 (the true Aphis praeterita Walker is according to Doncaster (1961) another species).

Distribution: Europe. It is known from Sweden and Finland.

Occurrence in Denmark: Collected on Epilobium montanum in Jutland at Vodskov in Vendsyssel (29-7-64), Jenle in Salling (28-7-63), Strandkjær at Femmøller (5-8-59), and Lyngballe Forest near Århus (21-7-59); on Funen at Nyborg (9-7-58); on Falster at Nr. Alslev (20-8-64, J. Reitzel leg.); on Læsø at Vesterø (9-8-57).

153. *Aphis fabae* Scop., 1763.

Aphis (Doralis) fabae: Börner 1952, p. 73, no. 194.

Distribution: All over the world. It is known from Sweden, Norway, and Finland.

Occurrence in Denmark: This species or complex of species is very common on many kinds of plants in all parts of the country. Only some findings represented in the writer's collection are mentioned below to show distribution and host plant range, but the species has been observed on many other occasions, especially on beets all over the country, and it is among the most frequent species in yellow Moericke-trays. The records include information about morphs collected (al., apt., juv.) because it is important when deciding if the plant in concern is a host or not. Alate specimens may alight on non-hosts, in certain cases bear youngs on them, too. Only when apterous adults occur on the plant there is some reason to believe that it is a host.

Jutland: On Euonymus europaeus at Skive (11-10-56, ovip., al.; 26-9-57, al., juv.; 28-6-58, al., apt., juv.; 7-8-58, juv.; 2-5-59, fundatrices; 16-5-59, fundatrices, al., apt., juv.; 22-7-60, apt.; 22-6-60, al., apt., juv.), on Viburnum opulus at Skive (16-5-59, nymphs), on Beta vulgaris (beet) at Borris (3-6-64, al., juv., C. Stapel coll.) and Ødum (in beet clamp, July 1957, juv., B. Petersen coll.), on Chenopodium album at Dølby near Skive (19-7-57, al., apt., juv.) and Egeris, Skive (31-8-58, apt., juv.), on Amaranthus caudatus at Studsgård (9-7-59, al., juv.), on Polygonum convolvulus in Krabbesholm Forest (9-9-58, al.), on Ranunculus at Tulstrup near Rye (21-7-59, apt., juv.), on Papaver dubium at Lundø in Fjends (7-7-59, al., juv.), on Glaucium flavum at Kås in Salling (31-8-55, apt., juv.), on Capsella bursa-pastoris at Skive (24-7-63, apt.) and Næsbydale in Himmerland (27-7-59, apt., juv.), on Impatiens noli-tangere at Støvring Nørreskov at Randers Fjord (13-7-59, al., juv.), on Tropaeolum at Blokhus (2-9-62, apt., juv.), on Fragaria (indoors) at Spangsbjerg (17-9-58, apt., K. Lindhardt coll.), on Lathyrus pratensis at Blokhus (1-8-63, al.), on Vicia faba at Højer (8-8-56, apt., juv.), on Angelica silvestris at Skive (14-9-58, al., apt., juv.) and Handbjerg (16-7-59, apt.), on Heracleum sphondyleum at Mariager (13-7-59, al., apt., juv.), on Torilis japonica at Tulstrup near Rye (21-7-59, al., apt., juv.), on Aster tripolium at Rønland near Harboøre (2-9-64, apt. it has too few marginal tubercles and too many caudal hairs to be *Aphis tripolii* Laing), on Chrysanthemum segetum at Tolne in Vendsyssel (20-8-56, apt., juv.), on Chrysanthemum sp. (cultivated) at Skive (8-8-62, al.,

apt., juv.), on Dahlia at Skive (5-9-60, al., apt., juv.), on Matricaria matricarioides at Skive (1-7-59, apt., juv.), on M. inodora at Vodskov in Vendsyssel (18-8-62, apt., juv.), on Senecio vulgaris at Lundø (7-7-59, al.) and Studsgård (9-7-59, al., apt., juv.), on Aphelandra at Skive (indoors, 22-8-58, apt., juv., N. J. Winther coll.).

Funen: On Beta vulgaris (beet) at Årslev (28-7-56, al., apt., juv.) and in a clamp at Blangstedgård (July 1957, al., apt., juv., B. Petersen coll.), on Dipsacus silvestris in Odense (12-9-60, apt., juv., P. Hammer coll.), on Carduus crispus at Nyborg (9-7-58, apt., juv.).

Sealand: On Euonymus europaeus at Tryggevælde, Stevns (7-5-50, fundatrices), on Philadelphus coronarius at Holte (2-6-60, apt., juv.; 17-10-60, ovip., al., juv., J. Jørgensen coll.), on Philadelphus sp. at Virum (23.7.54, al., apt., juv., O. Wagn coll.), on Urtica urens at Høng (5-8-55, apt., juv.) and Lyngby (3-7-58, al., apt., juv.), on Chenopodium album near Næstved (14-8-58, al.), on Capsella bursa-pastoris at Lyngby (3-7-58, al., juv.), on Pyrus communis at Lyngby (6-7-59, al., apt., juv., and 14-7-59, apt., juv., large colonies, Hille Ris Lambers det.), on Trifolium pratense at Klampenborg (22-7-63, juv., C. Stapel coll.), on Calendula arvensis at Bagsværd (15-8-58, apt.), on Chrysanthemum segetum near Næstved (14-8-58, al., apt., juv.), on Cirsium palustre on Luknam at Furesø (16-8-58, apt., juv.), on Dahlia at Virum (4-9-50, apt.), on Larix decidua at Bagsværd (15-8-58, al., juv.).

Other islands: On Papaver somniferum at Sophiehøj near Rødby on Lolland (4-8-56, al., apt.), on Malva silvestris at Landet on Tåsinge (3-7-57, al., juv.), on Cirsium arvense on Avernakø (11-7-57, al., apt.), on Chenopodium album at Onsbjerg on Samsø (10-8-58, al., apt., juv.), on Hypericum perforatum at Ballebjerg on Samsø (11-8-58, al., juv.), on Anchusa officinalis at Hårdmark on Samsø (12-8-58, juv.), and on Solanum nigrum at Onsbjerg on Samsø (10-8-58, al., juv.).

The species has been mentioned by several Danish authors, e. g. Sofie Rostrup (1900, 1912), Sv. G. Larsson (1940, 1940a, 1941, 1941a, 1943), Henriksen (1944, from Chenopodium and beets), Bovien & Thomsen (1945, 1950), Børge Petersen (1959), Heie (1951, 1960b, 1961, 1962), and in the monthly and annual surveys from the Dansh State Experimental Station for Plant Diseases and Pests (syn. *Aphis papaveris*). The Danish name is: Bedebladlus (or bedelus).

Euonymus, Viburnum, and Philadelphus are primary hosts, and numerous plant species may serve as secondary hosts. The aphid is most abundant on cultivated plants as beets, Dahlia, Vicia faba a. o. Among the weeds Chenopodium, Matricaria, and Capsella are often attacked. It is not common to find attacks on pear, but large colonies may develop here in early summer causing leaf curling.

Hibernation takes place as eggs on primary hosts. Though the aphids are brought into the beet clamps in the autumn they cannot survive during the winter there. When specimens are found on beets in clamps in early summer, they have been born by alate mothers arrived from other plants in the spring.

154. *Aphis farinosa* Gmelin, 1788.

Aphis saliceti Kaltenbach, 1843: Theobald 1927, p. 171.

Aphidula farinosa: Börner 1952, p. 78 (Medoralis f.), p. 265, no. 218.

Distribution: Holarctic. It is known from Sweden, Finland, and Norway.

Occurrence in Denmark: In Jutland collected on Salix caprea at Madum Lake (19-6-58), on S. cinerea on Rømø (3-7-58) and at Kongsø near Bryrup (11-7-58), on S. smithiana (one dying aptera) and S. dasyclados (only one alata) at Studsgård (18-6-64), on S. sp. at Madum Lake (17-6-58) and at Kjellerup (24-6-64), and observed on Salix south of Vejle (12-6-66). On Sealand collected on Salix in Copenhagen (30-6-18, M. Thomsen leg.) and on S. viminalis at Bagsværd (15-8-58, 2 apt. viv. + 1 juv.).

The species is monoecious. According to the litterature colonies are found on Salix in spring and early summer, only. The eggs are laid in early summer. The sample from Kongsø from July 11 thus consisted of oviparous females and males. The record from Bagsværd of viviparous females as late as in the middle of August is rather unusual, as viviparous females normally disappear in July.

155. *Aphis forbesi* Weed, 1889.

Cerosipha forbesi: Börner 1952, p. 90, no. 296.

Distribution: Europe, North America.

Occurrence in Denmark: Collected on Fragaria

(cultivated strawberries) at Lyngby on Sealand (3-7-58, al., apt., juv.; 10-9-59, juv.; K. Lindhardt coll.).

There are no other records from this country though strawberries have been examined at several localities in 1958—59 (Heie 1961b, p. 60—61). The Danish name is: Den lille jordbærbladlus.

156. *Aphis frangulae* Kaltenbach, 1855 s. lat.

Cerosipha frangulae Kalt.: Börner 1952, p. 87, no. 279.
C. beccabungae Koch: Börner 1952, p. 87, no. 280.
C. epilobiina Walker: Börner 1952, p. 87, no. 281.
Aphis praeterita Walker: Doncaster 1961, p. 109.
A. frangulae s. lat.: F. P. Müller 1961, p. 49.

Distribution: Europe. It is known from Sweden, Finland, and Norway.

Occurrence in Denmark: Collected in Jutland on Frangula alnus at Madum Lake in Himmerland (25-5-59), on Lamium amplexicaule in the city of Århus (14-8-57), and on Chamaenerium angustifolium at Lyngballe Forest near Århus (21-7-59), at Brunshåb near Viborg (12-7-59), and at Hald Lake south of Viborg (27-8-64).

As in Heie & Heikinheimo (1966, p. 121) *Aphis frangulae* in accordance with the opinion of Müller (1961) is considered a complex of forms comprising Börner's species nos. 279, 280, and 281, all of which being holocyclic and heteroecious with Frangula alnus as the primary host. According to the host plants the aphids from Lamium may be *beccabungae,* and the aphids from Chamaenerium *praeterita* (Walker, not Börner). The biology and taxonomy of this species complex is very difficult, and no adequate information has thus far been published to separate the various inferior taxa from each other and from the very similar anholocyclic species *gossypii* Glover.

For occurrence on potatoes, see *Aphis gossypii.*

157. *Aphis galii-scabri* Schrk., 1801.

Cerosipha (Uraphis) galii-scabri: Börner 1952, p. 84, no. 260.

Distribution: Europe. It is known from Finland and Sweden.

Occurrence in Denmark: This aphid is mentioned as *Aphis galii* Kaltenbach by Henriksen (1944, p. 165, no. 481) from Lolland at Ravnsby Bakke on Galium mollugo (27-7-1901, Ove Rostrups obs.) with reference to no. 1140 in Ross & Hedicke.

158. *Aphis gossypii* Glover, 1854.

Cerosipha gossypii: Börner 1952, p. 88, no. 286.

Distribution: All over the world. It is recorded from Norway, Sweden, and Finland.

Occurrence in Denmark: Collected in Jutland on potato, Solanum tuberosum, at Fjelstervang (9-8-56) and Studsgård (13-7-60). Observed on potato leaves on Sealand at Virum and Glostrup, and on Lolland at Vesterborg. Rather common on potatoes, though not as common as *A. nasturtii*. *Aphis gossypii* is mentioned as a pest to pumpkins in Bovien & Thomsen (1945, 1950). In the annual surveys of pests from the Danish State Experimental Station for Plant Diseases and Pests (Statens plantepatologiske Forsøg) attacks of this species on Cucurbitaceae are mentioned several times, on late melons at Bækkeskov on Sealand in 1920 (p. 743), on cucumbers at Lyngby on Sealand and at Aalborg in Jutland in 1921 (p. 228) and at Glostrup on Sealand in 1922 (p. 286), and — with question mark after the species name — on cucumbers at Blangsted on Funen in 1924 (p. 395), on cucumbers and melons at Odense on Funen in 1925 (p. 124), and on melons at Oringe on Sealand in 1926 (p. 817), and on melons in Denmark (no locality mentioned) in 1930 (p. 472).

It is not possible to separate this anholocyclic species with certainty from the holocyclic *A. frangulae*. The records from potato may concern *frangulae* (Tambs-Lyche 1957, Müller 1961).

Aphis gossypii is polyphagous and according to Börner (1952) it hibernates in glass houses.

159. *Aphis grossulariae* Kaltenbach, 1843.

Aphis grossulariae: Theobald 1927, p. 169.

Aphidula grossulariae: Börner 1952, p. 78, no. 220.

Aphidula despecta: Börner 1952, p. 79, no. 223.

Distribution: Europe. It is known from Sweden, Norway, and Finland.

Occurrence in Denmark: In Jutland collected on Ribes uva-crispa at Skive (5-6-58, fundatrix, juv.; 24-5-59, apt.), on Epilobium obscurum at Skive (16-7-58, apt., juv.), on E. hirsutum at Lyby in Salling (2-8-57, 1 alate male, 1 nymph) and at Flyndersø south of Skive (22-7-57, apt.), and on E. montanum at Løgumkloster (5-7-58, al., apt., juv.). On Sealand collected on E. montanum at Holte (16-8-58, apt., juv.) and on E. hirsutum

at Luknam at Furesø (15-8-57, apt., juv.).

Börner (1952) says that *grossulariae* is a monoecious species whereas Stroyan (1952) gives Epilobium as summer host. This is confirmed by later authors. On gooseberry it causes leaf curling in the spring. Bovien & Thomsen (1945) mention *grossulariae* as a pest to gooseberries in this country (Danish name: Stikkelsbærbladlus). The records of *grossulariae* from Ribes rubrum and R. nigrum given by Henriksen (1944, p. 107) and Jensen (1962, p. 156) presumably concern *Aphis schneideri,* however.

160. *Aphis hederae* Kaltenbach, 1843.

Aphis (Doralis) hederae: Börner 1952, p. 75, no. 198.

Distribution: Europe, Israel, Turkey, South Africa, North America. It is known from Sweden.

Occurrence in Denmark: Collected on Hedera helix (ivy) at Skive (4-6-59, N. J. Winther leg.). Traces of aphid attacks on ivy have also been observed on Funen at Fåborg (10-7-57), but the aphids had been killed by an insecticide and could not be examined.

161. *Aphis hieracii* Schrk., 1801.

Cerosipha hieracii: Börner 1952, p. 91, no. 302.

Distribution: Germany, Austria, Sweden, France, Norway, Finland, U.S.S.R., Poland, and Denmark.

Occurrence in Denmark: Collected on Hieracium umbellatum in Jutland at Blokhus (14-8-63), Holmslands Klit (30-6-58), Henne Strand (1-7-58), and on Rømø (3-7-58).

162. *Aphis hypochoeridis* (Börner, 1940).

Cerosipha hypochoeridis: Börner, 1940, p. 4.

Cerosipha hypochoeridis: Börner 1952, p. 91, no. 305.

Distribution: Germany, England, Scotland, Sweden, Poland, and Denmark.

Occurrence in Denmark: In Jutland collected on Hypochoeris radicata at Sejstrup in Fjends (16-6-59, apt., juv.) and Haderup (13-7-60, al., apt., juv.), on Hypochoeris sp. at Strandkjær at Femmøller (4-8-59, apt., juv.; 8-9-60, ovip.), and on Rømø (4-7-58, apt., juv.); it has also been observed at Blokhus (17-7-60) and Fuglsø (14-9-62).

The aphids have been found partly on undersides of the rosettes, partly on the root, attended by ants. The intraspecific variation with regard to size and colour is considerable.

163. *Aphis idaei* v. d. Goot, 1912.

Aphis idaei: Theobald 1927, p. 147.

Aphidula idaei: Börner 1952, p. 80, no. 227.

Distribution: Europe. It is known from Sweden, Norway, and Finland.

Occurrence in Denmark: In Jutland collected on Rubus idaeus in Dronninglund Storskov (22-9-58), at Madum Lake in Himmerland (10-6-58, 5-9-58), Brunshåb near Viborg (12-7-59), and Studsgård (9-7-59) and observed at Strandkjær at Femmøller (7-8-59) and in Lyngballe Forest near Århus (21-7-59). On Funen collected at Morud (10-7-58) and at Årslev (in yellow Moericke-tray, 27-7-56). On Sealand collected at Ørslev (in yellow tray, July 1956).

As a pest to raspberries it is only of minor importance in Denmark.

164. *Aphis intybi* Koch, 1855.

Pergandeida (Doralida) intybi: Börner 1952, p. 83, no. 254.

Distribution: Europe, Israel. It is known from Sweden.

Occurrence in Denmark: Collected (coll.) or only observed on Cichorium intybus on Funen east of Fåborg (13-7-57), on Tåsinge east of Bjerreby (3-7-57, coll.), on Langeland at Rudkøbing (5-7-57, coll.), on Strynø (7-7-57), on Ærø (8-7-57), on Avernakø (11-7-57), and on Lolland at Sandby near Harpelunde (22-6-60).

165. *Aphis lambersi* (Börner, 1940).

Doralina lambersi: Börner, 1940, p. 3.

Toxopterina (Tuberculaphis) lambersi: Börner 1952, p. 92, no. 311.

Aphis lambersi: Stroyan 1955, p. 314.

Distribution: Germany, Switzerland, England, Poland, U.S.S.R., Hungary, and Denmark.

Occurrence in Denmark: Collected on Daucus carota in Jutland at Funder (12-7-60, apt., juv.); on Avernakø (11-7-57, apt., juv.); on Samsø north of Ballen (10-8-58, apt., juv.) and at Permelille (12-8-58, apt., juv.). The aphids are found on lower parts of stems and leaf sheaths and the upper part of the root.

166. *Aphis leontodontis* (Börner, 1950).

Doralina leontodontis: Börner, 1950, p. 7.

Toxopterina (Tuberculaphis) leontodontis: Börner 1952, p. 93, no. 324.

Distribution: Germany (Naumburg), Sweden (Uppsala), Poland, and Denmark.

Occurrence in Denmark: In Jutland collected on undersides of etiolated proximal parts of basal rosettes of Leontodon autumnalis in the coniferous plantation in the dunes at Blokhus (10-7-64, al., apt., juv.), attended by ants, who had covered the aphid colony with soil particles.

167. *Aphis mirifica* (Börner, 1950).

Cerosipha mirifica: Börner 1952, p. 87, no. 283.

Aphis mirifica: Stroyan 1957, p. 332.

Distribution: Germany, England, Poland, and Denmark.

Occurrence in Denmark: Collected on Chamaenerium angustifolium in Jutland at Brassø at Silkeborg (mainly on subterranean parts of the host, 12-7-60), in coniferous plantation at Fly south of Skive (on subterranean parts and undersides of curled leaves, 25-7-59), and at Blåbjerg at Henne (in the top of the plant, 1-7-58).

168. *Aphis nasturtii* Kaltenbach, 1843.

Aphis solanina: Theobald 1927, p. 166.

Doralis rhamni: Ossiannilsson 1943, p. 29.

Aphidula nasturtii: Börner 1952, p. 79, no. 226.

Distribution: Cosmopolitan. It is known from Finland, Sweden, and Norway. For further information, see Gleiss (1966).

Occurrence in Denmark: Common on potato (Solanum tuberosum) all over the country; observed 1948—52 by the writer on Amager, on Sealand (Glostrup, Tåstrup, Virum, Boeslunde, Skælskør), and on Lolland (several localities); in Jutland observed at Ø. Lyby in Salling (19-7-56) and Holstebro (1-7-59) and collected at Studsgård (9-8-56, 9-7-59).

As a pest to potato it is mentioned by Rostrup (Vort Landbrugs Skadedyr, from the 4th edition, 1928) and Bovien & Thomsen (1945).

According to Börner the primary host is Rhamnus (cathartica, alnifolia) and the secondary hosts are Nasturtium, Veronica, Solanum, and several other plants belonging in several families.

169. *Aphis origani* Pass., 1860.

Cerosipha origani: Börner 1952, p. 86, no. 271.

Aphis origani: Stroyan 1957, p. 333.

Distribution: Europe.

Occurrence in Denmark: Henriksen (1944, no. 444, p. 155) mentions *Aphis nepetae* Kaltenbach from Origanum vulgare at Bøllesminde Hestehave on Lolland (22-7-1900, Sofie Rostrup leg.), referring to Ross & Hedicke no. 1670. According to Börner (1952, p. 86) *Aphis nepetae* occurs on Nepeta only, whereas the closely related *Aphis origani* lives on Origanum, and its gall corresponds with Ross & Hedicke no. 1670. Consequently this record must apply to *A. origani*. I have not seen the species myself.

170. *Aphis pilosellae* (Börner, 1952).

Cerosipha hieracii Börner, 1940, p. 4.

Cerosipha pilosellae Börner, 1952, p. 91, no. 306.

Aphis pilosellae Hille Ris Lambers, 1955, p. 236.

Aphis pilosellae: Stroyan 1957, p. 335.

Distribution: Germany, Austria, England, Netherlands, U.S.S.R., Poland, Sweden, and Denmark.

Occurrence in Denmark: In Jutland collected at Strandkjær at Femmøller on undersides of basal leaves of Hieracium pilosella (5-7-60, apt., juv.), attended by ants (Heie 1965).

171. *Aphis podagrariae* Schrk., 1801.

Aphis (Doralis) podagrariae: Börner 1952, p. 76, no. 201.

Aphis podagrariae: Stroyan 1955, p. 316.

Distribution: Europe. It is known from Sweden.

Occurrence in Denmark: Collected on Funen at Horne on Aegopodium podagraria (14-7-57, apt., juv.).

The leaflets of the infested plant were folded around the aphids. According to Börner the species is monoecious.

172. *Aphis pomi* Deg., 1773.

Aphis pomi: Theobald 1927, p. 133.

Aphidula (Medoralis) pomi: Börner 1952, p. 81, no. 231.

Distribution: Nearly all over the world. It is known from Sweden, Norway, and Finland.

Occurrence in Denmark: In Jutland found on Pyrus malus at Aalborg (20-8-50), Hammer Bakker (24-7-67), Skive (17-6-56, 3-9-56, 17-6-59, 14-7-63), between Skive and Fly (13-5-59), and Lyngballe Forest near Århus (21-7-59), on Crataegus

monogyna at Hune in Vendsyssel (5-6-65), and on Crataegus sp. at Aalborg (2-8-62), Skive (13-9-58), and Lundø in Fjends (28-7-63). On Funen collected on Crataegus oxyacantha east of Bjerne near Fåborg (15-7-57). On other islands found on Crataegus oxyacantha on Lyø (11-7-57), on Crataegus sp. on Læsø (7-8-57), on Pyrus malus at Brattingsborg on Samsø (10-8-58), and on an unknown bush belonging in Pomaceae at Nykøbing on Falster (15-8-58).

It is a well known pest to apple trees in all parts of Denmark, mentioned by several authors (Bovien & Thomsen 1945, Henriksen 1944; Danish name: Den grønne æblebladlus). It is a non-migrating species which according to Börner & Heinze (1957) lives on several genera within Pomaceae: Crataegus, Mespilus, Sorbus, Pyrus, Cydonia, Cotoneaster. It is attended by ants.

173. *Aphis proffti* (Börner, 1942).

Doralina proffti Börner, 1942, p. 261.

Aphidula proffti: Börner 1952, p. 80, no. 230.

Distribution: Austria, Germany, Sweden, Poland, Hungary, and Denmark.

Occurrence in Denmark: Collected on Lolland at Sophiehøj near Rødby on Agrimonia (15-8-58, 5 apt.).

174. *Aphis psammophila* Szelegiewicz, 1967.

Aphis psammophila Szelegiewicz, 1967, p. 555.

Distribution: Poland, Netherlands, Czecho-Slovakia (according to Szelegiewicz 1967), and Denmark.

Occurrence in Denmark: Collected on subterranean parts of Campanula rotundifolia at Strandkjær at Femmøller, the area of the Mols Laboratory, in Jutland (7-7-60, apt.). Attended by ants. This species, which recently has been described from Poland, has only been found on Jasione montana previously, and according to Szelegiewicz it does not migrate, but lays its eggs on the subterranean parts of its herbaceous host in the autumn.

The present material deviates from the type material of *A. psammophila* by having marginal tubercles not only on abdominal segments I and VII, but also on interjacent segments. I want to thank Dr. Szelegiewicz for sending me a paratype for comparison.

In my list of aphid species from the area of the Mols Laboratory it is recorded as *Aphis* sp. (Heie 1965, p. 1 and 8).

175. *Aphis ruborum* (Börner, 1931).

Aphidula mordvilkiana (Dobrowljansky, 1913): Börner 1952, p. 80, no. 228.

Aphis ruborum: Stroyan 1955, p. 317.

Distribution: Europe, Israel, Turkey. It is known from Sweden (Öland).

Occurrence in Denmark: Collected on Rubus fruticosus (bramble) in Jutland at Strandkjær at Femmøller (4-8-59) and on Funen near Fåborg (13-7-57).

176. *Aphis rumicis* Linné, 1758.

Aphis (Doralis) rumicis: Börner 1952, p. 77, no. 214.

Distribution: Europe, Asia. It is known from Sweden and Norway.

Occurrence in Denmark: In Jutland collected on Rumex at Kjellerup (1-8-59), Strandkjær at Femmøller (6-7-60), Lønstrup in Vendsyssel (24-7-60), St. Vildmose (19-6-63), Krabbesholm Forest at Skive (11-6-63), and Skive (4-7-63, 16-7-63).

The aphids mainly occur on the undersides of leaves rolled inwards along the mid rib. The species is monoecious on Rumex spp., especially R. obtusifolius.

177. *Aphis sambuci* Linné, 1758.

Aphis sambuci: Theobald 1927, p. 95.

Aphis sambuci: Börner 1952, p. 73, no. 192.

Aphis sambuci: Iglisch 1966.

Distribution: Holarctic. It is known from Sweden and Finland.

Occurrence in Denmark: Very common. Collected (coll.) or only observed in Jutland on Sambucus nigra at Skive (2-9-56, coll.; 25-6-57, coll.; observed several times), Krabbesholm Forest at Skive (23-7-58), Glyngøre (10-7-59), Vodskov in Vendsyssel (29-7-64), Blokhus (15-6-65), Legind Bjerge on Mors (3-6-59), Højris on Mors (10-7-60), Tvede near Randers Fjord (13-7-59), Juelsminde (28-6-59), Studsgård (9-7-59), and Bryrup (10-7-58), on Melandrium rubrum in Krabbesholm Forest (8-7-59, coll.), on Melandrium album at Brunshåb near Viborg (12-7-59, coll.), on Rumex sp. at Sdr. Lem Vig near Skive (28-8-60, coll.), and in yellow Moericke-trays at Tylstrup, Borris, and Jyndevad (July and August, 1956); on Funen on Sambucus nigra at Svendborg (3-7-57), Fåborg (10-7-57), and Diernæs (12-7-57), and in yellow

tray at Årslev (20-7-56, 17-8-56, coll.); on Sealand on Sambucus nigra at Ringsted (13-10-57, coll.), Ålsgårde (16-6-18, M. Thomsen coll.), and Holte (16-8-58), on Poa annua (incidentally, it is not a true host) at Lyngby (24-6-61, coll.), in yellow Moericke-tray at Ørslev (from 22-6-56 to 10-8-56, coll.), flying in the air at Holte (30-6-59, J. Jørgensen coll.), and on Dianthus sp. in Copenhagen (August, 1928, unknown collector); on other islands on Sambucus nigra at Onsbjerg on Samsø (10-8-58, coll.), Tranebjerg on Samsø (10-8-58), Tullebølle on Langeland (6-7-57), Marstal on Ærø (10-7-57), on Avernakø (11-7-57), and on Lyø (11-7-57).

The species is mentioned from Sambucus nigra by Bovien & Thomsen (1945, 1950) and Heie (1967). The Danish name is: Hyldebladlus (hyldelus).

Large colonies occur on Sambucus in June, July, and August, often visited by ants. Oviparous females have been collected in October (at Ringsted). I have never found males, eggs, or fundatrices. In July and August viviparous females (apterae and alatae) were collected from secondary hosts belonging to the plant families Caryophyllaceae (Dianthus, Melandrium) and Polygonaceae (Rumex), partly underground, partly close above soil level.

It is still unknown how it hibernates in Denmark. In the beginning of June so large numbers of *Aphis sambuci* have been observed on basal shoots growing from soil level that it may be assumed that overwintering of parthenogenetic, viviparous females in mild winters may take place on subterranean parts of Sambucus like in England (Jacob 1949). In England it can overwinter on Sambucus as eggs and as viviparae and on secondary hosts as viviparae.

The biology has recently ben thoroughly studied in Germany near Berlin by Iglisch (1966). Here the aphids leave Sambucus in July and migrate to Rumex and Caryophyllaceae, from which gynoparae and males return to Sambucus in autumn. Oviparae can, but males cannot — according to Iglisch — arise from mothers bred on Sambucus, so consequently the host alternation is obligate.

178. *Aphis schneideri* (Börner, 1940).

Doralina schneideri Börner, 1940, p. 3.

Apidula schneideri: Börner 1952, p. 79, no. 221.

Aphis schneideri: Stroyan 1955, p. 318.

Distribution: Europe, Turkey. It is known from Sweden, Norway, and Finland.

Occurrence in Denmark: Collected in Jutland at Hornum on Ribes nigrum (25-6-59), on Funen at Fåborg on Ribes nigrum (16-7-56, 6-7-58) and R. rubrum (6-7-58), and on Sealand at Hørsholm on Ribes rubrum (6-8-64, J. Reitzel coll.).

179. *Aphis sedi* Kaltenbach, 1843.

Aphis sedi: Theobald 1927, p. 127.

Cerosipha sedi: Börner 1952, p. 88, no. 284.

Distribution: Europe, North America, perhaps also Australia (Eastop 1966). It is known from Sweden, Norway, and Finland.

Occurrence in Denmark: In Jutland collected on Sedum telephium in Krabbesholm Forest at Skive (28-9-58, ovip., apt., juv.), at Fly south of Skive (21-9-67, ovip., apterous male), and at Ebeltoft (6-8-59, apt., juv.), on Sedum spurium at Sjørrind in Thy (July 1957, apt.), and on cultivated Sedum sp. at Ø. Lyby in Salling (19-7-56, al., apt.). On Sealand collected on Sedum telephium at Ålsgårde (9-8-17, al., M. Thomsen coll.).

180. *Aphis subnitida* (Börner, 1940).

Doralina subnitida Börner, 1940, p. 3.

Toxopterina (Tuberculaphis) subnitida: Börner 1952, p. 92, no. 313.

Distribution: Austria, Poland, U.S.S.R., Finland, Sweden, and Denmark.

Occurrence in Denmark: Collected on Langeland at Ristinge Klint on Pimpinella saxifraga (6-7-57, apt., juv.). A colony was found on the stem, attended by ants.

181. *Aphis tormentillae* Pass., 1879.

Aphis tormentillae: Theobald 1927, p. 190.

Cerosipha tormentillae: Börner 1952, p. 90, no. 293.

Distribution: Italy, England, Scotland, Germany, U.S.S.R., Poland, Hungary, Sweden, Finland, and Denmark.

Occurrence in Denmark: In Jutland collected on Potentilla erecta on Rømø (3-7-58). On Sealand collected on Comarum palustre at Luknam at Furesø (16-8-58).

182. *Aphis triglochinis* Theobald, 1926.

Aphis triglochinis: Theobald 1927, p. 195.

Aphidula triglochinis: Börner 1952, p. 80 (Medoralis (Leucosiphon) tr.), p. 265, no. 226a.

Distribution: England, Germany, Sweden, Netherlands, Poland, and Denmark.

Occurrence in Denmark: Collected in Jutland at Skive on Ribes nigrum (9-6-57, apt., juv.) and at Mellerup at Randers Fjord on Triglochin maritima (13-7-59, apt., juv.).

According to Hille Ris Lambers & Dicker (1965) the primary host is Ribes (rubrum and nigrum) and the secondary hosts are Triglochin maritima, Rorippa silvestris, Barbarea vulgaris, B. stricta, Myosotis palustris, Anemone coronaria a.o.

183. *Aphis ulmariae* Schrk., 1801.

Aphidula ulmariae: Börner 1952, p. 80, no. 229.

Distribution: Europe. It is known from Sweden and Finland.

Occurrence in Denmark: In Jutland collected on Filipendula ulmaria at Skive (2-9-56, apt.) and at Tranum (16-8-63, apt., juv.). Visited by ants.

The leaves of the host plant are strongly curled. This deformity is mentioned by Henriksen (1944, p. 114) as caused by aphids which probably belong with this species: "Aphidae spp. (an *Macrosiphum ulmariae* Schrk.?)" The generic name in the parenthesis is due to confusion between *Aphis ulmariae* Schrk. and *Macrosiphum cholodkovskyi* Mordv. which lives on the same host, but never causes leaf-curling. Henriksen recorded the leaf-curling from Tisvilde on Sealand and Sæbygårdsskov in Jutland (Sofie Rostrup obs.).

184. *Aphis urticata* Fabr., 1781.

Aphis urticaria Kaltenbach, 1843: Theobald 1927, p. 176.

Aphidula urticata: Börner 1952, p. 78, no. 219.

Distribution: Europe, Middle East. It is known from Sweden, Finland, and Norway.

Occurrence in Denmark: Collected (coll.) or only observed on Urtica dioica in Jutland at Sødal near Viborg (16-6-57, coll.), Dølby at Skive (19-7-57), and — by sweeping — at Strandkjær at Femmøller (7-8-59, coll.); on Funen at Hylkedam (6-7-58); on other islands on Turø (2-7-57).)

185. *Aphis vaccinii* (Börner, 1940).

Doralis vaccinii Börner, 1940, p. 2.

Aphis (Doralis) vaccinii: Börner 1952, p. 75, no. 197.

Distribution: Germany, Netherlands, Austria, Switzerland, Poland, U.S.S.R., Sweden, England, Finland, and Denmark.

Occurrence in Denmark: Collected on Vaccinium uliginosum in Jutland at Madum Lake in Himmerland (3-9-58), St. Vildmose (19-6-63), and Blokhus (4-8-63, 30-7-64). An alate male was found on August 4, and an oviparous female was found on September 3, both times together with viviparous females. According to Börner the species does not migrate.

186. *Aphis vandergooti* (Börner, 1939).

Aphis plantaginis (pro Schrk., 1801): Theobald 1927, p. 129.

Toxopterina vandergooti: Börner 1952, p. 93, no. 325.

Distribution: Europe. It is known from Sweden and Finland.

Occurrence in Denmark: Very common on subterranean parts of Achillea millefolium and other composites. In Jutland collected (coll.) or only observed on Achillea millefolium at Hirtshals (26-7-60, coll.; 27-7-64), Blokhus (19-7-60, coll.), V. Hjermitslev (2-8-60), south of Hjørring (10-8-60), Brønderslev (2-8-60), Brovst (22-7-60), Haverslev in Han Herred (22-7-60), Skive (23-7-58, coll.; 4-8-58; 28-8-58), Krabbesholm Forest at Skive (28-8-58), Resen at Skive (18-7-57, coll.), Haderup (13-7-60), Brunshåb near Viborg (12-7-59), Studsgård (13-7-60), Strandkjær at Femmøller (5-7-60, coll.), Henne (1-7-58, coll.), Ribe (2-7-58, coll.), and Arrild near Løgumkloster (5-7-58, coll.), on Matricaria chamomilla at Resen at Skive (18-7-57, coll., 1 apt.), on Tussilago farfara at Skive (30-7-58, coll.), and — probably incidentally — on Potentilla argentea on Rømø (3-7-58, coll., only 1 al.). On Funen on Achillea millefolium at Udby (6-7-58, coll.) and Avnslev north of Nyborg (9-7-58). On Sealand on Achillea millefolium at Holte (16-8-58, coll.) and Fakse (15-8-58). On other islands on Achillea millefolium at Frejlev on Lolland (15-8-58, coll.) and at Onsbjerg on Samsø (9-8-58, coll.).

187. *Aphis viburni* Scop., 1763.

Aphis (Doralis) viburni: Börner 1952, p. 76, no. 202.

Distribution: Europe. It is known from Sweden.

Occurrence in Denmark: Collected on Viburnum

opulus in Jutland at Skive (4-5-59 (fundatrix), 30-6-57, 31-8-58), Studsgård (13-7-60), Rebild (4-9-58), and Vorså in Vendsyssel (6-8-62); on Sealand at Lyngby (17-10-60, parasitized specimens, incorrectly recorded as *Ceruraphis eriophori* in the 5th part of the list, no. 138); on the island of Lyø south of Funen (1-7-58, P. Overby coll.). Colonies can be found on Viburnum from spring till autumn.

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(continued from Entom. Medd. 35, 1967, p. 141)

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ANMELDELSE

Otto Buhl og *Tage Krake:* Storsommerfugle på den fynske øgruppe 1948—1966. 63 sider. Akademisk Forlag. København 1967. Kr. 15,50 + moms.

I videreførelse af Niels Pedersen og S. Johs. Sørensens fortrinlige arbejde »Sommerfugle på den fynske øgruppe« fra 1948 har Lepidopterologisk Selskab for Fyn udarbejdet en revideret og ajourført fynsfortegnelse, der hovedsagelig omfatter fund fra 1948—1966, men tillige enkelte ældre hidtil ikke offentliggjorte fund.

Medens den ældre fortegnelse kun nævnte arter, konstateret på Fyn, fremstår den nye som et systematisk hele af den danske *macros*-fauna, dog således, at arter, der ikke er noteret fra den fynske øgruppe (ihvertfald ikke efter 1948) angives ved 0. Den anvendte systematik retter sig for dagsommerfuglenes vedkommende efter Torben W. Langers »Nordens dagsommerfugle« (1958) og for spindere, ugler og måleres vedkommende efter Skat Hoffmeyers håndbøger med undtagelse af *Eupithecia*-arterne, hvor forfatterne fornuftigt har fulgt det af Knud Juul anvendte i »Nordens Eupithecier« (1948). Man savner ligesom i forgængeren et register, f. eks. leder man forgæves for at se, hvor *Dianthoecia albimacula* Bkh. er gemt hen.

Ethvert faunistisk arbejde må hilses velkommen, især når det som det foreliggende er saglig og grundig udarbejdet. Vel forekommer mindre skønhedsfejl, men de er uden betydning for det faktum, at man får en fyldestgørende opfattelse af de fynske arters forekomst de senere decennier. Det er prisværdigt, at forfatterne ikke blot har interesseret sig for de sjældne, men tillige for en del almindelige arter. Dette gør i høj grad fortegnelsen anvendelig for faunistisk interesserede. Prisværdig er tillige, at fangstdato er nævnt for en stor del af fundene.

Man kunne undre sig over de store forskydninger i faunaen i løbet af de relativt få år, siden den sidste fortegnelse så dagens lys. Af naturlige mere eller mindre kendte årsager vil der selvfølgelig altid forekomme visse forskydninger. Man må imidlertid i denne forbindelse ikke glemme, at der siden omkring 1950 er blevet bragt meget rationelle fangstmetoder i anvendelse, såsom den almindelige brug af Hg-lamper og fælder. Også den forøgede tilgang af egne, hurtiggående befordringsmidler har haft sin betydning. Tilbage bliver så det ubesvarede spørgsmål, hvorfor et antal arter er gået tilbage eller helt forsvundet. Dette gælder her som alle steder, især dagsommerfuglene. Endvidere står man uforstående overfor, at adskillige arter (f. eks. *Synanthedon formicaeformis* og *Sedina büttneri),* kendt og udbredt i det øvrige land, indtil nu ikke er opgivet fundet på den fynske øgruppe.

Kun de færreste og mest avancerede samlere kommer så langt som til at beskæftige sig med taxonomiske og systematiske arbejder. Med hensyn til faunistik ligger forholdet således, at de fleste samlere herigennem kan få deres hobby udviklet til et nyttigt formål. Faunistik skabes ikke af enkelte samlere, men af alle fra begynder til elite på enhver nok så lille som stor excursion. Blot må samlerne kunne forstå nødvendigheden af, at deres fund og iagttagelser koordineres af folk, der har påtaget sig det store arbejde at registrere materialet, som så fra tid til anden offentliggøres under en eller anden form.

På baggrund heraf kan nærværende fynsfortegnelse varmt anbefales enhver kategori af samlere af Lepidoptera.

Preben Bjørn.

Some Lonchopteridae and Chamaemyiidae (Diptera) collected in Southern Spain.

With an appendix.

By
Kenneth G. V. Smith
British Museum (Natural History), London.

The family Lonchopteridae has only one genus, *Lonchoptera* Meigen, which is represented in the Palaearctic region by 14 species. The species are very variable in colour and numerous varieties have been described and named, but these are ignored in the present paper since they have no true taxonomic status. Three species have been recorded from Spain (Strobl 1899, 1906; Czerny and Strobl, 1909). Two of these are present in the material reported upon.

The family Chamaemyiidae is represented in the Palaearctic region by 9 genera and subgenera containing some 72 described species. There was much confusion in the determination of species until modern workers, notably Tanasijtshuk in the U.S.S.R., began biological studies coupled with detailed descriptions and illustrations of the male genitalia. In the present author's opinion the genus *Leucopis* in particular should be regarded by Dipterists in the same way that Hymenopterists regard many Chalcidoidea, and descriptions or even determinations of some groups of species should be avoided unless reared series are available for study. The immature stages should be sought among colonies of Hemiptera-Homoptera of the families Aphididae, Adelgidae and Coccidae upon which the larvae are predaceous.

Eleven species have previously been recorded from Spain of which 6 are present in the collections reported upon. The recorded species not present are *Chamaemyia flavipalpis* Haliday (= *maritima* Zetterstedt) and *C. geniculata* Zetterstedt (Strobl, 1900); *Leucopis griseola* Fallén, *L. lusoria* Meigen and *L. aphidivora*

Rondani (Czerny and Strobl, 1909). In the present paper six species are recorded from Spain for the first time: *Chamaemyia herbarum* Desvoidy, *C. aridella* Fallén, *Parochthiphila inconstans* Becker, *Leucopis (Leucopomyia) ? alticeps* Czerny, *L. (Leucopis) grandis* Tanasijtshuk, and *L. (L.) ? palumbii* Rondani.

The specimens dating from 1966 were collected by an expedition from the Zoological Museum, Copenhagen, while the specimens dating from 1960 were collected by Dr J. R. Vockeroth, Ottawa. The material is deposited in the Zoological Museum, Copenhagen, and the Canadian National Collection, Ottawa, respectively, with duplicates in the British Museum (Natural History), London. An appendix lists Spanish species present in the British Museum (Natural History), London.

LONCHOPTERIDAE

Lonchoptera lutea Panzer, 1809.

Material. — ALMERIA: Alhama 5 km W, 200—500 m, 1 ♀, 28 March 1966. — GRANADA: Torrenueva E Motril, 0—50 m, 1 ♀, 17 April 1966; Barranco de Algarrobo 12 km SW Orgiva, 300 m, 1 ♀, 25 April 1966; Rio Guadalfeo, Orgiva, 300 m, 1 ♂ 5 ♀, 3—11 April 1966; Rio Lanjaron near Lanjaron, 600 m, 3 ♂ 4 ♀, 26—28 April 1966; Pampineira, 900 m, 4 ♂ 1 ♀, 9 April 1966; Rio Lanjaron 9 km NW Orgiva, 1600 m, 1 ♂ 4 ♀, 15 April — 7 May 1966; Sierra Nevada near Padul, 1300 m, 1 ♀, 4 May 1966; Granada, 700 m, 13 ♂ 2 ♀, 19 July 1960; Maitena, 900 m, 8 ♂ 18 ♀, 11 July 1960; N. slope Veleta, Sierra Nevada, 2300—2550 m, 11 ♂ 6 ♀, 22 July 1960.

Distribution. — Europe, Canary Islands, Asia, a very common and widely distributed species. Previously recorded from Spain by Strobl (1906), and by Czerny and Strobl (1909).

Lonchoptera furcata Fallén, 1823.

Material. — ALMERIA: Rioja, 50—200 m, 1 ♀, 9 March 1966; Alhama 5 km W, 200—500 m, 1 ♀, 28 March 1966. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 7 ♀, 11 April — 3 May 1966; Rio Chico, Orgiva, 450 m, 1 ♀, 2 April 1966; Rio Lanjaron 9 km NW Orgiva, 1600 m, 1 ♀, 6 April 1966; Maitena, 900 m, 3 ♀, 11 July 1960; N. slope Veleta, Sierra Nevada, 2300—2550 m, 5 ♀, 22 July 1960.

Distribution. — Europe, Madeira, North and South America,

Hawaii, New Zealand and possibly Tasmania and Australia. Previously recorded from Spain by Czerny and Strobl (1909).

Remarks. — A common species, but males are very rarely taken on the continent and are unknown in the Americas, New Zealand and Hawaii and it has been suggested that the species is parthenogenetic. However males have been taken more frequently in Britain and Collin (1938) suggests that this sex may be crespuscular in habit and thus overlooked by diurnal collectors.

CHAMAEMYIIDAE

Chamaemyia aridella (Fallén), 1823.

Material. — GRANADA: N. slope Veleta, Sierra Nevada, 2200 m, 1 ♀, 30 July 1960.

Distribution. — Europe; precise distribution uncertain as the species has been regarded as a synonym of *C. juncorum* Fallén (Czerny, 1936). The species is usually found in dry areas. Not previously recorded from Spain.

Remarks. — The male genitalia are figured by Coe (1942) and Collin (1966), the shape of the aedeagus in lateral view being quite distinct.

Chamaemyia herbarum (Desvoidy), 1830.

Material. — ALMERIA: Cabo de Gata, 0—50 m, 11 ♂ 7 ♀, 24 March 1966. — GRANADA: Rio Lanjaron 9 km NW Orgiva, 1600 m, 1 ♀, 22 April 1966; N. slope Veleta, Sierra Nevada, 2200—3000 m, 15 ♂ 7 ♀, 27—30 July 1960.

Distribution. — Europe. The precise distribution of *herbarum* is not known due to its inclusion in the synonymy of *juncorum* by authors previous to Coe (1943). Not previously recorded from Spain.

Chamaemyia juncorum (Fallén), 1823.

Material. — GRANADA: N. slope Veleta, Sierra Nevada, 2200—2400 m, 2 ♂ 2 ♀, 27—30 July 1960.

Distribution. — Europe. Previously recorded from Spain by Strobl (1900), Czerny and Strobl (1909) thought the name probably covered several species.

Chamaemyia polystigma (Meigen), 1830.

Material. — GRANADA: Torrenueva E Motril, 0—50 m, 2 ♂, 10—12 April 1966; Barranco de Algarrobo 12 km SW Orgiva, 300

m, 1 ♂, 25 April 1966; Barranco de Miranda 8 km SW Orgiva, 300 m, 1 ♂, 20 April 1966; Rio Guadalfeo, Orgiva, 300 m, 2 ♂, 4—18 April 1966; Rio Lanjaron near Lanjaron, 600 m, 6 ♂ 6 ♀, 28 April 1966; Pampineira, 900 m, 1 ♂, 9 April 1966; Rio Lanjaron 9 km NW Orgiva, 1600 m, 1 ♀, 7 May 1966; N. slope Veleta, Sierra Nevada, 2500 m, 1 ♀, 25 July 1960.

Distribution. — Europe and N. Africa. A common species previously recorded from Spain by Strobl (1900), Czerny and Strobl (1909).

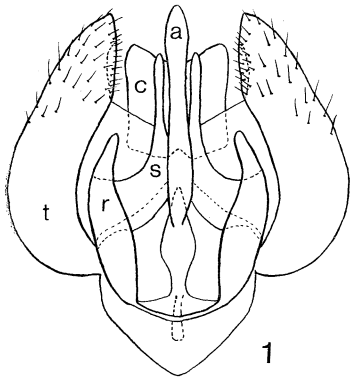
Remarks. — In Collin's (1966) key to the British species of *Chamaemyia* (which includes all the known Palaearctic species) a small typographical error has occurred in couplet 18 (19), 19 (18): the comments on setae refer to the mid femora, not the tibiae as stated.

Euestelia nigripes (Strobl), 1900.

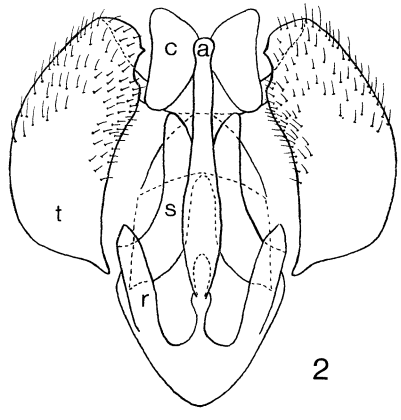
Material. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 1 ♂, 3 May 1966; Rio Lanjaron near Lanjaron, 600 m, 1 ♂, 28 April 1966.

Distribution. — Southern Europe. Described from Spain by **Strobl (1900)** as a variety of *E. coronata* Loew.

Remarks. — Czerny (1936) treated *nigripes* as a species distinguished from *coronata* by the dark tibiae. I have examined the male genitalia of both and find them to be good species. In ventral



1



2

Fig. 1. Male genitalia of *Euestelia coronata* (Loew) in ventral view.

Fig. 2. Male genitalia of *E. nigripes* (Strobl) in ventral view. t = 9th tergite, c = cerci, a = aedeagus, r = anterior paramere, s = posterior paramere.

view (Figs. 1—2) the upper inner margin of the 9th tergite is excised in *nigripes;* the tip of the aedeagus is rounded in *nigripes* and pointed in *coronata;* the anterior parameres are shorter and blunter in *nigripes* while the posterior parameres are much thicker; the cerci project above the aedeagus in *nigripes.*

In these two males there is variation in the length of the dorsocentrals such that they might variously be interpreted as 1+2 or 1+4 which could be misleading at couplet 8 in McAlpine's (1960) key to world genera.

Euestelia coronata (Loew), 1858.

Material. — GRANADA: Sierra Nevada Highway, 900 m, 1 ♂, 27 July 1960; Maitena, 900 m, 1 ♀, 11 July 1960.

Distribution. — Central and southern Europe, Asia and N. Africa. Previously recorded from Spain by Czerny (in Czerny and Strobl, 1909).

Remarks. — Tanasijtshuk (1963) states that *E. coronata* larvae are predaceous on the scale insect *Pseudococcus aberrans* Goux in the leaf sheath of couchgrass; he also figures the male genitalia in lateral view. The genitalia in ventral view are figured here and compared with those of *E. nigripes* (Figs. 1—2).

Parochthiphila inconstans Becker, 1902.

Material. — ALMERIA: Rioja, 50—200 m, 1 ♀, 20 April 1966.

Distribution. — Southern Europe and North Africa. Not previously recorded from Spain.

Remarks. — This specimen has 1 presutural dorsocentral and only 2 distinct postsutural dorsocentrals which would take it to *Chamaemyia* in McAlpine's (1960) key to genera, see also above under *Euestelia* for further comment on this.

Leucopis (Leucopis) albostriata Czerny, 1936.

Material. — GRANADA: Sierra de Contraviesa, Rabite, 1300 m, 1 ♀, 2 May 1966.

Distribution. — This very distinct species was described from Spain by Czerny (1936) and has not been recorded since.

Leucopis (Leucopomyia) ? alticeps Czerny, 1936.

Material. — GRANADA: Barranco de Miranda 8 km SW Orgiva, 300 m, 1 ♂, 16 April 1966.

Distribution. — *Leucopis (Leucopomyia) alticeps* was described from Germany.

Remarks. — This male agrees closely in genital characters with Tanasijtshuk's (1965) figure of *L. (L.) alticeps* but the tibiae are only yellow at the base.

In my treatment (Smith, 1963) of the British *Leucopomyia,* without seeing types, but in agreement with unpublished views of other workers, I sank *L. alticeps* Czerny as a synonym of *L. annulipes* Zetterstedt. Dr. V. S. Tanasijtshuk (1965) doubted the validity of this synonym and Dr. Frank McAlpine informs me (in litt.) that he has now examined the syntypic series of *annulipes* and finds them not to belong to *Leucopomyia.* Incidentally, the study of further material of *Leucopomyia* reared from *Eriopeltis* ovisacs by Professor G. C. Varley in England has established the identity of the British species as *L. silesiaca* Egger. Mr. M. Ackland suggested this identity to me after a preliminary study of Professor Varley's material and Dr. Tanasijtshuk has since confirmed this (in litt.).

The slight difference in tibial colouration of the Spanish specimen, if coupled with other characters may indicate the presence of a subspecies or species, but any decisions of this nature are better deferred until a complete revision of the genus, based upon reared series, can be undertaken by some future worker.

Leucopis (Leucopis) grandis Tanasijtshuk, 1959.

Material. — GRANADA: N. slope Veleta, Sierra Nevada, 2400 m, 1 ♂, 25 July 1960.

Distribution. — Crimea, new to Spain.

Remarks. — A distinct species because of its size (3.7 mm) and yellow antennae. Tanasijtshuk (1959) reared and described this species from larvae feeding upon *Aphis cytisorum* Htg. (= *laburni* Kalt.) on Spanish gorse (*Genista hispanica* L.). He figures the male genitalia in lateral view and a figure of the male genitalia in ventral view is given here (Fig. 3).

Leucopis (Leucopis) magnicornis Loew, 1856.

Material. — MALAGA: Torremolinos, 1 ♂, 3 May 1966.

Distribution. — Spain.

Leucopis (Leucopis) ? palumbii Rondani, 1874.

Material. — GRANADA: Barranco de Miranda 8 km SW Orgiva, 300 m, 1 ♂, 16 April 1966; Sierra Nevada Highway, 1650 m, 1 ♂, 22 July 1960.

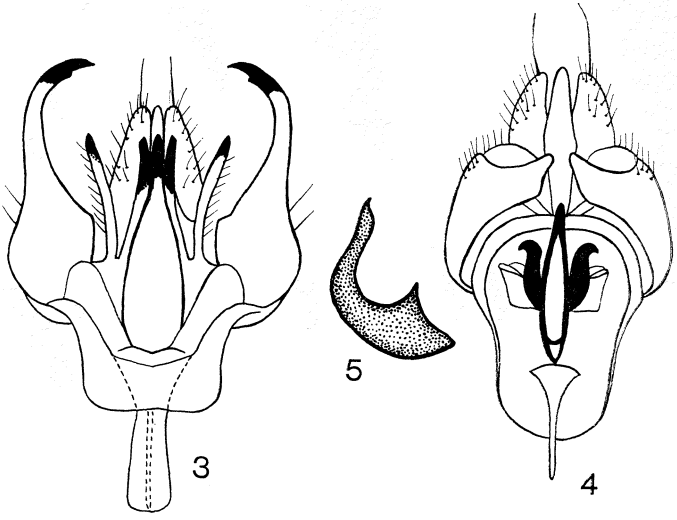


Fig. 3. Male genitalia of *Leucopis grandis* Tan. in ventral view. Fig. 4. Male genitalia of *L. ? palumbii* Rond. in ventral view. Fig. 5. Aedeagus of *L. ? palumbii* in lateral view.

Distribution. — *L. palumbii* was described from Sicily.

Remarks. — A species with completely yellow tibiae and tarsi. Genitalia (Figs. 4—5) similar to Tanasijtshuk's (1959) figure for *L. palumbii* from the Crimea, but the penis is strongly curved (Fig. 5). It seems probable that two species are involved, but which (if either) is true *palumbii* is better resolved when Rondani's types can be studied against series of reared specimens.

Rondani (1874) described *L. palumbii* from larvae and pupae found in galls on *Pistacia terebinthus* (L.) in Sicily, the larvae feeding on *Geoica (= Pemphigus) utricularia* (Pass.) and other aphids of the same genus inside galls on *Pistacia.*

Leucopis (Leucopis) spp.

Material. — ALMERIA: Rioja, 50—200m, 1 ♂ 1 ♀, 7 March & 26 April 1966; Pechina, 50—200 m, 2 ♀, 9 March 1966; Alhama 5 km W, 200—500 m, 1 ♀, 19 March 1966. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 1 ♀, 19 April 1966; N. slope Veleta, Sierra Nevada, 2400—3000 m, 2 ♂ 3 ♀, 20—30 July 1960; Granada, 700 m, 1 ♂, 15 July 1960. — CADIZ: La Linea, 1 ♀, 2 August 1960.

Remarks. — These specimens are allied to *puncticornis* and I

am reluctant to comment further until the types of Rondani's southern European species and varieties of *puncticornis* can be studied and dissected.

Appendix.

Spanish Lonchopteridae and Chamaemyiidae in the British Museum (Natural History), London.

Lonchoptera tristis Meigen, 1824.

Material. — N. SPAIN: Gerona, Las Planas, 3 ♂ 3 ♀, 12—18 July 1965 (A. M. Hutson) (B. M. 1965 — 632).

Distribution. — Europe. Not uncommon, but usually more numerous in woodland. Previously recorded from Spain by Strobl (1899).

Lonchoptera lutea Panzer, 1809.

Material. — C. SPAIN: Sierra de Guadarrama, 6—800 ft., 1 ♂ 1 ♀, August 1927 (B. P. Uvarov) (B. M. 1928 — 95).

Lonchoptera furcata Fallén, 1823.

Material. — C. SPAIN: Sierra de Guadarrama, 6—800 ft., 3 ♀, 3 August 1927 (B. P. Uvarov) (B. M. 1928 — 95). N. SPAIN: Gerona, Las Planas, 4 ♀, 12—18 July 1965 (A. M. Hutson) (B. M. 1965 — 632).

Chamaemyia aridella (Fallén), 1823.

Material. — C. SPAIN: Sierra de Guadarrama, San Rafael, above tree-zone, 1400—1600 m, 1 ♀, 19 August 1963 (A. C. Pont); San Rafael, pine forest and bracken hills, 1260—1500 m, 1 ♀, 19 August 1963 (A. C. Pont).

Chamaemyia herbarum (Desvoidy), 1830.

Material. — N. SPAIN: Gerona: Las Planas, 2 ♂ 2 ♀, 12—18 July 1965 (A. M. Hutson) (B.M. 1965—632).

Chamaemyia polystigma (Meigen), 1830.

Material. — C. SPAIN: Sierra de Guadarrama, 6—8000 ft., 1 ♀, Aug. 1927 (B.P. Uvarov) (B.M. 1929—95). — N. SPAIN: Gerona, Las Planas, 3 ♀, 12—18 July 1965 (A. M. Hutson) (B.M.) (B.M. 1965—632.

Euestelia coronata (Loew), 1858.

Material. — C. SPAIN: Sierra de Guadarrama, 6—8000 ft., 3 ♂, August 1927 (B.P. Uvarov) (B.M. 1929—65). — N. SPAIN: Gerona,

Las Planas, 1 ♀, 12—18 July 1965 (A. M. Hutson) (B.M. 1965—132).

Remarks. — One of the three males has no distinct presutural and only two of the usual three postsutural dorsocentrals present.

Summary.

The paper presents records from Southern Spain of 2 species of Lonchopteridae and 12 species of Chamaemyiidae. 6 of the 12 species of Chamaemyiidae have not earlier been recorded from Spain. In an appendix is listed 3 species of Lonchopteridae and 4 species of Chamaemyiidae from other parts of Spain based on material in the British Museum (Nat. Hist.), London.

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Bombyliidae (Diptera) from Southern Spain, with descriptions of twelve new species.

By
Frans J. J. François
Koninklijk Belgisch Instituut voor Natuurwetenschappen,
Brussel, België.

The present collection numbers 473 specimens and belongs to three different institutions. The bulk of it (408 specimens) was assembled during a joint expedition of the Zoological Museums of Copenhagen, Denmark, and Helsinki, Finland, under the leadership of Drs. L. Lyneborg and W. Hackman, and gives a comprehensive idea of the Bombyliid fauna of Southern Spain in early spring. This material was collected between 3 March and 8 May 1966. The other collectors were Messrs. Ole Martin and Søren Langemark.

The remaining 65 specimens belong to the Canadian National Collection of the Entomological Research Institute, in Ottawa, Canada, and were collected by Dr. J. R. Vockeroth between 9 and 30 July 1960 at altitudes ranging between 700 and 2550 m. Taking this fact into account the species concerned may also be considered as vernal, at least those caught above the 1000 m line.

The collection includes no less than 27 genera of which 5 are new to Spain (*Empididеicus, Glabellula, Oligodranes, Heterotropus* and *Desmatoneura*). The two last named genera are new to Europe as well. Dr. J. M. Andréu-Rubio, in his catalogue of Spanish Bombyliidae (1961), records 26 genera. He lists a total of 174 species from Spain proper. The number of species represented in the collection is 64 (a further species, *Aphoebantus lyneborgi* n. sp. from N. Morocco has been added, merely for the sake of convenience). An unexpectedly large number of these are new: eleven. It must also be noted that altogether 14 of the species reviewed here are new to Spain, which enlarges the number of already known Bombyliids of that country by 8 %.

Apart from its intrinsic value the collection is revealing in that it brings to light a rather unexpected fact, viz. that the European Bombyliid fauna is still far from well known. It also gives a useful hint as to how more new or little-known species are to be found, namely by collecting the smaller species in early spring or at high altitudes.

Most of the specimens collected in 1966 by Dr. Leif Lyneborg and his assistants are not indicated by collectors names and are in the Zoological Museum of the University of Copenhagen, but those specimens indicated as collected by Dr. W. Hackman are in the Zoological Museum of Helsinki. The specimens collected in 1960 by Dr. J. R. Vockeroth are in the Entomology Research Institute of Ottawa. Duplicates of most species have been kept in the Royal Institute for Natural Sciences, Brussels.

I thank Dr. Leif Lyneborg, Dr. W. Hackman and Dr. J. F. McAlpine for submitting to me this exceptional material, which it was all the more pleasant to study as most of the specimens are in excellent condition.

Amictus variegatus (Meigen), 1835.

Material. — GRANADA: Salobrena 6 km W. Motril, 0—50 m, 1 ♂, 24 April 1966; Barranco de Miranda 8 km SW Orgiva, 300 m, 6 ♂ 5 ♀, 20—21 April 1966.

Distribution. — Recorded from "Southern Europe and North Africa" by Séguy and Engel. I know the species only from Spain and from France near the Pyrénées (Banyuls; Séguy, 1926).

Conophorus fuliginosus (Wiedemann ap. Meigen), 1820.

Material. — GRANADA: Barranco de Miranda 8 km SW Orgiva, 300 m, 2 ♀, 23 April 1966; Rio Guadelfeo, Orgiva, 300 m, 3 ♂, 2, 4 and 18 April 1966.

Distribution. — Southern France, Portugal, Spain, Morocco, Algeria, Tunisia.

Conophorus macroglossus (L. Dufour), 1852.

Material. — ALMERIA: Alhama 5 km W, 200—500 m, 11 ♂ 1 ♀, 17—28 March 1966, (1 ♂ 1 ♀ leg. W. Hackman).

Distribution. — This is an exclusively Spanish species which has been found in the Provinces of Alicante, Barcelona, Coruna, Madrid, Murcia, Teruel and Zaragossa (J. M. Andréu-Rubio, 1961: 17). It had not yet been found in the Almeria Province.

Remarks. — Of the twelve specimens caught only one is a female. This scarcity of the females is typical of the species. It is only in 1962 that a specimen of this sex was caught by A. Collart near Barcelona (François, 1962:2). The length of the proboscis and the characteristic and motley infuscation of the wings make this species quite easy to identify.

Usia aenea (Rossi), 1794.

Material. — GRANADA: Sierra Nevada, N. slope Veleta, 2400 m, 1 ♂ 1 ♀, 22 July 1960 (J. R. Vockeroth).

Distribution. — An exclusively Mediterranean species, it has been found in Portugal, Spain, S. France, Italy (Ligurian Alps; Abruzzi, Sicily), Greece, Syria, N. Morocco.

Usia aurata loewi Becker, 1906.

Material. — GRANADA: Pinus Puente 15 km NW Granada, 500—1000 m, 5 ♀, 17 April 1966.

Distribution. — An exclusively Spanish subspecies of the widely distributed *aurata* (F.).

Remarks. — I have seen specimens from San Fernando (Czerny & Strobl) which agree well with the Copenhagen Museum material except for the length of the proboscis and of the pile on mesonotum, which in the latter material is shorter. In the absence of male specimens it would be inadvisable to draw any conclusions from such differences. These small forms (3—4 mm) are generally overlooked and consequently insufficiently known.

Usia grata Loew, 1856.

Material. — ALMERIA: Alhama 5 km W, 200—500 m, 2 ♀, 17 March 1966. — GRANADA: Pinus Puente 15 km NW Granada, 500—1000 m, 1 ♀, 27 April 1966.

Distribution. — Spain. Originally described from Andalusian material by Loew; Engel (1932) records a male from Egypt (?) and J. M. Andréu-Rubio (1961) gives records from the Spanish provinces of Alicante, Almeria, Jaén, Madrid, Murcia and Sevilla.

Remarks. — Efflatoun Bey in his monograph of the Egyptian Bombyliidae Homoeophthalmae (1945:202) mistakenly records it as a synonym of *aurata* (F.), from Egypt. *Aurata* and *grata* cannot be confused. I have seen specimens of both species. The ♂ of *grata* is holoptic, *aurata* not; moreover *aurata* has strikingly developed genitalia, which *grata* has not; the ♀ of *aurata* has a much narrower frons than *grata*.

Usia martini n. sp. (Figs. 1 a, b).

Material. — GRANADA: Sierra Nevada near Padul, 1300 m, 2 ♀, holotype and paratype, 1 May 1966. Hototype in Zoological Museum, Copenhagen. Paratype in R. Inst. nat. Sc., Brussels.

Diagnosis, ♀. — A small (less than 3 mm), black, whitish and brownish pollinose species, with broad, oval abdomen which is not banded transversely, with tegument of thorax and abdomen not conspicuously pitted. Hairs on body short, longer only on ocellar tubercle and on hind margin of scutellum. As a rule hairs on dorsal side of body black or at least dark, white or whitish on ventral side. Tegument of body dull, slightly shiny on abdominal tergites only, under the pruinescence. Seems to belong to Paramonov's *versicolor* group (1950).

Description, ♀. — Head: frons dull, entirely pollinose, brownish on upper part, greyish on lower part which bears minute, dark reddish hairs; genae glabrous, rather more developed than is the rule in this genus, buccal cavity very shallow; hairs on greyish pollinose occiput longer but still rather short, shorter than the basal antennal joints; ocellar tubercle with distinctly longer hairs; proboscis almost 2,5 times as long as head; first and second antennal joints with very short, dark hairs, third antennal joint (Figs. 1 a, b) lanceolate but distinctly blunted at tip, with an oval, preapical, dorsolateral pit in which a very short rod is visible as a brilliant white spot, third joint thickly covered with microtrichia and also with a few longer hairs at base of preapical pit; frons rather narrow, hardly broader than ocellar tubercle, the head being a little more than 5 times as broad as the interocular space at vertex.

Thorax: ground colour dull black but with a brownish pruinosity and, centrally, a double longitudinal blackish-brown stripe which reaches more than halfway down to the scutellum, laterally two less distinct spots of the same colour; mesonotum neither conspicuously wrinkled nor pitted, hairs sparse, short, distinctly longer on hind margin of scutellum; pleura dull black, greyishly pulverulent.

Abdomen: broadly oval, distinctly broader than thorax; tegument black, slightly shiny, not distinctly pitted, covered with a brownish, almost golden pruinosity; hairs on tergites above, minute, not dense, black; laterally and beneath, on sternites, longer, whitish or yellowish; in profile the abdomen shows above a succession of slight ridges and depressions.

Wings: of a uniformly brownish tinge and with dark brown veins; cubital fork long, beginning distinctly beyond apex of discal cell, latter cell and 2nd basal cell of equal length; R_5 3,5 times longer than apical transverse vein of discal cell; r-m cross-vein situated slightly beyond middle of discal cell; vein 1A straight; anal cell pedunculate, with a stalk longer than m-cu transverse vein; axillary lobe slightly narrower than anal cell; knob of halteres whitish, without dark spot.

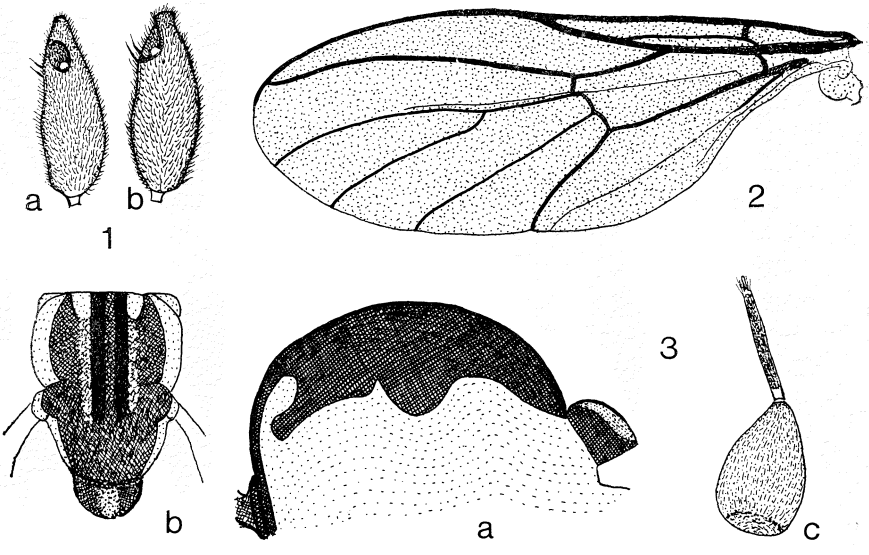
Legs: white haired, tibiae with numerous rows of minute white hairs; all 3 pairs of femora with hairs shorter than femoral breadth.

Measurements: length of body 2,52 mm, of wing 2,73 mm, maximum breadth of abdomen 1,33 mm, breadth of thorax 1,05 mm.

This species is named in honour of Mr. Ole Martin.

Toxophora maculata (Rossi), 1790.

Material. — GRANADA: Barranco de Miranda 8 km SW Orgiva, 300 m, 4 ♂ 2 ♀, 23 April and 5 May 1966.



Figs. 1—3. — 1. *Usia martini* n. sp., female, holotype; third antennal joint, a. In dorsal view, b. In profile. — 2. *Empidideicus hispanus* n. sp.; left wing of female holotype. — 3. *Empidideicus hackmani* n. sp.; a. Thorax in lateral view, b. Same in dorsal view, c. Third antennal joint in lateral view.

Distribution. — This rather rare though in the Mediterranean basin ubiquitous species is also found in S. Egypt, in the Crimea, in the Caucasus, Kazakhstan, Persia and Baluchistan.

Empidideicus hispanus n. sp. (Fig. 2).

Material. — ALMERIA: Cabo de Gata, 0—50 m, 1 ♀, holotype, 26 March 1966. In Zoological Museum, Copenhagen.

Diagnosis, ♀. — Minute (1,5 mm), brownish species, with many yellow markings, yellow face, black frons, yellow scutellum, without so much as an indistinct longitudinal stripe on mesonotum, wings with distinct brownish tinge and a long M_1-M_2 fork, halteres bright yellow, abdomen with bright yellow hind margins above, legs mostly yellow, coxae I and II almost entirely yellow.

Description, ♀. — Head: dull black with yellow face, yellowish brown microtrichia on frons and antennae, short hairs on occiput; frons at vertex between 1,5 and 2 times as broad as ocellar tubercle; terminal style of third antennal joint not much shorter than third joint (2:3); proboscis about as long as the head is high.

Thorax: dorsum dull black, without visible longitudinal stripes, narrowly yellow anteriorly next to yellow alar calli; mesonotum laterally yellow, the yellow areas completely surround the black dorsum; scutellum yellow with, laterally, a brown hind border and (? only in type) a small brownish spot on disc; propleura yellow, pleura otherwise grey and black with numerous yellow spots, almost bare; hairs on mesonotum reddish, very short, rather dense, erect; a few blackish, bristle-like, small hairs near base of wing.

Abdomen: brown, with distinct yellow hind margin on tergites: linear on the two first tergites, then broadening gradually until the last three tergites appear almost entirely yellow; laterally the tergites are entirely or almost entirely yellow; sternites practically completely yellow; hairs yellow and very short.

Wings (Fig. 2): dark brownish, distinctly and densely covered with microtrichia, fork of veins M_1-M_2 long, more than twice as long (19:8) as its basal stalk (19:17 in *E. carthaginiensis* Beck.); anal cell broader than axillary lobe; knob of halteres bright yellow; squama alaris dirty white.

Legs: coxae I and II yellow, brown at their base, coxae III almost entirely brown; femora dorsally brown with more or less extensive yellow base and tip, ventrally yellow; tibiae entirely yel-

low, slightly darkened near apex; tarsi brownish; claws and pulvilli well developed; hairs short and yellow, no spines or spicules except very tiny ones at tip of tibiae.

Measurements: length of body 1,54 mm, of wing 1,82 mm, breadth of wing 0,67 mm; maximum breadth of abdomen 0,88 mm, breadth of thorax near wing 0,60 mm.

Remarks. — Seven species of *Empididеicus* were known from the Palaearctic Region, only one of which was European. These minute flies are very rare in collections and it is most likely that many more species are still to be discovered. The genus is new to Spain.

E. hispanus n. sp. is closely related to *E. carthaginiensis* Beck.; it differs from it in having a yellow scutellum, brownish wings, apparently no longitudinal stripes on mesonotum, bright yellow knobs on halteres, a narrower wing with longer R_1-R_2 fork and a narrower axillary lobe.

Empididеicus hackmani n. sp. (Figs. 3 a, b, c).

Material. — GRANADA: Sierra Nevada, N. slope Veleta, 2200 and 2400 m, 2 ♀, holotype and paratype, 30 July 1960 (J. R. Vockeroth). Holotype in Canadian National Collection, Ottawa; paratype in R. Inst. nat. Sc., Brussels.

Diagnosis, ♀. — Minute (1,20 mm), yellow-haired, dull, dark brown species, with many pale yellowish and whitish markings and with hyaline wings; face entirely, frons and occiput partly pale yellow, thorax peripherally yellow with a distinct, double, longitudinal black stripe centrally; abdomen distinctly broader than thorax and with pale-yellow, almost white hind margins on tergites; wing with marginal and second submarginal cell wanting; legs with brown femora and whitish tibiae.

Description, ♀. — Head: face and frons immediately above antennae pale yellow, discal part of frons brown but on either side a relatively large, pale yellow triangle, ocellar tubercle brown, occiput also brown except for a lateral, pale yellow triangle immediately behind eyes; hairs rather sparse, minute, yellow; first and second antennal joints yellowish brown, third joint (Fig. 3 c) brown, style longer than basal width of third joint; proboscis brown, with longer yellow hairs at the base, a little more than twice as long as the head.

Thorax (Figs. 3 a, b): pale yellow but with most of the mesonotum brown, with a distinct central, dark brown double stripe

above, which reaches more than halfway down to the scutellum and is made more distinct by a narrow, adjacent, longitudinal, greyish pollinose area; though it seems to be slightly variable the brown pattern on the mesonotum may prove to be of specific value as it is almost identical in both specimens (dessication tends to make the contours a little indistinct); very small, sparse, yellowish white hairs on mesonotum; scutellum brown with yellow tip.

Abdomen: velvety black with, on tergites, an increasingly broader, yellowish white hind margin, which occupies more than half the surface of the three last tergites, laterally the tergites are almost entirely yellowish white, sternites brown and yellow; hairs yellow, denser and longer than on mesonotum.

Legs: anterior coxae almost entirely yellow, coxae II and III mostly brown, femora brown but yellow at either tip, tibiae whitish, slightly darker at apex, metatarsus pale yellow, tarsi otherwise brown; claws and pulvilli well developed.

Wings: hyaline but slightly darkened by numerous brown microtrichia, brown veins; no discal cell; fork of M_1-M_2 about twice as long as its stalk; anal cell and axillary lobe equally broad. The wings of both type and paratype are damaged. Knobs of halteres almost pure white.

Measurements: (dried specimen) length of body 1,19 mm, of wing about 1,40 mm (damaged), max. breadth of wing 0,56 mm, max. breadth of thorax 0,39 mm, of abdomen 0,60 mm.

Remarks. — This species is at once distinguished from other known species by the yellow face, the yellow frons with a brown disc and by the partially yellow occiput.

It is named in honour of Dr. W. Hackman.

Cyrtosia pruinosula n. sp. (Figs. 4 a, b, c, d).

Material. — ALMERIA: Rioja 10 km N, 50—200 m, 1 ♂, holotype, 12 March 1966; Tabernas 8 km N, 200—500 m, 1 ♀ paratype, 14 March 1966. Holotype in Zoological Museum, Copenhagen. Paratype in R. Inst. nat. Sc., Brussels.

Description, ♂♀. — A tiny, slender species of less than 3 mm; ground colour dull black but body almost entirely greyish pollinose, devoid of conspicuous yellow spots; the humeral and postalar calli, the hind borders of the abdominal tergites from a dirty white to a slightly yellowish shade. Face pointed and, like genae and mouth margin, yellow; head otherwise black with a

greyish bloom, proboscis 1,5 times as long as head (100:61); the greyish, not sharply deliminated pollinose markings on mesonotum are shaped as follows: behind each humeral callus an ill-defined spot from which originates a thin, longitudinal stripe; these two stripes are separated by a black area about as broad as length of third antennal joint without its style, and they lose themselves in an extensive greyish pulverulent zone which covers almost the entire posterior third of mesonotum (without scutellum); in the ♀ the central black area is divided by a linear, longitudinal, pale grey stripe; laterally the anterior greyish bloom

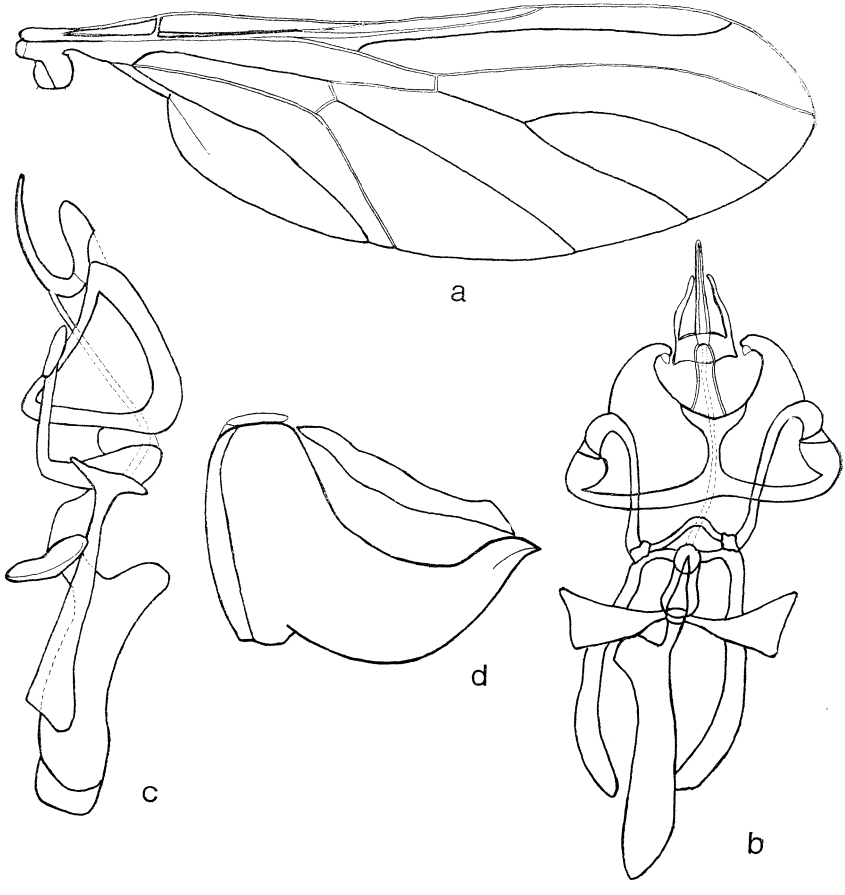


Fig. 4. *Cyrtosia pruinosula* n. sp.; a. Right wing of female paratype, b. Hypopygium of holotype, ventral view (damaged, see text), c. Same in lateral view, d. Epandrium in lateral view.

extends towards the base of the wings and covers the entire pleura and coxae; the whole thorax is covered with a pale, not very dense pubescence; scutellum greyish pollinose.

Abdomen: eight visible segments, the first seven with a linear, dirty white hind border, the 8th more broadly yellowish white at end; short, whitish pubescence which is sparser in ♀ than in ♂; abdomen slightly clubbed at end in ♂ because of the rather large genitalia. Epandrium with two broad, apical lamellae. ♂ hypopygium (Figs. 4 b, c, d): it should be noted that the phallosome is accidentally partly severed from the gonocoxites and that consequently the upper part of the phallosome is ruptured.

Legs: ♂, femora dark brown, tibiae and tarsi lighter, with yellow "knees" and a broadly yellowish base on metatarsus; ♀, yellow tipped femora, yellow tibiae with slightly darker apex, brown tarsi, but basal part of metatarsus yellowish as in ♂; hairs on legs mostly white.

Wings (Fig. 4 a): typical of the genus, long, greyish hyaline, slightly iridescent, alula vestigial, third longitudinal vein unforked, discal cell absent, anterior border of wing conspicuously depressed; knob of halteres white, laterally more or less blackened.

Measurements: length of body, ♂ 1,5 ♀ 2,6 mm, of wing, ♂ 2.1 ♀ 3,8 mm.

Remarks. — Although Engel, in his revision (1933) of the Palaearctic fauna, has made a meritorious effort to put some semblance of order into the systematics of the genus, it is still very poorly known. Few specimens are to be found in collections; the descriptions are widely scattered and often unsatisfactory; there is practically no useful iconography; the study of the ♂ genitalia, an indispensable means to the separation of the species, has been so far neglected. It is therefore well-nigh impossible to divide the genus in groups of related species. The present species is conspicuous by the absence of distinct yellow markings and by the greyish pruinescence which covers most of the body. According to Engel's table it runs down to *tetragramma canariensis*. Thanks to the helpfulness of Dr. H. Schumann, Zoologisches Museum der Humboldt Universität zu Berlin, I have been able to examine Engel's type, a wingless male. It is distinct from *pruinosula* by the following characters: larger (3,5 mm), pubescence on mesonotum darker, denser and longer, scutellum with denser, relatively longer, brown hairs (on *pruinosula* the hairs are white); abdomen relatively

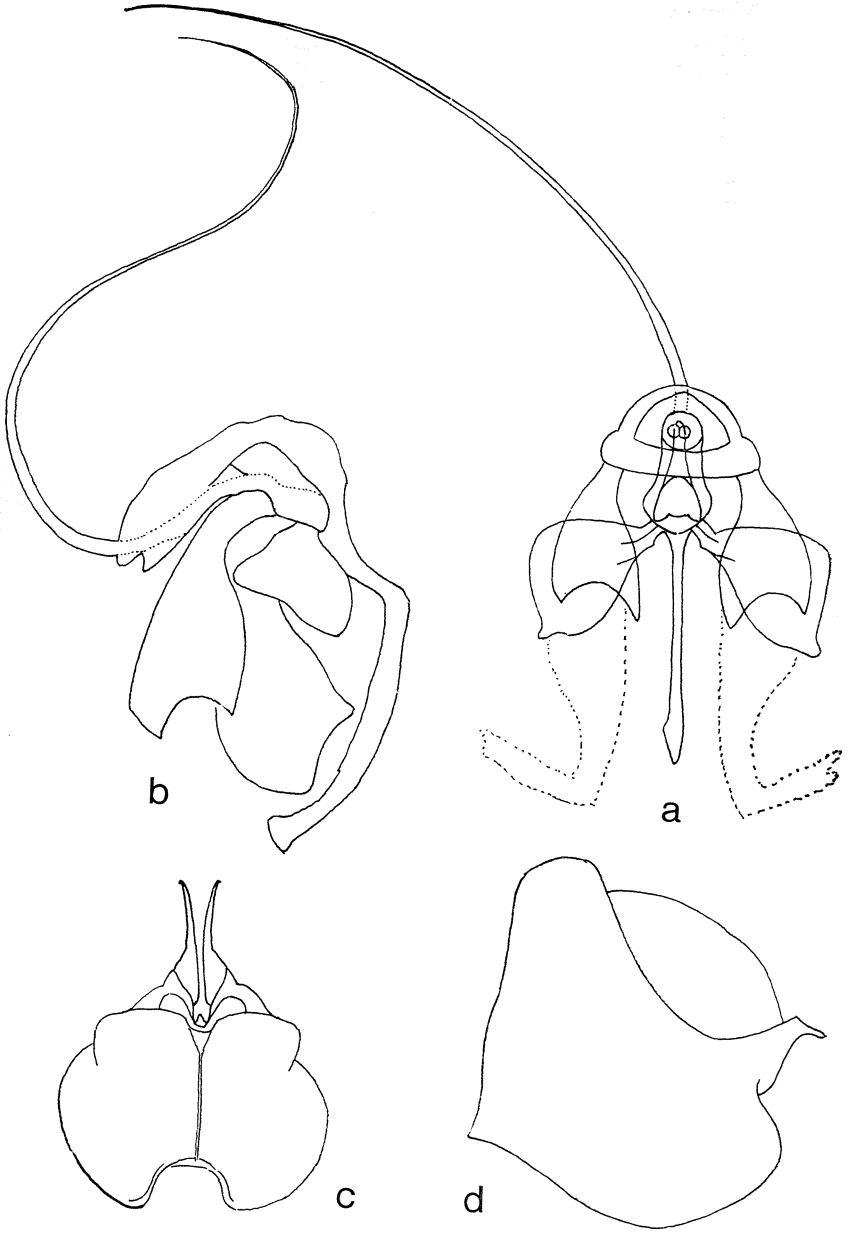


Fig. 5. *Cyrtosia canariensis* Engel, type; a. Phallosome in dorsal view, b. Same in lateral view, c. Gonopods in dorsal view, d. Epandrium in lateral view.

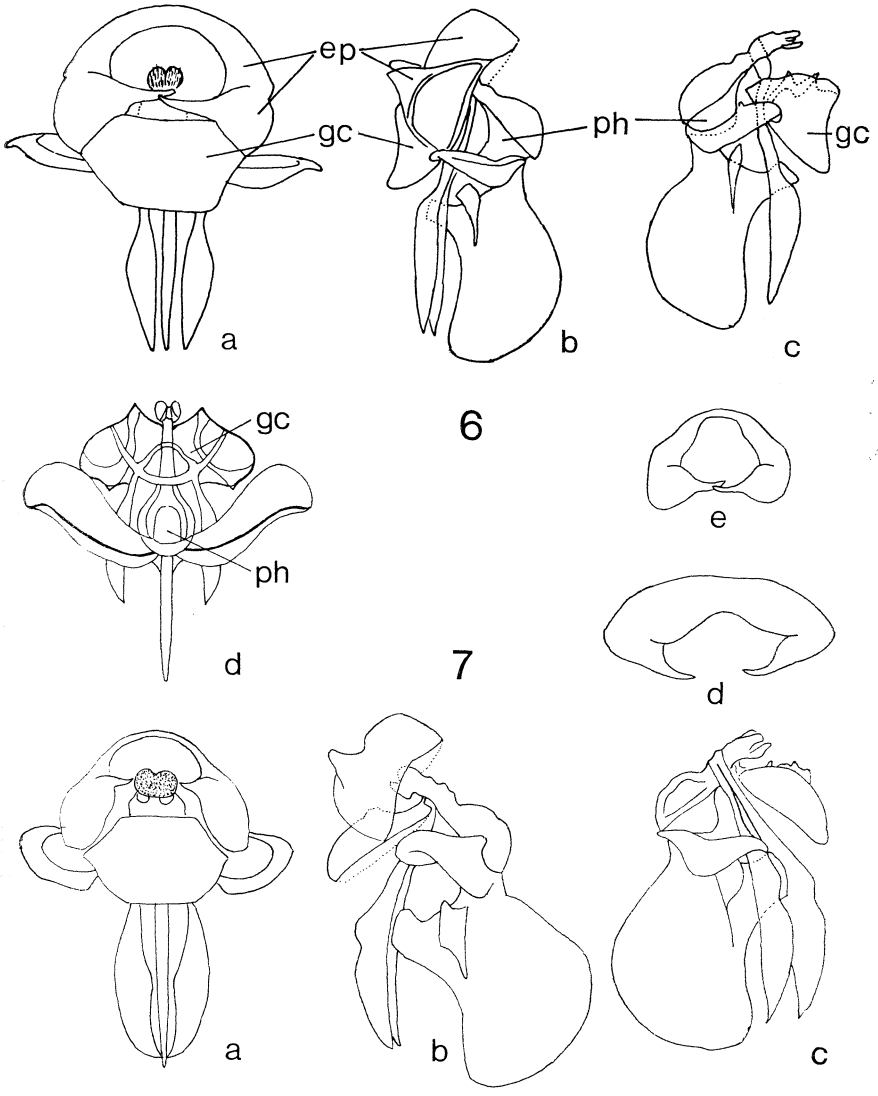
shorter, thick set, compressed, hairs on tergites in ♂ adpressed, very dense, forming almost a pile on the anal segments, epandrium reddish brown, shiny, densely haired; halteres pale brown, knob brown; the ♂ genitalia are very different (Figs. 5 a, b, c, d). Among the species described by Efflatoun (1940:34) *Cyrtosia abragi* has much in common with *pruinosula* but can be separated from it by the yellow lower part of the frons, the distinctly yellow humeral and postalar calli, the several yellow spots on pleura, the presence of a distinct yellow hind border on all abdominal tergites etc.

From what I have been able to learn about *Cyrtosia* there is little doubt that Engel's *tetragramma canariensis* is a species in its own right, which is not even closely allied to *tetragramma*.

Genus **Glabellula** Bezzi, 1902.

In Europe this genus has been recorded so far only from the high Scandinavian North, from Holland, Austria and Greece. It has now been found in Spain and is certainly a native of several other European countries. Most authors who have written about this genus have stated that the metamorphosis was unknown. This may be because they have generally overlooked an interesting note made by De Meijere in Tijdschrift voor Entomologie, 1924, LXVII p. XXXV, which was repeated in his additions to the list of Netherlandish Diptera of 1928 and 1935 (ibidem 1928, LXXI: 23 — among the Empididae — and 1935, LXXVIII:203). I believe these references to be generally unknown. V. S. van der Goot (1963:18) includes the species among the Bombyliidae of Holland and records it as a possible parasite of *Formica*. As Netherlandish ("Dutch") is not readily understood outside Holland and Belgium it may be useful to give a translation of the text of the first of these references. De Meijere reports on Diptera new to the fauna of Holland.

"Among insects captured in nests of *Formica exsecta* Nyl. at Nunspeet, on July 22 1923, the speaker has found a most remarkable Dipteron. The tiny, shining little fly showed a very peculiar venation which made it difficult to define even the family to which it belonged. After some research it proved to be *Glabellula* (first and successively *Platygaster* — *Sphaerogaster* — *Glabella,* but it appeared that these names were already in use) *arctica* Zetterstedt, a very rare little fly, first discovered in the high North,



Figs. 6—7. — 6. *Glabellula sufflava* n. sp., holotype; a. Hypopygium with epandrium in dorsal view, b. Same in lateral view, c. Hypopygium in lateral view, d. Same in dorsal view, e. Epandrium in apical view. — 7. *Glabellula canariensis* Frey, paratype; a. Hypopygium with epandrium in dorsal view, b. Same in lateral view, c. Hypopygium in lateral view, d. Epandrium in apical view.

near the North Cape, on August 17 1821 and later also mentioned from England and Siberia, without anything of its manner of life having until now come to light. The first author, Zetterstedt, considered it as belonging to the Acroceridae, with which it has indeed in common a thick-set and arched thorax and abdomen. But the halteres are not covered by large squamae and, for other reasons as well, the species was included by Loew among the Bombyliidae. Other species parasitizing Hymenoptera are found among these, so that the animal might well prove to be a parasite of *Formica*. The best description . . . etc."

Glabellula sufflava n. sp. (Figs. 6 a, b, c, d, e).

Material. — GRANADA: Sierra Nevada Highway, 2200 m, 1 ♂, holotype, 1 ♀, paratype, 27 July 1960 (J. R. Vockeroth). Holotype in Canadian National Collection, Ottawa. Paratype in R. Inst. nat. Sc., Brussels.

Description, ♂♀. — Measurements: length of body, ♂ 1,12, ♀ 1,22 mm, of wing ♂ 1,22, ♀ 1,33 mm. Very near *Glabellula canariensis* Frey of which, thanks to the kindness of Dr. W. Hackman, I have been able to study a ♂ and a ♀ paratype. *Glabellula sufflava* differs however by the following characters. Face yellow, hairs on thorax whitish, yellow spots on thorax more extensive and more distinct: there is one laterally on the mesonotum, just before the transverse suture, and a smaller one on the mesopleuron before the base of the wing; humeral and postalar calli distinctly yellow; the yellow spot above coxae I is joined to a metapleural spot, next to the halteres, by a narrow yellow membrane; the ♂ has two yellow spots on mesonotum anteriorly (not to be confused with the yellow humeral calli); ♂ tergites 1—2 without whitish hind border except laterally; tergites 3—4 with a distinct one; tergites 5—7 are almost entirely yellow laterally; ♀ tergites without yellow hind border before on tergite 4 and this very inconspicuous, distinct hind borders on tergites 5—7. Femora yellow at tip, elsewhere chocolate brown, tarsi of a paler brown than femora and tibiae. The male genitalia (Figs. 6 and 7), are different, i.a. in that *canariensis* has the epandrium with relatively shorter apical processes (Fig. 7 d) which do not overlap, whereas they do so in *sufflava* (Fig. 6 e); the latter has distinctly better developed gonocoxites, triangular in profile, in *canariensis* they are flat, lens-shaped in profile.

Genus **Apolysis** Loew, 1860.

The Palaearctic representatives of this genus are very little known. As far as I can make out there are not 20 specimens recorded from the various European museums, barely half the material found in the South African Museum alone. This is no doubt due to the minute size of these flies (2—3 mm) which makes them both difficult to spot and awkward to catch. The genus was erected by Loew in 1860 for a South African species, *A. humilis*. In 1873 Loew created a second species for material (♂ and ♀) found in Turkestan (*A. eremophila*). *Cyrtosia cinerea* Perris, 1839, from France and *C. andalusica* Strobl, 1898, from Spain, were shown also to belong to the genus *Apolysis*. Further specimens from Croatia, Tunis and Ismailia (Egypt) were allotted to *eremophila* and *humilis*. In 1938 Hesse revised the South African species and, for the first time since the creation of the genus, really serviceable figures (♂ genitalia and antennae) were provided for the distinction of the species. Engel's revision of the Palaearctic species of the genus (1933:127), though useful, is unreliable because the *A. humilis* supposedly found in Tunis is not *humilis* and because several species are lumped together in what he considers to be *eremophila*. Efflatoun (1945:103) also records *eremophila* from Egypt but judging from his description one can safely conclude that this is an altogether different species. Paramonov's revision (1947:213) is not very satisfactory either, from lack of material and because he has neither studied the types nor figured whatever material was at hand. Thus the work which Hesse did thirty years ago for the South African species remains to be done for the Palaearctic ones.

Apart from the Spanish material from the Copenhagen Museum and from the Entomology Research Institute, Ottawa, the study of which is the subject of the present paper, I have at my disposal two specimens (1 ♂ 1 ♀) of *eremophila* (sensu Villeneuve), from Croatia, originating from the Villeneuve collection in the R. Inst. nat. Sc., Brussels. Considering the dearth of usable figures of Palaearctic *Apolysis* I give sketches of the wing and genitalia (♂) of this species as well as of the Spanish species which is hereafter described as new.

Apolysis montivaga n. sp. (Figs. 8 a, b, c, d).

Material. — GRANADA: Barranco de Miranda 8 km SW Orgiva.

300 m, 1 ♂, holotype, 23 April 1966; Sierra Nevada near Padul, 1300 m, 1 headless ♂, paratype, 1 May 1966; Maitena, 900 m, 1 ♀ (? same species), 10 July 1960 (J. R. Vockeroth). Holotype in Zoological Museum, Copenhagen. Paratype in R. Inst. nat. Sc., Brussels.

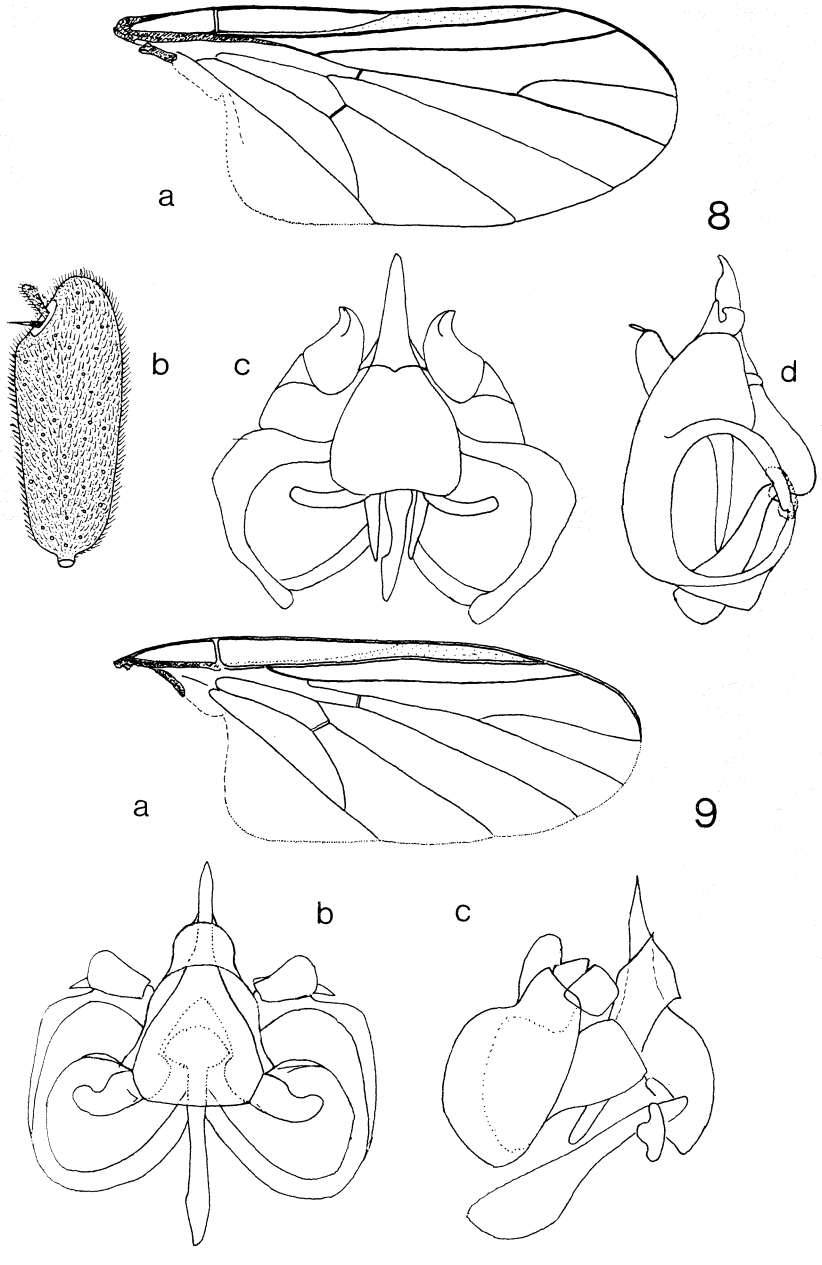
Diagnosis, ♂♀. — A minute fly, 1,85 mm in total length, wing 1,85 mm, entirely dull black with white hairs, greyish or brownish grey pollinosity on frons and face, anterior part of mesonotum, pleura and on anal sternites and tergites.

Description, ♂♀. — Head: proboscis projecting only slightly beyond extended antennae, not outranging them by more than the length of the two basal antennal joints; palps not conspicuous and apical joint not thickened; third antennal joint elongated, sausage-like (Fig. 8 b.); male holoptic.

Thorax: mesonotum black though anteriorly greyish pollinose, without any distinct longitudinal stripe. Abdomen: posterior margin of tergites very narrowly pale brown; dorsum and sides of tergites with sparse, short, erect white hairs which are more conspicuous in ♂ than in ♀; minute, white, relatively numerous hairs on epandrium in ♂; except for the anal tergites and sternites the abdominal segments are of a deep black, devoid of pollinosity; in ♀ the intersegmental membrane protrudes markedly along the dorso-ventral suture and the first tergite is entirely black; ♂ hypopygium: see figs. 8 c, d. Wing: (Fig. 8 a) brownish, cinereous hyaline, moderately iridescent, not milky white, with dark brown veins; the ambient vein delimitates clearly axillary lobe and alula; basal cells of equal length; lower cubital branch equal in length with part of 3rd longitudinal vein situated between middle cross-vein and cubital fork (much shorter in *cinerea*, 9:13); ♂ with halteres black, knob sometimes whitened at tip and underneath, ♀ with yellowish knob (? same sp.).

N.B. The ♀ has not been given the rank of paratype because she may well belong to yet another species, with yellow knobs of halteres, shorter lower cubital fork (16:19, see above) etc. Although these may be mere manifestations of sexual dimorphism too little is known about the taxonomy of *Apolysis* and there is not enough material available, to allow me to give a well considered opinion.

Remarks. — Engel (1933:128) lists 3 Palaearctic species: *andalusica* Strobl, *eremophila* Loew and *humilis* Loew. The last one is a South African species and is unlikely to be found much



Figs. 8—9. — 8. *Apolysis montivaga* n. sp.; a. Right wing of male paratype, b. Third antennal joint of male holotype, c. Hypopygium in dorsal view of paratype, d. Same in lateral view. — 9. *Apolysis eremophila* Loew (sensu Villeneuve); a. Right wing of male, b. Hypopygium in dorsal view, c. Same in lateral view.

farther north. On the other hand *A. cinerea* (Perris), which Engel considers a synonym of *eremophila,* is almost certainly a valid species. This leaves us with 3 Palaearctic species from which *montivaga* can be differentiated as follows. From *eremophila* (sensu Villeneuve) it can easily be distinguished by the wing, as the ambient vein stops before the axillary lobe in *eremophila* and the first basal cell is longer than the second (Fig. 9 a), and also the male genitalia (Figs. 9 b, c) are different. From *eremophila* sensu Engel *montivaga* is different through the less extensive grey pollinosity, the very short palps which do not reach half-way down the third antennal joint, the absence of any distinct longitudinal stripe on mesonotum, the only moderately iridescent wings, the dark brown veins etc. From *andalusica* it is distinguished by the absence of longitudinal stripes on mesonotum, by the not yellow but dark brown veins on the wing, by the at least partly dark halteres, by the entirely black first tergite. From *cinerea* it can be separated by the much longer cubital fork and by the closed and pedunculate anal cell.

Geron albidulus n. sp. (Figs. 10 a, b).

Material. — TERUEL: Albarracin, 1200 m, 1 ♂, holotype, 26 July 1965 (V. S. van der Goot). — GRANADA: Sierra Nevada, N. slope Veleta, 2200 m, 1 rather denuded ♂, paratype, 30 July 1960 (J. R. Vockeroth). Holotype in Zoölogisch Museum der Universiteit van Amsterdam. Paratype in Canadian National Collection, Ottawa.

Diagnosis, ♂. — Small, black species (2,5 and 3,5 mm), with pure white hairs on entire body, hairs on face long and dense, wings vitreous hyaline, whitish pruinosity on face, frons, antennae, occiput, pleura, coxae, sides of mesonotum and base of abdomen (in well preserved specimens), silvery white scales on thorax and rest of abdomen.

Description, ♂. — Head: face entirely devoid of scales, densely covered with long, white hairs, centre of face from clypeus upwards narrowly bare, as is also a small crescent immediately under the antennae; face and frons: ground colour black under a whitish pruinosity; frons with minute, adpressed, silvery scales and no hairs; antennae with first joint whitish pollinose, bearing long, rather sparse white hairs and no scales, about twice as long as second joint which is barrel-shaped and slightly broader than

first joint; third antennal joint a little less than two and a half times the length of first joint; eyes in actual contact above, for about three times the length of the ocellar tubercle.

Thorax: a slight, narrow, greyish central stripe on anterior third of mesonotum (only to be seen in well preserved specimens).

Abdomen: with numerous, silvery white, brilliant scales and long, relatively dense hairs.

Hypopygium: gonocoxites with two diverging, narrow and pointed, prong-like appendices on the ventral side above (Fig. 10 a), the two branches of the epiphallus very long, widely bifurcating and characteristically shaped (Fig. 10 b).

Wings: length 3 and 3,7 mm, vitreous hyaline, not milky whitish except for the axillary lobe, with yellowish or brownish veins, Sc. hardly discernible, R_5 a little more than twice as long as transverse vein closing the discal cell apically, halteres with yellowish stem and white knob.

Legs: blackish brown, metatarsus sometimes yellowish, silvery white scales.

Remarks. — The new species is nearly related to *intonsus* Bezzi, but can be distinguished from this by the smaller size and the distinctly different male genitalia. It is also quite near *emiliae*

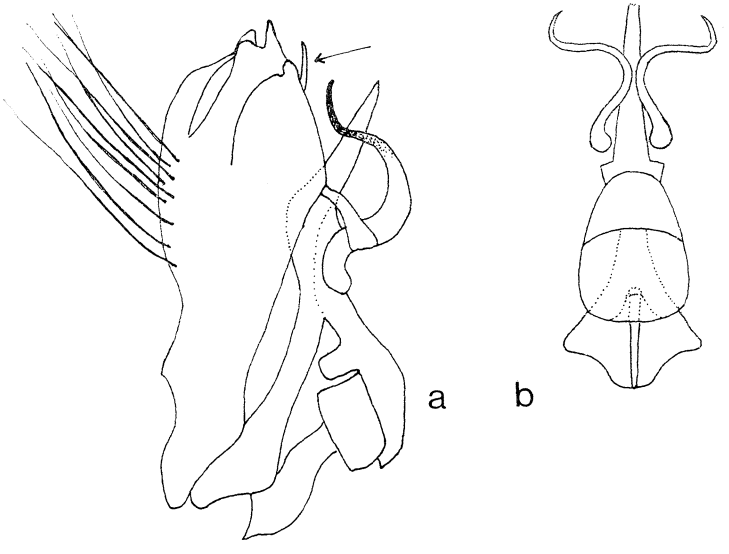


Fig. 10. *Geron albidulus* n. sp.; a. Hypopygium in lateral view of holotype, b. Phallosome in frontal view of paratype.

Zaitzev, from Kazakhstan, but differs from this by the shape of the phallus and of the rami of the epiphallus.

Oligodranes langemarki n. sp. (Figs. 11 a, b).

Material. — GRANADA: Barranco de Miranda, 8 km SW Orgiva, 300 m, 2 ♀, holotype and paratype, 16 and 23 April 1966. Holotype in Zoological Museum, Copenhagen. Paratype in R. Inst. nat. Sc., Brussels.

Diagnosis, ♀. — A very small (less than 2,5 mm), black, *Phthiria*-like, distinctly hump-backed species, with sparse and short, whitish pubescence on entire body, uniformly hyaline wings, 3rd antennal joint with a dorsal, upwardly directed, style-like process (as in *Apolysis*), discal cell present, two submarginal and three posterior cells, first basal cell hardly longer than second: r-m situated near base of discal cell, and abdominal segments black with very narrow yellowish-white hind margins.

Description, ♀. — Head: frons dull black, slightly depressed centrally and also distinctly transversely towards apex; the part on which the antennae are situated, however, slightly tumid; frons at apex distinctly broader than ocellar tubercle, almost twice as broad, face practically non-existent; upper part of frons with very spare, yellowish-white, erect hairs; anterior part of frons and genae greyish pollinose and with more numerous and longer hairs of the same colour; inner margin of eyes only gradually diverging anteriorly, frons consequently not much broader at level of antennae than at apex; antennae black with small basal joints, combined, slightly longer than half the length of third joint, with very small, sparse, yellowish-white hairs; third joint (Fig. 11 b) club-shaped, laterally compressed, broadening towards tip, with a distinct, dorsal, preapical excavation from which protrudes a rather stout, upwardly directed, style-like process (no hair-like style is visible); proboscis about twice as long as head; occiput with longer and more abundant hairs, welt-like protuberances well visible, elongate, as in *Usia*.

Thorax: roundly convex when seen laterally, distinctly humped, black with vague, greyish markings anteriorly on mesonotum, the latter part anteriorly and laterally and also pleura with a greyish-white pruinosity; mesonotum almost hairless: short, white, erect hairs only on anterior part and laterally between humeral callus and base of wing, hairs on discal part rare and weak; scutel-

lum with a few feeble, bristle-like hairs on hind margin; pleura hairless; one of the specimens shows a distinct pronotal ledge in neck region, as in *Platypygus*.

Abdomen: black, convex and carinate below, with 8 visible tergites, elongated and pointed at apex, a little broader than thorax; 1st tergite and all sternites grey-pollinose; on tergites and sternites the hairs are sparse, erect and very short, they are a little longer and more abundant laterally; tergites and sternites with a linear, yellowish-white hind border; one of the specimens (the paratype) with the three basal sternites brownish-red.

Wings (Fig. 11 a): uniformly hyaline, without a prediscoidal spot or a stigma, but cell Sc is slightly opaque, yellowish-grey; pale brown veins; r-m situate opposite base of discal cell, thus is 1st basal cell hardly longer than 2nd; axillary lobe well developed, triangularly lobate; alula large, lobate; halteres with yellow stalk and unspotted, pure-white knob.

Legs: dark-brown to black, rather long, without any spines on femora below, only with short hairs; elsewhere hairs short, downy, inconspicuous; no distinct spicules; apical spurs on tibiae minute; claws and pulvilli well developed.

Measurements: length of body about 2,34 mm, of wings about 2,80 mm, breadth of abdomen 0,88 mm, of thorax 0,80 mm.

This species is named in honour of Mr. Søren Langemark.

Remarks. — I at first felt doubtful about the generic status of this tiny but remarkable species. It has the antennae of an *Apolysis* but a closed discal cell. The general appearence is that of a *Phthiria* but differs in antennae and wing venation; it has neither the abdomen nor the antennae of a typical *Usia*. At first sight it did not seem to be an *Oligodranes* either, because of the

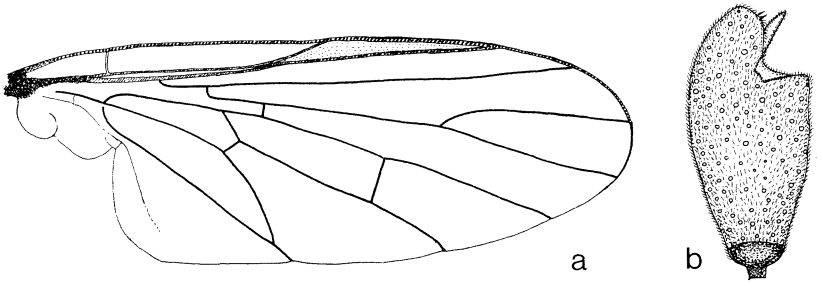


Fig. 11. *Oligodranes langemarki* n. sp.; a. Right wing of female paratype, b. Third antennal joint of female holotype.

Apolysis-like antennae and the apparently one-jointed palpi (I have not been able to ascertain whether they are one- or two-jointed); also the occipital welt-like excrescences (Okzipitalschwielen sensu Engel) are present, the intersegmental membranes are distinct and, far from being situated on or beyond middle of discal cell, the r-m cross-vein is very proximal, which considerably reduces the length of the first basal cell.

On the other hand, sensu Melander (1946:451) and Hesse (1938: 861), the present species is an *Oligodranes* and there is not much doubt that, on the whole, it has more in common with this genus than with any other genus whatsoever. It is thus fairly certain that this species belongs to *Oligodranes,* even though it is a rather aberrant representative of it. A study of the male genitalia will be necessary to settle the matter once and for all.

Oligodranes was as yet unknown from the Western Mediterranean, though in 1941 Séguy described an *O. hyalipennis* from the Atlantic coast of Morocco (Agadir). Of the five known Palaearctic *Oligodranes* species *hyalipennis* Séguy seems to be nearest to the species described here. *Langemarki* differs from it in having shorter hairs on thorax and abdomen and no distinct longitudinal stripe on mesonotum.

Phthiria barbatula n. sp. (Figs. 12, 13 b, 14 b).

Material. — GRANADA: Sierra Nevada, N.slope Veleta, 2200 m, 1 ♂, holotype, 20 July 1960 (J. R. Vockeroth). Deposited in Canadian National Collection, Ottawa.

Description, ♂. — Small (3 mm), entirely blackish-brown to olive brown, slightly shiny.

Head: antennae with third antennal joint (Fig. 12) narrow, with a hardly distinguishable dorsal process and almost thrice as long as basal segments; face only moderately produced (Fig. 13 b), not more than the length of basal antennal joints; hairs on frons shorter and not so dense as in *pulicaria* and *lacteipennis;* hairs on frons, antennae and ocellar tubercle black, elsewhere whitish; oral margin narrowly shiny; face and frons (as well as anterior part of mesonotum, pleura, coxae and abdomen laterally) whitish pollinose.

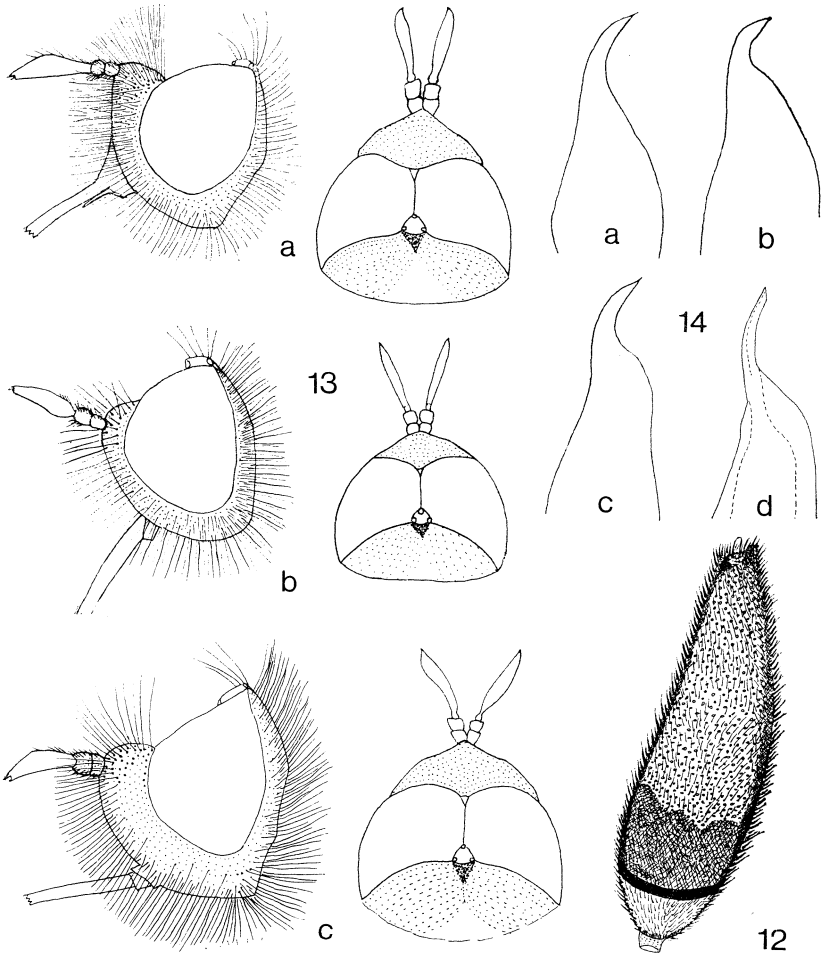
Thorax: devoid of yellowish markings and of longitudinal grey stripes.

Wings: long (3,4 mm) and broad, with a distinctly yellow stigma and yellow veins. Halteres yellow with brownish knobs.

Abdomen: without spots or stripes, hind border of tergites not differently coloured.

Male genitalia: with a quite distinctive phallus (Fig. 14 b).

Remarks. — Though the hairs on the head of this species is not entirely and exclusively whitish, the species is nearer to *canescens* Lw. (1846:390,3) and *xanthaspis* Bezzi (1925: 192) than to *pulica-*



Figs. 12—14. — 12. *Phthiria barbatula* n. sp.; third antennal joint of holotype. — 13. Heads in lateral and dorsal views of males of a. *Phthiria lacteipennis* Strobl, b. *Ph. barbatula* n. sp., holotype, c. *Ph. pulicaria* (Mikan). — 14. Phallus in lateral view of a. *Phthiria lacteipennis* Strobl, b. *Ph. barbatula* n. sp., holotype, c. *Ph. pulicaria* (Mikan), d. *Ph. umbripennis* Loew.

ria and *lacteipennis*. It is distinguished from the former two species by the black hairs on frons, antennae and ocellar tubercle, by the entirely olive brown and black legs, by the absence of any longitudinal stripes on mesonotum, by the shape of the third antennal joint and of the phallosome. The species *pulicaria* and *lacteipennis* have a distinctly more produced face and an altogether different third antennal joint (Figs. 13 a, c).

Phthiria lacteipennis Strobl, 1909 (Figs. 13 a, 14 a).

Material. — GRANADA: Barranco de Miranda 8 km SW Orgiva, 300 m, 1 ♀, 23 April 1966; Sierra Nevada, N. slope Veleta, 2400 & 2250 m, 2 ♂, 22 and 24 July 1960 (J. R. Vockeroth).

Distribution. — Southern Spain only.

Remarks. — This rare, or at least very little known species is characterized by vitreous wings with milky white alula, by the absence of a yellow spot on the scutellum and of a yellow border behind the eyes; all tergites and sternites are grey.

The present specimens agree well with a male of the original specimens of Czerny and Strobl, which I have seen, except for the presence of a slight discoloration on the apex of the scutellum and a rather longer cubital fork, which starts opposite the transverse vein closing the discal cell. The present specimens also have a slightly less developed axillary lobe. Such differences can be accounted for by mere individual variation.

Phthiria pulicaria (Mikan), 1796 (Figs. 13 c, 14 c).

Material. — GRANADA: Maitena, 900 m, 3 ♀, 11 July 1960 (J. R. Vockeroth).

Distribution. — Found practically everywhere in Europe: from Sweden and Finland to S. Spain (including Great Britain) and from the Atlantic coast of France to the U.S.S.R. Also recorded from Northern Africa, Asia Minor and Central Asia.

Remarks. — These specimens differ slightly from Engel's description by the reddish hairs at the base of the antennae, by the absence of black hairs on the anal segment and by the colour of the scutellum: it is almost entirely yellow, only narrowly darkened laterally.

Phthiria umbripennis Loew, 1846 (Fig. 14 d).

Material. — GRANADA: Sierra Nevada, N. slope Veleta, 2400 m, 7 ♂ 1 ♀, 27 and 30 July 1960 (J. R. Vockeroth).

Distribution. — Spain, Corsica, Italy, Sicily, Greece, Dalmatia, Syria, Palestine, Morocco.

Heterotropus nigrithorax n. sp. (Figs. 15, 16 a, b, c).

Material. — ALMERIA: Albufera, 0—50 m, 1 ♂, holotype, 1 ♂ 2 ♀, paratypes, 29 March 1966; Cabo de Gata, 0—50 m, 5 ♂ 5 ♀, paratypes, (2♂ 1 ♀ leg. W. Hackman), 24 March 1966; 1 ♂ 1 ♀, paratypes, 26 March 1966; 1 ♂ 2 ♀, paratypes, 13 April 1966 (W. Hackman). Holotype and 8 paratypes in Zoological Museum, Copenhagen. 4 paratypes in Zoological Museum, Helsinki. 6 paratypes in R. Inst. nat. Sc., Brussels.

Diagnosis, ♂♀. — Middle-sized *Heterotropus* (about 5 mm) with shiny black head and thorax, mouth cavity and margins and central part of face yellow; proboscis short; abdomen ivory yellow with, in the ♀, a distinctive but often vague or incomplete black

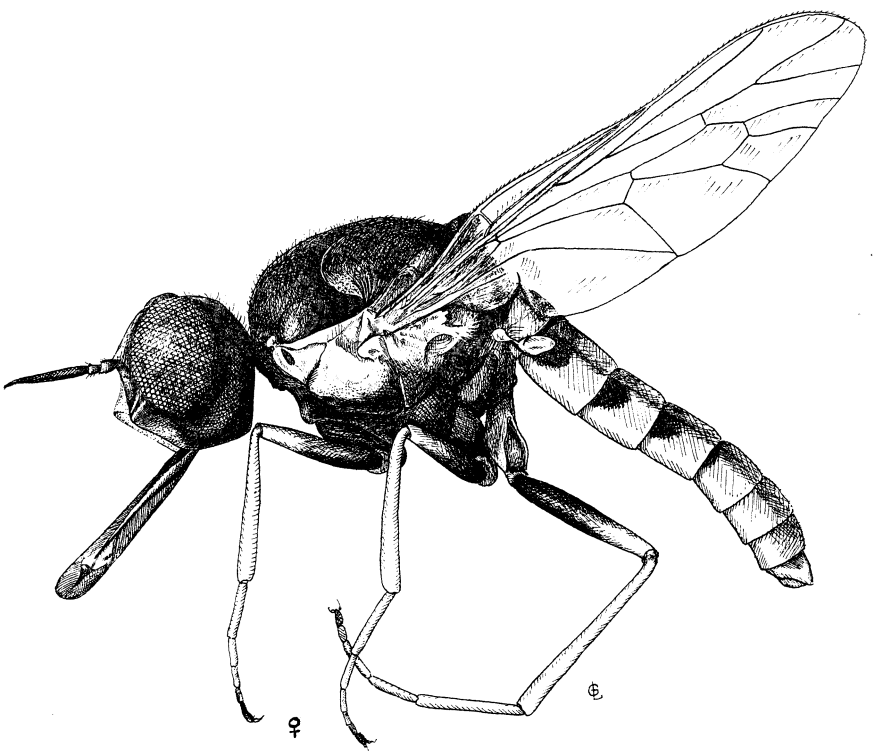


Fig. 15. *Heterotropus nigrithorax* n. sp.; habitus of female paratype.

pattern (Fig. 16 b) mostly on tergites 2—4, tergite 1 always unmarked, tergite 8 always dark; in ♂ irregular and badly defined dark anterior transverse bands, but tergite 1 always pale; wings with golden yellow veins; legs pale yellow except for the last tarsal joint and the basal two-thirds of the femora, which are shiny black or dark brown.

Description, ♂♀. — Head: entirely shining black except for the oral opening and its margin which are pale yellow as is also a triangle above the anterior mouth margin, of which the apex is situated slightly above the antennae; in the male sex also the frons is entirely yellowish white; face conically produced, frons in ♀ broad, almost half as broad at level of antennae as the entire head and hardly narrower towards vertex; ocellar triangle broad, almost half as broad as distance between the eyes at vertex (7:16); in ♂ eyes holoptic from ocellar triangle down to only a short distance above antennae, only separated by a very narrow black margin (distinctly narrower than anterior ocellus), frons in ♂ thus triangular and very small, smaller than ocellar triangle. Antennae (Fig. 16 a): with basal joints yellow, third joint to a variable degree yellow at base, apically dark brown, sometimes entirely brown, first joint narrow, second joint sub-globular, third joint laterally compressed, narrowly lanceolate, more than twice as long as two basal joints taken together (15:6 with style); proboscis short and thick, not extending beyond tip of antennae;

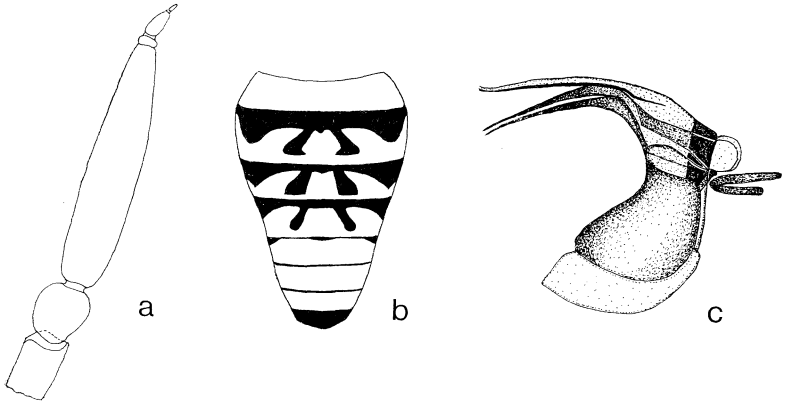


Fig. 16. *Heterotropus nigrithorax* n. sp.; a. Antenna in lateral view of female paratype, b. Abdominal pattern in some female paratypes, c. Hypopygium in lateral view.

white, erect hairs on face and frons scarce, more abundant on occiput.

Thorax: entirely shiny black except for a broadish, pale yellowish or white area laterally, extending from base of wings to humeral calli; short white erect hairs, longer in the ♂ than in the ♀, rather close set on mesonotum in ♂; prosternum yellowish white; scutellum and postalar calli varying in colour from black to brown; no spots or stripes on mesonotum whatsoever.

Abdomen: shiny, with a very distinctive black pattern in the ♀ (Fig. 16 b) which is often incomplete or badly defined; in the ♂ with irregular black, transverse, anterior bands of variable distribution, so much so that certain specimens seem to have a completely ivory yellow abdomen but bands are usually present and tend to be broader discally and laterally; in both sexes tergite 1 is always ivory yellow; in ♀ tergite 8 always brown; tergites 5—7 are often entirely or almost entirely whitish or pale yellow in both sexes; sternites yellow; on dorsum only short yellowish white erect hairs in ♀, longer and thicker in ♂. Hypopygium: Fig. 16 c.

Wings (Fig. 15): short and broad, entirely milky-white with pale-yellow veins and no pterostigma; first posterior cell very broad; the broadened axillary lobe gives the wing a truncated aspect; squamae and halteres white or very pale yellow.

Legs: rather short and strong for a Bombyliid; coxae black or brown, apically yellow; femora with basal two-thirds black and apical third or less yellow; tibiae pale yellow and white, tarsi yellow, pretarsus brown and, on first pair of legs, broader than other joints; pulvilli as long as claws; hairs white to yellow. In many specimens the anterior tibiae are longitudinally distinctly bicolorous, the anterior part being white, the posterior yellow.

Measurements. Length of body from 4,10 to 5,48 mm; of wings from 3,56 to 4,10 mm; relative breadth of head and of frons in ♀ (max.) 100:46; relative maximum and minimum breadth of frons in ♀ 100:81.

Remarks. — This is the first time that a representative of this genus is found within Europe's limits, though several species have been discovered in N. Africa, from Morocco to Egypt, and in the Near East. The genus is also known to occur, but rarely, in N. America, Ethiopian Africa and in the Oriental region. Certain species of the genus belong to the rare Bombyliidae to show, occasionally, a positive phototropism.

This species has some features in common with *H. elephantinus* Séguy (1929:62) from Chad (only the ♂ is known), which also has a completely black thorax and, in the ♂, an ivory-white abdomen without any particular dark pattern etc. But in opposition to *elephantinus, H. nigrithorax* has a shiny black occiput as is also the mesonotum instead of dull black, the third antennal joint is twice as long as the basal joints together, the femora and tibiae are vigorous, the former not whitish but black or brown except for the apical third, the metatarsus is entirely pale, not narrowly so at base only, the abdomen has in general black markings on at least a few anterior tergites. I do not think that Engel's *elephantinus* from Egypt is the same species as Séguy's.

Dischistus notatus Engel, 1933.

Material. — GRANADA: Sierra de Contraviesa, Rabite, 1300 m, 1 ♀, 2 May 1966.

Distribution. — Not found outside Spain. Algeciras, Valencia (Saler), Granada.

Remarks. — The degree of infuscation of the wing is variable and is less pronounced among females than among males.

Bombylius ater Scopoli, 1763.

Material. — GRANADA: Sierra de Contraviesa near Rabite, 1300 m, 1 ♀, 2 May 1966; Pinus Puente 15 km NW Granada, 500—1000 m, 5 ♂, 27 April 1966.

Distribution. — A common species widely distributed in the Palaearctic Region.

Bombylius canescens Mikan, 1796.

Material. — GRANADA: Pinus Puente 15 km NW Granada, 500—1000 m, 1 ♂, 27 April 1966.

Distribution. — Common in the whole of Europe; found also in Asia and in North Africa.

Bombylius cruciatus Fabricius, 1798.

Material. — GRANADA: Barranco de Algarrobo 12 km SW Orgiva, 1 ♂, 25 April 1966; Barranco de Miranda 8 km SW Orgiva, 300 m, 12 ♂ 3 ♀, 16—21 April 1966; Mecina Bombarón, 5 ♂, 8 May 1966.

Distribution. — This handsome species, a powerful flier and a great hoverer, is found in Southern Europe, W. Asia and N. Africa. It is found everywhere in the Iberian peninsula.

Bombylius discolor Mikan, 1796.

Material. — GRANADA: Sierra Nevada near Padul, 1300 m, 2 ♂ 3 ♀, 1 May 1966; 1 ♀, 8 April 1966.

Distribution. — It would seem that *discolor* is a more northerly species than the nearly related *medius*. Though this last species has been discovered in Sweden (Lyneborg, 1965), *discolor* is much more common in Northern Europe where it has been found almost everywhere except in the extreme north. *Medius* has been recorded neither from Denmark nor from Great Britain or the Netherlands. In Belgium it seems to occur only occasionally: I have seen one single correctly identified specimen, from Ter Hulpen (Brussels). From Spain *discolor* has been quoted only twice (J. M. Andréu Rubio, 1961: 29).

Bombylius fimbriatus Meigen, 1820.

Material. — GRANADA: Sierra de Contraviesa near Rabite, 1300 m, 8 ♂ 2 ♀, 8 April 1966, 1 ♂ 1 ♀, 2 May 1966; Pinus Puente 15 km NW Granada, 500—1000 m, 4 ♂ 8 ♀, 27 April 1966; Sierra Nevada near Padul, 1200 m, 5 ♂ 2 ♀, 1 May 1966.

Distribution. — This is a more characteristically southern species than its near relative *B. major* and has not been discovered north of France (Paris is, as far as I know, its northern limit); also Central Europe, W. Asia, N. Africa.

Bombylius fulvescens Wiedemann ap. Meigen, 1820.

Material. — GRANADA: Barranco de Miranda 8 km SW Orgiva, 300 m, 5 ♂ 3 ♀, 16—23 April 1966.

Distribution. — Southern Europe; also Central Europe and S. Russia, Palestine and N. Africa.

Remarks. — A variable species in which the femora are blackened to a variable degree.

Bombylius major Linné, 1758.

Material. — GRANADA: Barranco de Miranda 8 km SW Orgiva, 300 m, 2 ♂ 1 ♀, 21—23 April 1966.

Distribution. — A well known Holarctic species which appears in the early spring. All 3 specimens belong to the form *australis* Loew, 1855.

Bombylius medius Linné, 1758.

Material. — ALMERIA: Rioja, 50—200 m, 1 ♂, 7 March 1966; Alhama 5 km W, 200—500 m, 7 ♂ 6 ♀, 17—28 March 1966 (3 ♂

3 ♀ leg. W. Hackman). — GRANADA: Barranco de Miranda 8 km SW Orgiva, 300 m, 4 ♂, 16—21 April 1966; Sierra de Contraviesa near Rabite, 1300 m, 3 ♂, 8 April 1966; Pinus Puente 15 km NW Granada, 500—1000 m, 1 ♂ 4 ♀, 27 April 1966; Sierra Nevada near Padul, 1200 m, 1 ♀, 8 April 1966.

Distribution. — Native of many European countries; N. Africa, Asia Minor, Turkestan, W. Siberia.

Remarks. — It is a moot point whether the different species described by Loew in 1855 (Neue Beiträge) are valid species or merely forms or races. Engel (1934) considers them as "varieties" of *medius*. More material should be gathered and series of the genitalia examined before giving a well considered opinion. Judging from the material before me, however, it is quite clear, that *medius* and *punctipennis* coexist in the South of Spain and exhibit distinct characters (see below). These characters do not show any sign of overlapping, at least not in such material as I have been able to examine until now.

? Bombylius nubilus Mikan, 1796.

Material. — GRANADA: Pinus Puente 15 km NW Granada, 500—1000 m, 1 ♂, 27 April 1966.

Distribution. — This by no means common species has been found in S. Europe (Spain, Dalmatia, Greece), in Central Europe (Austria, Czechoslovakia, Hungary, Bessarabia), S.Russia (Crimea, Ukraine, Caucasus), Asia Minor (Syria, Mesopotamia, Armenia); a "variety" *algericus,* was described by Villeneuve from Algeria. This enumeration reveals surprising gaps: the species does not seem to have been found in France, nor in Italy; in N. Africa it is only known from Algeria.

Remarks. — I rather doubtfully refer this specimen to *nubilus* Mikan, with which species it has a number of characters in common. But it has also some rather unusual features for a *nubilus:* it is much smaller (4,10 mm) than the smallest specimens I have seen as yet; the femora are olive-brown, not black; the scutellum shows a number of long, black hairs; the third antennal joint and the proboscis are not conspicuously hairy as is usual in this species; the wings are entirely infuscated, the anterior and basal parts being very dark. Several forms or subspecies have been described and this may be a further one, but *nubilus* is a rather variable species and more material will be required before committing oneself.

Bombylius punctipennis Loew, 1855.

Material. — ALMERIA: Alhama 5 km W, 200—500 m, 1 ♀, 28 March 1966. — GRANADA: Pinus Puente 15 km NW Granada, 500—1000 m, 4 ♂, 27 April 1966.

Distribution. — The more meridional parts of Europe (S. and Central Spain, Greece) and Asia Minor. I have also seen numerous specimens from N. Africa: mostly from Algeria but also from Tunisia and Morocco.

Remarks. — Loew (1855:12) gives the following distinctive characters: "Er unterscheidet sich von *B. medius* ... durch die weiß-gelbliche Behaarung der Schenkel, durch die viel weniger mit Schwarz gemengte Behaarung des Bauchs und viel sparsamere schwarze Borsten am Seitenrande der vorderen Einschnitte, ferner durch weniger ausgeprägte dunkle Haarstrieme der Brustseiten und durch das Verschwinden des Doppelfleckens in der Behaarung vorn auf der Oberseite des Thorax ..., das 3. Fühlerglied gleichmäßiger zugespitzt". Kertesz, in his catalogue (1909: 142) and Paramonov in his revision of the genus *Bombylius* (1926:146) consider *punctipennis* a valid species. Later Paramonov (1931 and 1940: 349) reduced it to a subspecies of *medius*. Engel (1934:243) considers it merely as a variety of the latter species. I am inclined to regard it as a "good" species. Externally it can be quite readily distinguished from *medius* and the genitalia are rather different. Nevertheless I am aware that the differences are not altogether above discussion and for all I know *B. discolor*, *medius* and *pictipennis* may, from N. to S., be three successive races of one single species. But intermediate forms, if they exist, have not come to my knowledge and, whatever the taxonomic status of these three forms, they have distinctive characters and a proper geographical range, and should consequently be retained as valid taxonomic entities.

Bombylius vulpinus Wiedemann ap. Meigen, 1820.

Material. — GRANADA: Salobreña 6 km W Motril, 0—50 m, 1 ♀, 24 April 1966; Barranco de Miranda 8 km SW Orgiva, 300 m, 8 ♂ 5 ♀, 16—21 April 1966.

Distribution. — Southern and Central Europe, North Africa and Asia Minor. Also found in S. Russia, in the Netherlands and in Belgium.

Remarks. — The thorax is usually devoid of any black hairs

but some female specimens may show a very few, scattered, black hairs in the yellow-grey pile.

Acanthogeron senex (Wiedemann ap. Meigen), 1820.

Material. — GRANADA: Barranco de Algarrobo, 12 km SW Orgiva, 300 m, 1 ♂, 25 April 1966; Barranco de Miranda 8 km SW Orgiva, 300 m, 15 ♂ 2 ♀, 20—21 April 1966.

Distribution. — Spain and N. Africa.

Remarks. — I am quite unable to decide whether these specimens belong to *A. senex* or *biroi*. They have in common with *senex* the absence of black hairs on the humeral callus and on the pleura, and the presence of yellow or whitish macrochaetae near the root of the wing; on the other hand, like *biroi,* they have black hairs on the posterior part of the mesonotum, numerous and long black hairs along the hind margin of the tergites and broadly blackened femora (the hind femora rather less so); what is more the corresponding females do have black hairs on the humeral region. I very much suspect that *senex* and *biroi* are either one and the same species or only two forms or perhaps races of one single species.

The genus *Acanthogeron* is badly in need of a revision. It was not, as several authors seem to believe, erected by Bezzi in 1921 (Ann. S. Afr. Mus., XVII:35, no mention whatsoever of *Acanthogeron*) but in 1925 (Bull. Soc. R. ent. Egypte, 1924:164).

? Acanthogeron separatus (Becker), 1916.

Material. — GRANADA: Torrenueva E Motril, 0—50 m, 1 ♂ 3 ♀, 10—14 April 1966; Barranco de Miranda 8 km SW Orgiva, 300 m, 2 ♀, 21—23 April 1966; Sierra Nevada near Padul, 1200 m, 1 ♂, 8 April 1966.

Distribution. — Recorded from Spain, N. Africa, the Canary Islands and Syria.

Remarks. — I am by no means certain that these specimens are Becker's *separatus,* they do not coincide any too well with Engel's redescription. In the ♀ specimens before me the ruff-like occipital collar is not "von hellbräunlich weißen Haaren gebildet", but the long hairs show a silvery whitish hue (like the beard and the mystax), which is in striking contrast with the dull greyish pile of the anterior part of the mesonotum; there is long, black hairs along the upper margin of the genae and on the two first antennal joints; these show also yellowish-brown hairs, mostly underneath,

but also, to a lesser extent, above; the same yellowish-brown hairs are seen in the oral cavity, at the base of the proboscis; the frons of the female is jet-black and shiny, which Engel does not mention; the femora have yellow scales and mostly black hairs underneath instead of white scales and white hairs.

Systoechus gradatus tesquorum Becker, 1916.

Material. — GRANADA: Mecina Bombarón, 800 m, 1 ♂ 3 ♀, 8 May 1966; Barranco de Miranda 8 km SW Orgiva, 300 m, 1 ♀, 21 April 1966; Sierra Nevada, N. slope Veleta, 2550 m, 1 ♂, 24 July 1960 (J. R. Vockeroth).

Distribution. — Originally described from Spain and Corsica; according to Engel (1935:283) also found in Hungary and Bulgaria.

Cytherea infuscata (Meigen), 1820.

Material. — GRANADA: Barranco de Miranda 8 km SW Orgiva, 300 m, 2 ♂, 21 April and 5 May 1966.

Distribution. — Already known from the Provinces of Alicante, Avila, Badajoz, Granada, Madrid, Murcia, Saragossa (Andréu-Rubio, 1961:40). Has also been discovered in N. Africa and Asia Minor.

Lomatia infernalis Schiner, 1868.

Material. — ALMERIA: Punta Sabinal, 0—50 m, 4 ♂ 8 ♀, 26 April 1966 (W. Hackman). — GRANADA: Torrenueva E Motril, 0—50 m, 5 ♂ 8 ♀, 17 April 1966; Barranco de Algarrobo 12 km SW Orgiva, 300 m, 1 ♂, 25 April 1966; Barranco de Miranda 8 km SW Orgiva, 300 m, 7 ♂ 7 ♀, 16—23 April 1966; Sierra Nevada Highway, 2200 m, 1 ♂, 27 July 1960 (J. R. Vockeroth).

Distribution. — Originally caught in Spain it has further been recorded from Hungary, Albania, Bulgaria, Greece, Syria, Palestine and Armenia.

Genus **Stomylomyia** Bigot, 1887.

Engel (1935:390) reduced this genus to the position of a subgenus of *Plesiocera* Macquart but this decision is questionable. Bigot erected the genus *Stomylomyia* for a new species which he called *leonina*. This is almost certainly a synonym of Loew's "*Tomomyza*" *europaea* which is a fairly variable species. Bezzi (1921a:474) showed that the genus *Tomomyza* was exclusively South African and referred the Palaearctic species grouped under

that name to the genus *Stomylomyia,* which had been mistakenly sunk as a synonym of *Tomomyza* (Kertesz, 1909:85). Paramonov (1929:92) treated *Stomylomyia* as a valid genus. Engel (l.c.) relegated it to the position of a subgenus of *Plesiocera* with the following justification "Wenn man das Hauptkennzeichen dieser Gattung (*Plesiocera*), das ... Merkmal des schnauzenartig vorgezogenen und aufgestülpten Mundrandes annimmt, so ist kein Grund vorhanden, nicht auch die Gattung *Stomylomyia* mit *Plesiocera* zu vereinigen, bzw. erstere als Untergattung von letzterer zu betrachten, denn die Anzahl der Unterrandzellen ist kein Hindernis dafür, haben wir doch verschiedene Gattungen, in denen 2 und 3 Unterrandzellen auftreten". The presence of 2 or 3 submarginal cells has no absolute significance, it may or may not have a generic connotation: in certain groups of species it has not but in others it most decidedly has, e.g., among the Exoprosopines. Hesse (1956:99), having compared *Stomylomyia europaea* with the South African species of *Plesiocera,* lists the following differences: "three submarginal cells in the wings, a tuft of hairs on the metanotum, longer hairs on abdomen, denser hairs on body, well devel-

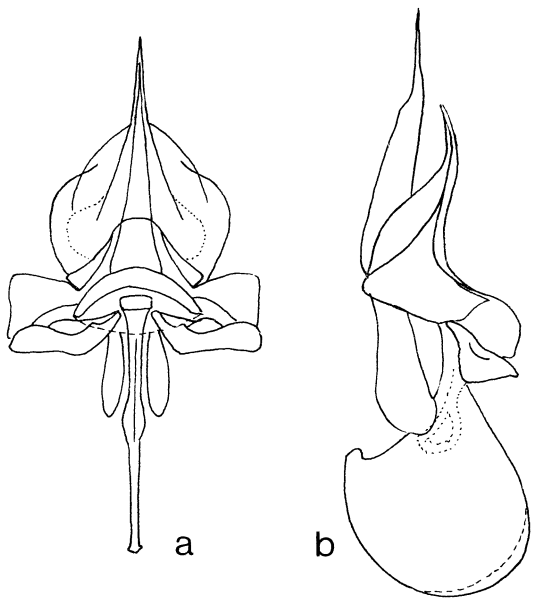


Fig. 17. *Stomylomyia tenella* (Loew); a. Phallosome in dorsal view, b. Same in lateral view.

oped spicules on front tibiae, a more distinct indentation in hind margin of eye etc." No species of *Plesiocera* s.str. are presently available to me but some time ago I made a sketch of the genitalia of *P. algira* (v. François, 1967:5, fig. 12) and they are quite similar to those of the South African species as figured by Hesse (l.c.). As *Stomylomyia tenella* has a distinctly different epiphallus (Fig. 17) I find it preferable to keep *Stomylomyia* as a valid genus, at least provisionally, until I have some *Plesiocera* s.str. at my disposal for further study.

Stomylomyia tenella (Loew), 1869 (Figs. 17 a, b).

Material. — GRANADA: Barranco de Miranda, 8 km SW Orgiva, 300 m, 10 ♂ 4 ♀, 20—23 April 1966; Mecina Bombarón, 800 m, 1 ♂, 8 May 1966.

Distribution. — An exclusively Spanish species and until now found only in the southern provinces of Granada and Murcia. According to Bezzi (1925:200) also indigenous to Algeria.

Remarks. — The abdomen of the ♀ is broader, flatter; the 2 longitudinal grey stripes on the mesonotum are less distinct; there are more black hairs along the posterior margin of the tergites; the hind femora are yellow (black in the ♂); the ocellar tubercle occupies a little more than half the distance between eyes at vertex; the ♀ seems as a rule to be larger than the ♂. Hypopygium : Figs. 17 a, b.

Aphoebantus scutellatus (Meigen), 1838 (Figs. 18 a, c).

Material. — GRANADA: Barranco de Miranda, 8 km SW Orgiva, 300 m, 10 ♂ 10 ♀, 20—23 April 1966 and 5 May 1966; Torrenueva E Motril, 0—50 m, 5 ♂ 6 ♀, 17 April 1966; Salobreña, 6 km W Motril, 0—50 m, 2 ♂, 24 April 1966.

Distribution. — A species by no means rare in Spain but as yet not recorded from any other country. I have recently seen specimens from Portugal (Villa Nova, 21.VII.1963, Dr. J. Leclercq leg.). A related species from Morocco is described hereafter.

Remarks. — It is necessary to point out an error in Engel's table of the Palaearctic species (1935:397) because it is liable to cause trouble in the identification of the ♂ of the species. In couplet 10, "Stirnhaare schwarz" should be "Stirnhaare weiß". I must add that the character given in couplet 1 to separate *Cononedys,* which Engel considers a subgenus of *Aphoebantus,* from *A.* proper, is very unreliable.

Aphoebantus lyneborgi n.sp. (Figs. 18 b, d).

I have caught near Tangier, Morocco, in 1966, an *Aphoebantus* which, though closely related to *scutellatus,* is sufficiently different from it to justify its erection as a new species. It is dedicated to Dr. Leif Lyneborg.

Material. — Morocco, Bight of Tangier, 0—50 m, 23 May — 10 June 1966, 1 ♂ (holotype), 3 ♀ (paratypes), F. J. J. François leg. In the collections of the Royal Institute for Natural Science, Brussels.

Description, ♂♀ (Figs. 18 b, d).

Like *A. scutellatus* but differs from it by the following characters:

a. Frons in ♂ with mixed black and whitish hairs; *scutellatus* has no erect black hairs on at least the lower ⅔ of the frons.
b. The eyes, in the ♂, are not quite holoptic but narrowly separated, the distance between them at the vertex being less than the breadth of the anterior ocellus; in *scutellatus* the eyes are, in the ♂, shortly holoptic.
c. The relative length of the joints which form the style of the third antennal segment, is different (Figs. 18 c, d).
d. Anterior part of wing distinctly darker, 2 spots on wing (on r-m and on m-cu) more distinct.
e. r-m situated on anterior half of discal cell; in *scutellatus* it is situated on the middle of this cell or it is slightly distal.

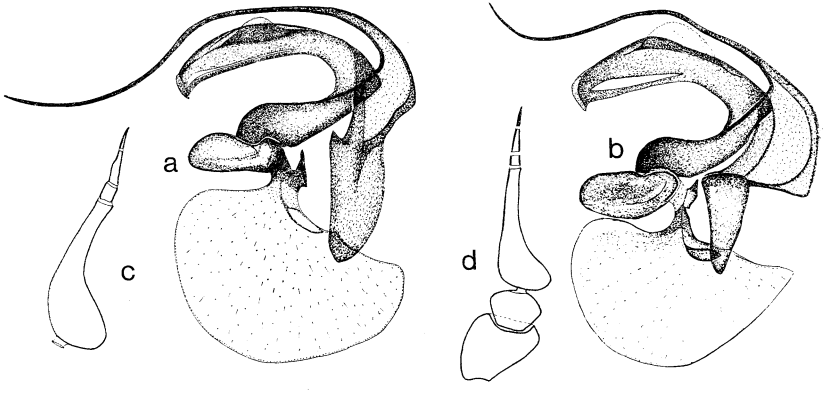


Fig. 18. a. Phallosome in lateral view of *Aphoebantus scutellatus* (Meigen), b. Same of *A. lyneborgi* n. sp., holotype, c. Third antennal joint of male af *A. scutellatus* (Meigen), d. Antenna of *A. lyneborgi* n. sp., female paratype.

f. Lateral veins of 2nd posterior cell almost parallel; they are distinctly diverging in *scutellatus.*

g. Femora and terminal segments of tarsus black, tibiae and metatarsi I and II yellowish red.

h. The phallosome (Figs. 18 a, b) is different: the phallus is distinctly shorter in *lyneborgi* and its base differently shaped; the epiphallus is humped above in *lyneborgi,* regularly rounded in *scutellatus.*

Petrorossia hesperus (Rossi), 1790 (Figs. 19 a, b, c, d).

Material. — GRANADA: Barranco de Miranda 8 km SW Orgiva, 300 m, 1 ♂, 5 May 1966; Granada, 700 m, 1 ♀, 15 July 1960 (J. R. Vockeroth); Sierra Nevada Highway, 1650 m, 1 ♀, 27 July 1960 (J. R. Vockeroth).

Distribution and remarks. — There is little doubt that this is the *"Bibio" hesperus* which Rossi described in his "Fauna Etrusca" (1790:277). I have not seen the type nor even specimens from Tuscany but this species is common in the South of France and Corsica, and in Spain. I have also seen a good series from

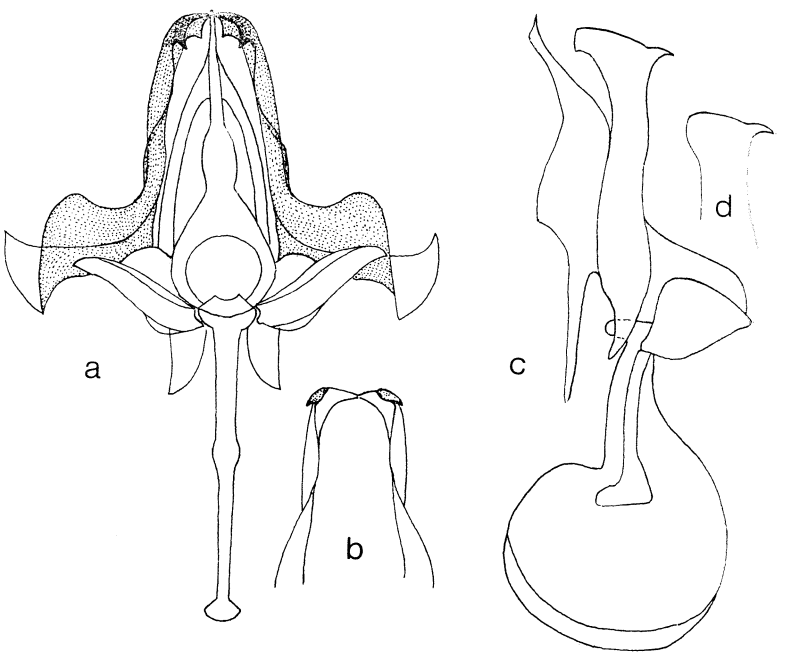


Fig. 19. *Petrorossia hesperus* (Rossi); a. Phallosome in dorsal view, b. Same, variation, c. Phallosome in lateral view, d. Same, variation.

Morocco (Tangier). Several other, undescribed, species are very near this one and are practically indistinguishable except by the male genitalia, which are indeed so different as to leave no doubt about the validity of these species.

This remark holds true for the whole genus. When Engel revised it (1936:407) he disregarded the genitalia and consequently accepted only five valid species for the whole Palaearctic region. It has now become apparent that many species thus escaped his investigations. In his monograph on the Transcaucasian Bombyliidae alone, Zaitzev (1966:214—225) described ten additional species; many more will no doubt be discovered in the future.

Hesperus is a very variable species, as the examination of about 50 specimens of divers origins has revealed. The extent of the black markings on the legs is variable; in the male the hind femora are generally almost entirely black, the other legs can be entirely yellow, partly yellow and black or almost entirely black; in most females the tibiae and femora are entirely yellow save for an elongated black spot above on the hind femora. The coloration of the wing also varies appreciably. I have seen specimens with hyaline wings, others with the wings definitely yellow (no distinct dark pattern is, however, present); the females have more frequently wings with yellow base and foreborder than the males. Even the male genitalia (or at least the epiphallus) vary rather markedly (Figs. 19 a, b and c, d). It must be noted that between the extremes of these variations numerous intermediary degrees exist which preclude the presence of several species.

Desmatoneura flavifrons (Becker), 1915 (Figs. 20 a, b).

Material. — GRANADA: Barranco de Miranda 8 km SW Orgiva, 300 m, 1 ♂, 5 May 1966.

Distribution. — Southern Spain. J. M. Andréu-Rubio (l.c.:42) has reported its presence in the provinces Alicante, Murcia, Saragossa. Granada must now be added.

Remarks. — This species was mistakenly placed by Becker in the genus *Plesiocera,* from which it differs by having only the oral margin produced and not the entire face, by the normally developed axillary lobe and alula, by the course of the 2nd longitudinal vein which starts at right angles near the middle cross vein etc. The male genitalia (Fig. 20 a) are also quite differently shaped (François, 1967: Figs. 1—10). *Desmatoneura argentifrons* Wil-

liston, *Chionamoeba nivea* (Rossi), type species of *Chionamoeba* Sack, and a few other species of the same "genus" though not all, *Chiasmella brevipennis* Bezzi and *Plesiocera flavifrons,* all belong to the same genus, namely *Desmatoneura* Williston (1895). These species are mainly characterized by a broad, shiningly pruinose frons, by the absence of bristly black hairs on face, frons, vertex and mesonotum, by the hollow, often poorly developed, 1st antennal joint and by strikingly similar genitalia. *Chiasmella brevipennis,* of which I have lately seen Bezzi's two specimens, is only an aberrant species of the genus *Desmatoneura;* it has peculiar characters of its own, like the abruptly tapering abdomen, but also many characters in common with the other species of *Desmatoneura,* i.a. the evidently similar genitalia (Greathead, 1967:239, Fig. 42). It could be considered at most as a subgenus of *Desmatoneura.*

It seems evident to me that, in the reallocation of the species between the different genera of this group, more attention will have to be paid to the genitalia. These obviously related species, forming a transition between Homoeophthalmae and Tomophthalmae, present morphological characters merging into one another: for instance, the plumula and the apical tuft of the third antennal joint can in one and the same genus — *Desmatoneura* for one — be either present, vestigial or absent, whereas the male genitalia seem to lend themselves rather well to generic apportioning. This might well apply to the assignment of the genera to the several subfamilies involved. The present limits of such subfamilies as Tomomyzinae, Lomatiinae and Anthracinae seem to me rather unsatisfactory.

Anthrax anthrax (Schrank), 1781.

Material. — GRANADA: Barranco de Miranda 8 km SW Orgiva, 300 m, 1 ♂, 21 April 1966.

Distribution. — Everywhere in Europe. Also found in N.Africa, the Canary Islands, Asia Minor, the Caucasus and the Crimea, Persia, Siberia, Mongolia, China.

Anthrax binotatus (Schiner), 1862.

Material. — ALMERIA: Alhama 5 km W, 200—500 m, 4 ♂, 17, 19 and 28 March 1966. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 2 ♂, 4 and 11 April 1966.

Distribution. — Central and Southern Europe, Crimea, Caucasus, Asia Minor, N. Africa.

Remarks. — These specimens have entirely hyaline wings except for three small spots, one on the middle cross-vein, the prediscoidal spot, and a small spot just opposite it, in the first basal cell; the extreme base of the wing is blackish grey.

Anthrax trifasciatus Meigen, 1804.

Material. — GRANADA: Granada, 700 m, 1 ♀, 9 July 1960 (J. R. Vockeroth).

Distribution. — Found almost everywhere in the Palaearctic region, including Siberia and China. In Belgium only the subspecies *leucogaster* is found and this seems to be its northern limit, though it may well be found in Holland, south of the great rivers.

Anthrax trifasciatus leucogaster Wiedemann ap. Meigen, 1820.

Material. — GRANADA: Granada, 700 m, 1 ♂, 13 July 1960 (J. R. Vockeroth).

Distribution. — More or less like *trifasciata trifasciata*. It seems to reach farther north than the typical form.

Anthrax varius Fabricius, 1794.

Material. — GRANADA: Barranco de Miranda 8 km SW Orgiva, 300 m, 5 ♂ 1 ♀, 20 April — 5 May 1966; Sierra Nevada, N. slope Veleta, 2400 m, 1 ♂, 25 July 1960 (J. R. Vockeroth).

Distribution. — From Denmark (Lyneborg, 1965) and Finland to Southern Spain, Central and Southern Europe, Western U.S.S.R., Asia Miinor; never recorded from N. Africa.

Anthrax virgo Egger, 1859.

Material. — GRANADA: Barranco de Miranda 8 km SW Orgiva, 300 m, 2 ♂ 1 ♀, 20 and 21 April 1966.

Distribution. — Found in all the Mediterranean countries: S. Europe, N. Africa and Asia Minor.

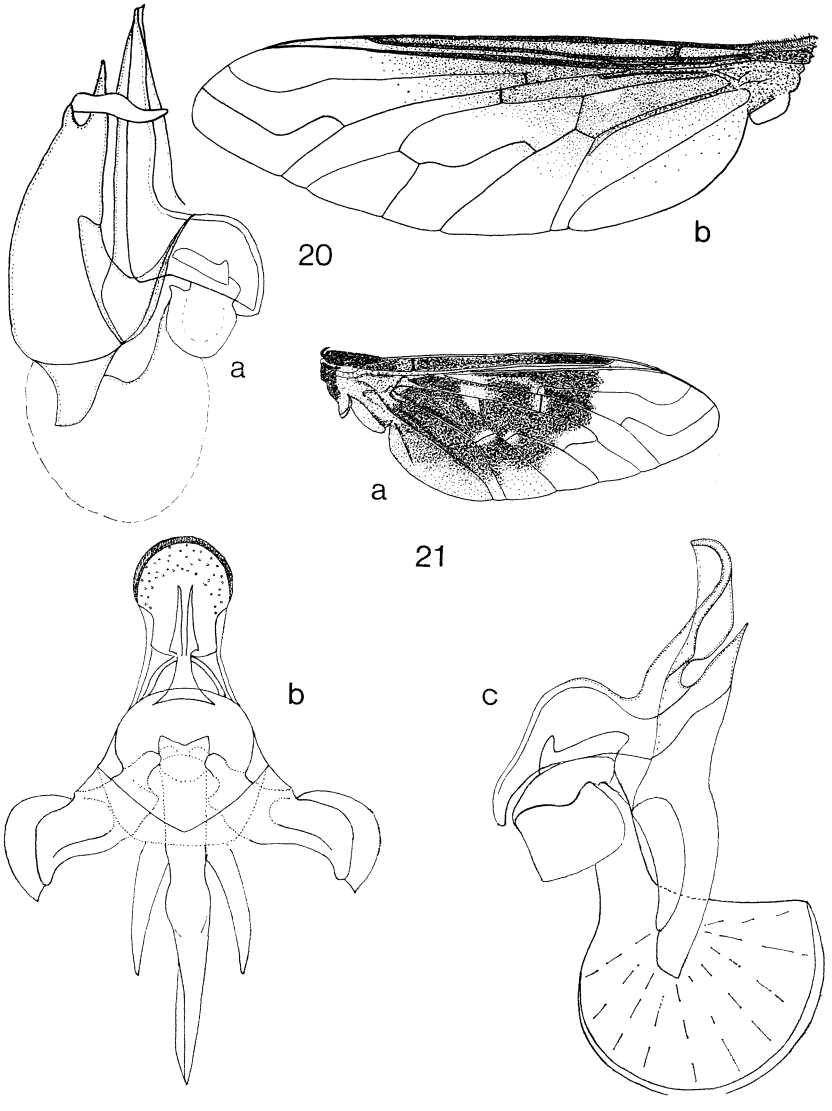
Exoprosopa italica (Wiedemann ap. Meigen), 1820.

Material. — GRANADA: Granada, 700 m, 1 ♂, 15 July 1960 (J. R. Vockeroth).

Distribution. — Italy, Spain. Western Mediterranean (Paramonov, 1928).

Exoprosopa jacchus (Fabricius), 1805.

Material. — GRANADA: Barranco de Miranda 8 km SW Orgiva, 300 m, 1 ♂, 5 May 1966.



Figs. 20—21. — 20. *Desmatoneura flavifrons* (Becker); a. Hypopygium in lateral view, b. Left wing of male. — 21. *Thyridanthrax hispanus* (Loew); a. Right wing of male, b. Phallosome in dorsal view, c. Same in lateral view.

Distribution. — Western (except the British Isles and Holland), Central and Southern Europe, S. Russia, Asia Minor, N. Africa.

Remarks. — The most common (in Southern countries) and earliest on the wing of the *Exoprosopa* species. It appears as early as April in the Mediterranean countries but is usually only met with in great numbers from mid-May till early June.

Thyridanthrax elegans (Wiedemann ap. Meigen), 1820.

Material. — GRANADA: Granada, 700 m, 6 ♂ 1 ♀, 15 July 1960 (J. R. Vockeroth); Maitena, 900 m, 10, 11 July 1960 (J. R. Vockeroth).

Distribution. — S. Europe, N. Africa and Asia Minor: Portugal, Spain, France, Corsica, Sicily, Corfu, Greece, Morocco, Egypt, Syria, Lebanon.

Thyridanthrax fenestratus (Fallén), 1814.

Material. — GRANADA: Sierra Nevada, N. slope Veleta, 2400 m, 6 ♂, 25 July 1960 (J. R. Vockeroth).

Distribution. — According to Loew (1869:158) and Bezzi (1925: 235) this species is not found in Southern Europe, where it is replaced by the sister species *perspicillaris* and *hispanus*. This is only partly true: *fenestratus* is, no doubt, a more typically northern than southern species and it may be of some interest to try to circumscribe its real geographical distribution as known to-day. It must first be noted that all references to it are by no means acceptable. It took dipterists 55 years to distinguish the first described species, *fenestratus* (1814), from the very similar looking *perspicillaris* and *hispanus* (1869). Even afterwards all available evidence is far from trustworthy. *Thyridanthrax fenestratus* is one of the very few Bombyliidae to be met with as far North as Lapland. It is also found elsewhere in the three Scandinavian countries concerned and in Denmark. Further south it is found in Western Europe, including Great Britain and the greater part of France. It has been recorded from Spain but, according to Andréu-Rubio (1961:52), mostly by mistake: he accepts as correctly labelled only a single male from Lérida, among more than 500 specimens identified as *fenestratus*. The six specimens from Andalusia under review (I have checked the genitalia of one of them) are thus quite interesting but one must keep in mind that they were caught at 2.400 m above sea level. The species is also quite certainly indigenous to Central Europe (Switzerland, Germany, Austria,

Czechoslovakia), to the U.S.S.R. including W. Siberia, to the Caucasus (Zaitzev, 1966) and to Palaearctic China (Séguy, 1963). It seems to be absent from the Balkans. It has not been found in Rumania, as there is no reference to the species in the works of Weinberg and Dusha who have been for some years actively studying i.a. the Bombyliidae of Rumania. Nor has it in any dependable source that I know of, been recorded from S. Italy, Albania, Greece, Turkey, Syria or Palestine. It has been allegedly found in N. Africa: in Algeria (Künckel, 1894) and in Egypt, Suez (Bezzi, 1925). It is preys on the Acridiid, *Dociostaurus maroccanus* (Thunb.), as is asserted by Künckel d'Herculais (l.c.) and the authors of "La lutte contre les sauterelles en Algérie" (1929), it ought to have been located in the whole of the Mediterranean Basin, which is far from being the case. The southern limit of *fenestratus's* geographical range thus remains problematic.

Thyridanthrax fimbriatus (Meigen), 1804.

Material. — GRANADA: Torrenueva E Motril, 0—50 m, 8 ♂ 1 ♀, 10—17 April 1966; Barranco de Miranda 8 km SW Orgiva, 300 m, 1 ♂, 5 May 1966; Sierra Nevada, N. slope Veleta, 2400 m, 1 ♂ 1 ♀, 25 July 1960 (J. R. Vockeroth).

Distribution and remarks. — As I have shown (François, 1967a: 289) the obsolescent "*Anthrax*" *fimbriatus* Meigen (= in parte *afer* auctt. nec. F.) has had to be revided for a southern species of *Thyridanthrax* which is exteriorly quite similar to *afer* (a typical case of sibling species) but with an obviously different epiphallus. Meigen's *fimbriatus* seems to be restricted to Southern Europe and the Mediterranean Basin, where it is quite common.

Thyridanthrax hispanus (Loew), 1869 (Figs. 21 a, b, c).

Material. — GRANADA: Barranco de Miranda 8 km SW Orgiva, 300 m, 3 ♂ 4 ♀, 20—23 April 1966.

Distribution. — Found in the whole of Spain and in Spain only, though it is likely to exist in French Roussillon, in Portugal and in Morocco.

Remarks. — This by no means rare species has, since its discovery, been known long in the ♀ sex only; the ♂ was unknown to Engel in 1936. For the genitalia and the wing see Figs. 21 b, c and 21 a.

Thyridanthrax perspicillaris (Loew), 1869.

Material. — GRANADA: Barranco de Miranda 8 km SW Orgiva,

300 m, 2 ♂ 1 ♀, 21 and 23 April 1966; Sierra Nevada Highway, 2200 m, 1 ♂, 27 July 1960; N. slope Veleta, 2400 m, 1 ♂, 25 July 1960 (J. R. Vockeroth).

Distribution. — Native to the whole of Southern and part of Central Europe; also found in N. Africa, Asia Minor and the U.S.S.R.

Hemipenthes vockerothi n.sp. (Figs. 22 a, b, c).

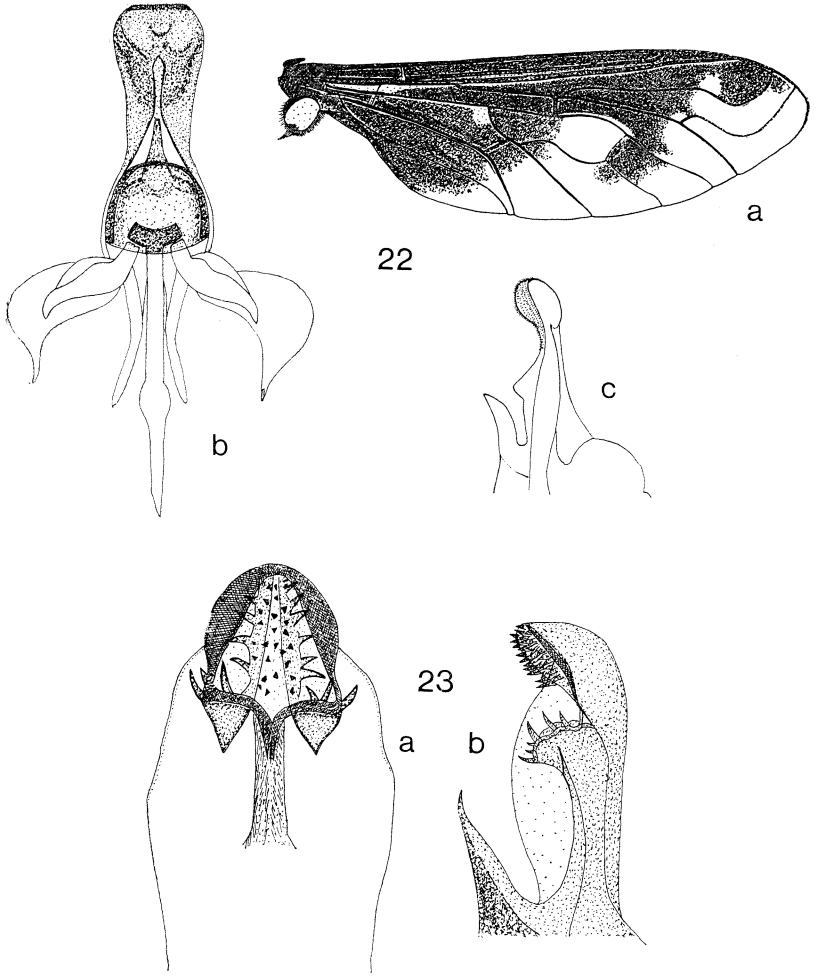
Material. — GRANADA: Sierra Nevada, N. slope Veleta, 2550 m, 1 ♂, holotype, 23 July 1960 (J. R. Vockeroth). In Canadian National Collection, Ottawa.

Diagnosis, ♂. — A *Hemipenthes* of medium size (about 11 mm), with an entirely black body, with mostly black but also some yellowish brown tomentum and black hairs; wing with a typical blackish-brown infuscation (Fig. 22 a) and without fenestrae, marginal cell entirely infuscate but for a small preapical hyaline spot, middle of wing with a dark, broadish, hook-like band, bordering the apex of the discal cell and penetrating well into the 3rd posterior cell, anal cell and axillary lobe broadly hyaline at apex; dorsum of abdomen with anterior transverse bands of white scales on tergites 1 and 4, narrower and situated posteriorly on tergites 6 and 7, a narrow, incomplete band of minute reddish scales on anterior part of tergite 3 and apparently also on tergites 5 and 6; hairs in collar black beneath, plumula yellowish brown, hairs on pleura black; tibiae I and II brownish-red.

Description, ♂. — Head: frons at apex less than twice as broad as ocellar tubercle (5:3), 1st antennal joint long, about 3 times as long as second, its apical half distinctly broader and thickly covered with coarse black hairs, 3rd joint brown, longer than the two black basal ones combined (5:4), its bulb-shaped base short and its style-like part long, almost three times as long (without the apical style) as bulb; proboscis short, entirely, but for the labellae, concealed in oral cavity; face pointed, black hairs and brownish-yellow scales on both face and frons, as also on occiput, scales and hairs more abundant on anterior margin of buccal opening, occipital cavity bordered by thick, short, brownish-black hairs.

Thorax: hairs in collar yellowish-brown above, black beneath; mesonotum with short, soft, black, erect hairs and minute hair-like yellowish-brown scales, lateral whitish stripes well developed,

post-alar bristles black and brownish-red, bristles along hind border of scutellum black; pleura exclusively black-haired, even metapleural tuft, plumula yellowish-brown. Abdomen: 1st tergite with a lateral tuft of white hairs, a transverse band of erect, pale-yellow hairs, and another one behind it formed of pure-white, half erect, elongated, hair-like scales; other tergites with erect,



Figs. 22—23. — 22. *Hemipenthes vockerothi* n. sp., holotype; a. Right wing, b. Phallosome in dorsal view, c. Apex of phallosome in lateral view. — 23. *Villa fasciculata* Becker; a. Apex of phallosome in dorsal view, b. Same in lateral view.

soft black hairs and tiny, brilliant black scales; transverse bands as described in diagnosis; lateral tufts along tergites composed of long, thick, black hairs except along 1st and 4th tergites; ventrum black-haired; hypopygium ♂, see Figs. 22 b, c. Wing: Fig. 22 a, long (12,3 mm for a body-length of 11,2 mm), infuscation as described in diagnosis, 1st posterior cell widely open on wing margin, discal cell obtuse, broader at apex than at base and with distinctly curved anterior and posterior veins; alula vestigial, alar squamae brown, thoracic squamae black, halteres black with a yellowish-white tip. Legs: black except for tibiae I and II which are brownish-red; black hairs, spines and spicules from coxae to tarsi.

This species is dedicated to Dr. J. R. Vockeroth who first caught it.

Remarks. — This species is very near *H. hamiferus* (Loew), so much so that I believe Zaitzev's two ♀ of *hamiferus* from Andalusia (Zaitzev, 1966:198) to belong to the species here described. Distinguishing characters are as follows: different shape of the wing infuscation, the central black hook being broader and penetrating well into the 3rd posterior cell, under the discal cell; collar black beneath; exclusively black hairs on pleura and black metapleural tuft; jet black scales on the legs; differently shaped phallosome.

Villa cingulum (Wiedemann ap. Meigen), 1820.

Material. — GRANADA: Sierra Nevada Highway, 1400 m, 1 ♀, 27 July 1960 (J. R. Vockeroth).

Distribution. — Originally described from Portugal. Séguy later recorded it from Spain.

Remarks. — This rare species, of which I had only seen one single specimen before (also from Spain), is relatively easy to identify because the third antennal joint, seen from above, has a distinctly elongated conical shape, which is exceptional among *Villa* species. Face with snow-white hairs and scales; in ♀ two transverse bands of snow-white scales on abdomen above: a very narrow one anteriorly on tergite 2 and a very broad one on tergite 4; tergite 7 entirely covered with the same kind of scales and with two lateral tufts of long, pure white, hair-like scales; the black hairs on hind margin of tergites and laterally along abdomen are thick and bristle-like.

Villa circumdata (Meigen), 1820.

Material. — GRANADA: Sierra Nevada, N. slope Veleta, 2400 m and 2550 m, 2 ♀, 25 and 20 July 1960 (J. R. Vockeroth).

Distribution and remarks. — It is at present quite impossible to give the distribution of this species with any precision because it has usually been confused with other species, mostly with *venusta*. The examination of Meigen's types has shown that the true *circumdata* is not the *circumdata* of most authors (Lundbeck, Verrall, Engel, Lyneborg), which as the dissection of the genitalia has revealed is in fact *V. venusta* (Meigen), 1820 (François, 1968, in press). I have seen specimens of *circumdata* from France and from Spain.

Villa distincta (Meigen), 1838.

Material. — ALMERIA: Almeria, 0—50 m, 1 ♂ reared 23 March 1966 from a pupa of a noctuid moth (W. Hackman); Albufera, 0—50 m, 1 ♀, 29 March 1966; same locality, 1 ♂, 14 April 1966 (W. Hackman); Punta Sabinal, 0—50 m, 1 ♀, 26 April 1966 (W. Hackman); Cabo de Gata, 0—50 m, 1 ♀, 13 April 1966 (W. Hackman); Rioja, 50—200 m, 1 ♀, 1—9 April 1966 (W. Hackman). — GRANADA: Torrenueva E. Motril, 0—50 m, 2 ♂ 13 ♀, 10—17 April 1966; Barranco de Miranda, 8 km SW Orgiva, 300 m, 2 ♀, 20—23 April 1966.

Distribution. — This species has not yet been recorded outside Spain. I have however seen specimens from Cavalière (France, Var) and Bastia (France, Corsica) in the Villeneuve collection.

Remarks. — The principal characters of this frequently misinterpreted species are as follows. An often large-sized, robust *Villa* of well over 10 mm length (the smaller specimens are more slender than the larger); its general colouring varies from whitish-grey to pale brown; the pile of well preserved specimens shows a silvery sheen on abdomen and thorax and looks as if it had been shorn. Face (♂♀) with yellow hairs and scales on its discal part, laterally hairs and scales are often distinctly more whitish; occiput covered with snow-white scales. Wings: vitreous, costal cell slightly opaque, space between veins Sc and R_1 narrowly yellow, base of wing yellowish-white; r-m often situated well beyond basal third of discal cell which, although variable in shape, is often shortish and broad; final loop of vein R_{2+3} oval; patagium and costagium thickly covered with silvery white scales (♂) or in variable degree with shiny yellow and black ones (♀); knob of the

halteres from white to pale yellow. Abdomen: five distinct transverse bands of yellowish scales present, that on tergite 4 covers most of its surface; lateral black tufts on tergites 5—6 small and short, separated by a narrow tuft of yellow and whitish hairs and scales; all sternites densely covered with whitish and yellowish hairs. Male genitalia: the phallosome shows a certain degree of variability and can easily be confused with that of *V. circumdata* Meigen, when viewed from an antero-superior angle; this last species can however be immediately distinguished from *V.distincta* by the brown infuscation on the fore-border and base of the wing.

Villa fasciculata Becker, 1916 (Figs. 23 a, b).

Material. — GRANADA: Sierra Nevada, N.slope Veleta, 2400 m, 2 ♂, 25 July 1960 (J. R. Vockeroth).

Distribution. — A rare and handsome species which was known until now only from the Eastern Mediterranean: Dalmatian coast, Greece, Cyprus. New to Spain.

Remarks. — This species has some unusual features for a *Villa*. The ♂ genitalia (Figs. 23 a, b) are also quite distinctive: the epiphallus with its almost wild profusion of spines and spicules is remarkable in a genus where this organ, as a rule, is quite plain.

Villa hottentotta (Linné), 1758.

Material. — ALMERIA: Rioja, 50—200 m, 1 ♀, 12—20 April 1966 (W. Hackman); Alhama, 200—500 m, 3 ♂, 17—28 March 1966 (1 ♂ leg. W. Hackman). — GRANADA: Barranco de Algarrobo 12 km SW Orgiva, 300 m, 2 ♂ 1 ♀, 25 April 1966: Barranco de Miranda 8 km SW Orgiva, 300 m, 2 ♂ 2 ♀, 16 April — 5 May 1966; Rambla de Aculas 10 km E Orgiva, 400 m, 1 ♂, 27 April 1966; Rio Sucio 5 km NW Orgiva, 700 m, 1 ♂, 3 April 1966; Pinus Puente 15 km NW Granada, 500—1000 m, 1 ♂, 27 April 1966; Sierra Nevada near Padul, 1300 m, 1 ♂, 4 May 1966; Granada, 700 m, 1 ♀, 15 July 1960 (J. R. Vockeroth).

Distribution. — A common and widely distributed species. In Europe it has been recorded from Spain, Italy, France, Belgium, Holland, Denmark and Sweden; it has not been found in Great Britain, at least not under the present name; also recorded from Central Europe and generally all the countries of the Mediterranean Basin; Western U.S.S.R., Caucasus, Asia Minor and supposedly N. Persia, North Africa. Séguy (1963) records it from China.

Remarks. — With *Exoprosopa jacchus* (F.) the earliest of the Exoprosopines to appear in spring. The colour varies from whitish yellow to golden yellow. A generally large and stocky *Villa,* it may confusingly vary in size and bulk, the smaller specimens appearing a good deal more slender. As far as my experience goes the brownish infuscation of the anterior part of the wing never extends beyond the costal cell and the extreme base of the wing; the patagium in both sexes is black, brown and yellowish in a varying degree, never predominantly white or silvery.

Villa ixion (Fabricius), 1794.

Material. — ALMERIA: Punta Sabinal, 0—50 m, 1 ♀, 26 April 1966 (W. Hackman). — GRANADA: Barranco de Miranda 8 km SW Orgiva, 300 m, 7 ♂ 2 ♀, 16 April — 5 May 1966.

Distribution. — Already known from NE (Barcelona) and Central Spain (Hervàs). From Spain to Greece, but curiously enough never mentioned in North Africa.

Remarks. — Varies in colour from pure white to yellow; the ♀ I have seen were always more yellowish than the ♂; a small species without lateral black tufts along tergites 5—6 and with a phallosome devoid of its usual (in *Villa*) hooks, the apex of the epiphallus being whole (François, 1966: fig. 14).

Designation of a lectotype. — Thanks to the kindness of Dr. Leif Lyneborg, I have been able to examine the 3 specimens of the Fabricius collection (Zimsen, 1964:463.274). All three are females and headless; two have lateral tufts of black scales along the abdominal tergites 5 and 6, one has no such tufts. This last specimen is designated as lectotype, the other two as paralectotypes.

Villa leucostoma (Meigen), 1820.

Material. — GRANADA: Barranco de Miranda 8 km SW Orgiva, 300 m, 5 ♂, 21 and 23 April 1966.

Distribution. — Originally caught in the South of France, its Northern limit seems to be the Département of the Seine et Loire. Generally found in Southern Europe, it is not uncommon in Spain and also N. Africa, and Séguy (1934) has recorded it from Tozeur, in Tunisia.

Remarks. — This species has been overlooked by Engel in his monograph on the Palaearctic Bombyliidae. It is sometimes considered as a form of *V. cingulata* but it is in fact a quite distinct

species. The male genitalia (François, 1966: compare figs. 9 and 13) have not much in common. According to Séguy (1934) this species preys on the caterpillar of *Constantia* sp.

A smallish, slender *Villa* (7—10 mm), with white hairs and scales on the face, silvery scales on the occiput; hairs on dorsum of thorax yellow, on pleura white; thoracic bristles yellow, a few weak, black ones on hind margin of scutellum; abdomen with a conspicuous yellow transverse band (laterally white) on tergites 2 and 4, on tergite 3 a similar band is either linear or absent; lateral margin of tergite 3 black-haired to a variable degree; scales on tergite 7 yellow but the apical tufts white; lateral black tufts along tergites 5—6 short and thick, consisting mostly of black scales; wings hyaline with yellowish costal cell and base; ♂ patagium white, costagium with shining black scales; knob of the halteres whitish, laterally pale yellow; legs black with white scales.

Villa melanura (Loew), 1869.

Material. — GRANADA: Sierra Nevada, N. slope Veleta, 2200, 2400 and 2550 m, 4 ♂ 4 ♀, 20, 24, 25 and 30 July 1960 (J. R. Vockeroth).

Distribution. — Spain. Paramonov and Engel record it from Armenia and Turkestan, respectively.

Remarks. — Engel's redescription (1937:591) is based on specimens from Turkestan and Armenia and though I am not convinced that these are identical with Loew's Spanish species, I must admit that the description suits these Spanish specimens well.

Villa modesta (Meigen), 1820.

Materiel. — GRANADA: Sierra Nevada, N. slope Veleta, 2400 m, 1 ♂, 22 July 1960 (J. R. Vockeroth).

Distribution. — From the Netherlands to the Mediterranean; Central Europe, Turkey, Turkestan.

Remarks. — This species has been repeatedly confused with either *hottentotta* or *paniscus* and in his revision of the Palaearctic species Engel (1937) has reduced its status to that of a subspecies of *hottentotta*. It can easily be distinguished from the *paniscus* by the less elongated and slender shape, by the anteriorly and basally lighter coloured wings and by the ♂ genitalia which are quite different. From *hottentotta,* with which it certainly has more in common, it differs by the silvery white patagium and the abdomen

devoid of yellowish transverse bands, in the ♂, also by the silvery white scales on the occiput; the ♂ genitalia have almost the same shape.

This species should be easily identified, in the ♂ sex at least, by the use of the following characters which, as far as my experience goes, are reliable.

Large *Villa* of about 15 mm (there are smaller specimens) with typically contrasted hairs on abdomen laterally: yellow from tergite 1 to 4, black along tergites 5 and 6, white or yellow at tip of abdomen (tergite 7); with hyaline wings, base, costal and first basal cells varying in colour from slightly opaque dirty grey to pale brown (in *paniscus* generally dark brown to black), patagium in ♂ silvery white; face with erect yellow hairs and scales; frons with erect black hairs and yellow scales; ocellar triangle, in ♂, distant from the eye by about the breadth of one lateral ocellus; occiput with silvery white scales in both sexes; postalar setae yellow, those on the hind margin of scutellum mostly black; abdominal tergites with small, brilliant black scales, well developed pile and no, or poorly developed, yellow transverse bands of scales in the ♂, in the ♀ with erect hairs on dorsum not so thick but with three distinct transverse bands of yellow scales; lateral black tufts of tergites 5—6 thick and broad; knob of halteres yellow, paler at the tip.

Summary.

Sixty-five species in twenty-seven genera of Bombyliidae are recorded from Southern Spain based on collections made in 1960 and 1966. Five genera and fourteen species are new to Spain. Twelve species, *Usia martini* n. sp., *Empidideicus hispanus* n. sp., *E. hackmani* n. sp., *Cyrtosia pruinosula* n. sp., *Glabellula sufflava* n. sp., *Apolysis montivaga* n. sp., *Geron albidulus* n. sp., *Oligodranes langemarki* n. sp., *Phthiria barbatula* n. sp., *Heterotropus nigrithorax* n. sp., *Aphoebantus lyneborgi* n. sp. (from N. Morocco) and *Hemipenthes vockerothi* n. sp., are described as new to science. Taxonomic discussions are given of a number of other species.

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Some Heleomyzidae, Opomyzidae, Sphaeroceridae, Diastatidae, Drosophilidae, Scatophagidae and Hippoboscidae (Diptera) collected in Southern Spain, with description of a new species of Acantholeria.

By
Walter Hackman
Zoological Museum, Helsinki, Finland.

The major part of the present material was collected in the provinces of Almeria and Granada by the Danish-Finnish Expedition in March—May 1966. The specimens collected by the author are indicated with (W. H.) and are in the Zoological Museum of Helsinki. The other specimens from 1966 were collected by Dr. Leif Lyneborg and his two assistents and are in the Zoological Museum of Copenhagen. The names of these collectors are not given to save space. Further, a collection made by Dr. J. R. Vockeroth in the Granada province in 1960 was included in this study. This 1960 material is indicated (J. R. V.) and is in the Canadian National Collection, Ottawa.

The combined collections number 13 species of Heleomyzidae, of which one is described as new to science (*Acantholeria vockerothi* n. sp.). A further three, *Suillia pallida* Fall., *Scoliocentra caesia* Meig., and *Heleomyza captiosa* Gor., are new to Spain. The Opomyzidae numbers 3 species, of which *Geomyza breviseta* Cz. and a *Geomyza*-species of the *combinata*-group are new to Spain.

Nine of the 28 species of Sphaeroceridae are new to Spain, viz. *Sphaerocera (I.) vaporariorum* Hal., *Limosina silvatica* Meig., *L. pullula* Zett., *L. fungicola* Hal., *L. bifrons* Hal., *L. penetralis* Coll., *L. beckeri* Duda, *Leptocera caenosa* Rond. and *L. modesta* Duda. It may be mentioned that the generic system of the Sphaeroceridae

is under revision. The genus *Leptocera* in its widest sense is obviously not a monophyletic taxon (paraphyletic if not polyphyletic), and some of the old *Leptocera* subgenera are here treated as genera.

One of the 3 species of Diastatidae, viz. *Euthychaeta spectabilis* Lw., and 2 of the 13 species of Drosophilidae, viz. *Cacoxenus indagator* Lw. and *Leucophenga maculata* Duf., are new to Spain. Further, 3 species of Scatophagidae and 1 species of Hippoboscidae are recorded.

HELEOMYZIDAE

Suillia variegata (Loew, 1862).

Material. — ALMERIA: Rioja, 50—200 m, 1 ♀, 7 March 1966 (W.H.); Same locality, 3 ♂ 3 ♀, 25 March 1966; Alhama 5 km W, 200—500 m, 7 ♂ 1 ♀, 17 March 1966 (W.H.); Same locality, 1 ♀, 21 March, 1 ♂, 28 March 1966. — GRANADA: Barranco de Algarrobo 12 km SW Orgiva, 300 m, 1 ♂, 25 April 1966; Barranco de Miranda 8 km SW Orgiva, 300 m, 2 ♀, 16 April 1966; Rio Guadalfeo, Orgiva, 300 m, 1 ♀, 4 April, 3 ♂ 2 ♀, 11 April 1966; Granada, 700 m, 2 ♂ 4 ♀, 9—10 July, 7 ♂ 5 ♀, 13—14 July, 21 ♂ 21 ♀, 19 July 1960 (J.R.V.); N slope Veleta, Sierra Nevada, 2200 m, 1 ♂ 2 ♀, 30 July 1960 (J.R.V.).

Distribution. — Recorded from England, France, Germany, Austria, Italy, Tunisia and Asia Minor by Czerny (1924). Further from Portugal: several localities (leg. Lindberg), Cyprus: near Kykko (leg. Lindberg), Algeria (coll. Frey), the Azores and Madeira (leg. Frey & Storå). Earlier records from Southern Spain by Czerny & Strobl (1909).

Suillia notata (Meigen, 1830).

Material. — GRANADA: Barranco de Miranda 8 km SW Orgiva, 300 m, 3 ♂ 4 ♀, 16 April, 7 ♂ 4 ♀, 20 April 1966; Rio Lanjaron near Lanjaron, 600 m, 1 ♂ 1 ♀, 28 April 1966; N slope Veleta, Sierra Nevada, 2200 m, 1 ♀, 30 July 1960 (J.R.V.).

Distribution. — *S. notata* including 'var.' *hilaris* Zetterstedt is widely distributed from South Sweden in the north to North Africa in the south, eastwards to Crete and Rhodos (Czerny, 1924). The type locality is in Portugal. Recorded from Southern Spain by Czerny & Strobl (1909).

Remarks. — The name: var. *hilaris* Zett. has been used for populations of *notata* in England and North Europe, where darker

forms seem to be missing. The Spanish specimens in the present collections are rather variable in mesonotal colour, but if *hilaris* is to be considered as a subspecies, then the Iberian specimens should be named *notata notata*.

Suillia flagripes (Czerny, 1904).

Material. — GRANADA: Granada, 700 m, 9 July 1960 (J.R.V.).

Distribution. — Switzerland, France, Algeria (Czerny, 1924). I have seen a specimen from Corsica (leg. H. Lindberg). Recorded from Spain (Pardo) by Czerny & Strobl (1909).

Suillia bistrigata (Meigen, 1830).

Material. — GRANADA: N slope Veleta, Sierra Nevada, 2200 m, 3 ♂ 3 ♀, 30 July 1960 (J.R.V.).

Distribution. — Central and Southern Europe, Algeria, Asia Minor (Czerny, 1924; Séguy, 1934). Czerny & Strobl (1909) record the species from Montserrat and Escorial in Spain.

Suillia pallida (Fallén, 1820).

Material. — GRANADA: N slope Veleta, Sierra Nevada, 2200 m, 1 ♂ 3 ♀, 30 July 1960 (J.R.V.).

Distribution. — In most parts of Europe except arctic and subarctic areas, in the south mainly in mountains. Known from the French Pyrenees (Séguy, 1934). New to Spain.

Heteromyza atricornis Meigen, 1830.

Material. — GRANADA: Sierra Nevada Highway, 1800 m, 1 ♂, 27 July 1960 (J.R.V.).

Distribution. — Germany, Holland (Maastricht, leg. Schmitz), France, Austria, European U.S.S.R., Jugoslavia, Italy, Spain, Algeria, Madeira (Czerny, 1924; Séguy, 1934).

Heteromyza rufiventris Meigen, 1830.

Material. — ALMERIA: Alhama 5 km W, 200—500 m, 1 ♂, 17 March 1966, 1 ♂, 19 March 1966 (W.H.). — GRANADA: N slope Veleta, Sierra Nevada, 2200 m, 1 ♀, 30 July 1960 (J.R.V.).

Distribution. — Most parts of Europe; Siberia; Madeira. Strobl (1906) mentions the species from Southern Spain.

Remarks. — *H. rufiventris* is a rather variable species and I have considered *H. laeta* Meigen and probably *H. lapponica* Czerny as aberrant forms of this species. Strobl (1906) mentions Spanish specimens with dark abdomen.

Oecothea fenestralis (Fallén, 1820).

Material. — ALMERIA: Rioja, 50—200 m, in *Pitymys*-burrows (Hackman, 1967). — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 1 ♀, 19 April 1966.

Distribution. — Europe, Asia, North and South America, New Zealand (Harrison, 1959; Gorodkov, 1959). Spanish record by Strobl (1906).

Eccoptomera nigricornis Strobl, 1906.

Material. — ALMERÍA: Pechina and Rioja, data published by Hackman (1967).

Distribution. — Spain, type locality Malgrat NW of Barcelona (Strobl, 1906).

Remarks. — A dominant fly in the burrows of *Pitymys duodecimcostatus* in Rioja March—April 1966.

Morpholeria limbinervis (Czerny, 1909).

Material. — GRANADA: N slope Veleta, Sierra Nevada, 2300—2550 m, 2 ♀, 22 July, 2 ♀, 25 July, 1 ♀, 27 July, 1 ♂ 1 ♀, 30 July 1960 (J.R.V.).

Distribution. — Spain: Tarifa and Moreda (Czerny & Strobl, 1909).

Acantholeria vockerothi n. sp.

Material. — GRANADA: N slope Veleta, Sierra Nevada, 2550 m, ♂ holotype, 21 July 1960 (J.R.V.); same locality 2500 m, 4 ♀ paratypes, 25 July 1960 (J.R.V.). Types in Canadian National Collection, Ottawa.

Description. — Holotype, male. — Body length 5 mm, wing length 5.6 mm. General shape of head and its chaetotaxy as in *A. cineraria* Loew. Frons longer than wide (median length: median width = 3:2.5), yellowish-brown, hairy in front. Anterior orbital bristle very small, about a fourth the length of the posterior one. Occiput greyish pollinose. Genae wide, about half of the diameter of the eye, yellow as is also the face. Antennae yellow, arista almost naked, black. Palpi yellow.

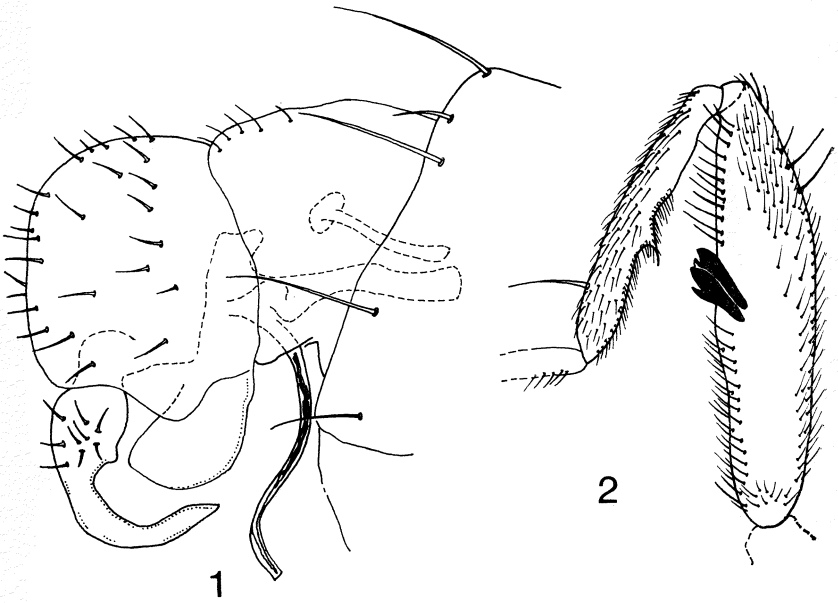
Mesonotum and scutellum pale grey, pollinose with brown spots at the insertion points of the dorsal bristles. Chaetotaxy as normal for the genus: dc 1 + 3, all strong bristles, one pair of praescutellars. Basal scutellars shorter than the apical ones (ratio 3:4). Pleura greyish pollinose, mesopleuron with a brownish shade in

the middle. Sternopleuron with scattered hairs and a prominent sternopleural bristle in usual position.

Wings yellowish hyaline, without any shadows at the cross-veins. Anterior cross-vein (ta) almost directly beneath the apex of r_1. Costal spines of normal size. Halteres yellow.

Legs yellow. First femur slightly swollen and with an antero-dorsal row of 5—6 long bristles, a few long bristles in a medio-dorsal row, a posterior row of smaller bristles, and finally 4—5 longer and less regularly spaced postero-ventral bristles. First tibia slender and with a prominent, dorsal, preapical bristle. Second femur with two ventral rows of small bristles and a few antero-lateral bristles of which two are more prominent. Second tibia with only one dorsal, preapical bristle and the usual group of spurs. Third femur (Fig. 2) postero-ventrally with two modified bifurcate, scale-like bristles and apically to these two ventral rows of small bristles. Third tibia with a ventral tooth just opposite the conspicuous modified bristles of the femur, and further a dorsal preapical bristle and two antero-ventral spurs.

Abdomen grey with yellowish hypopygium. Male genitalia (Fig.



Figs. 1—2. Male genitalia and hind femur of holotype to *Acantholeria vockerothi* n. sp.

1) of the same general type as in *A. caucasica* Gorodkov as figured by Gorodkov (1962: 321).

Female. — Body length about 5 mm, wing length 5.5—6 mm. Head, thorax and wings as in the male. First and second legs mainly as in the male. Third femur without any postero-lateral bristles, antero-dorsally with two prominent bristles in the apical fourth. Abdomen grey, but yellow from the fifth segment and onwards. Second to fifth tergites with long marginal bristles. Cerci short and round, almost hidden by the seventh tergite.

Remarks. — The species differs in the male sex from *A. cinereria* Loew, *caucasica* Gorodkov and *dentitibia* Oldenberg by the modification of the two conspicoous postero-ventral bristles of third femur, and from the first two species by the tooth on third tibia. The females of all these species seem difficult to separate. The cerci of *vockerothi* have the same small spines as in *caucasica.*

Scoliocentra caesia (Meigen, 1830).

Material. — GRANADA: Sierra Nevada, Alb. Universitaria, 2600 m, 2 ♀, 6 May 1966.

Distribution. — Germany, France, Holland, England, Sweden, Moravia, the Pyrenees (Séguy, 1934). No previous records from Southern Spain.

Heleomyza modesta Meigen, 1838.

Material. — GRANADA: Rio Lanjaron 9 km NW Orgiva, 1600 m, 1 ♂ 1 ♀, 22 April 1966; Sierra Nevada, Alb. Universitaria, 2600 m, 5 ♂ 3 ♀, 6 May 1966.

Distribution. — Central, Eastern and Southern Europe. Because of confusion with *H. borealis* Holmgren *(czernyi* Collart) old records in the literature are not reliable.

Remarks. — The male genitalia of the species of the *modesta*-group have been figured by Gorodkov (1962).

Heleomyza captiosa (Gorodkov, 1962).

Material. — GRANADA: Rio Lanjaron 9 km NW Orgiva, 1600 m, 1 ♀, 22 April 1966; Sierra Nevada near Padul, 1300 m, 2 ♂ 1 ♀, 1 May 1966; Sierra Nevada, Alb. Universitaria, 2600 m, 1 ♂ 2 ♀, 6 May 1966.

Distribution. — Germany (Heidelberg), Hungary, Italy (Gorodkov, 1962). I have seen a series of this species from Jugoslavia (Laibach, leg. J. A. Palmén). New to Spain.

Remarks. — The species is rather similar to *H. serrata* L., which is a common species in North Europe, but the male genitalia are distinctly different (characteristic parts visible without dissection).

OPOMYZIDAE

Geomyza sp. (**combinata**-group).

Material. — GRANADA: Maitena, 900 m, 2 ♀, 11 July 1960 (J.R.V.).

Distribution. — None of the several species confused under the name of *G. combinata* Linné has been recorded from Spain.

Remarks. — As shown by Vockeroth (1961) and the author (Hackman, 1958), several species have been confused under the name *G. combinata* Linné. The above specimens might possibly belong to *G. balachowskyi* Mesnil, but no characters have yet been found for separating the females of this group.

Geomyza breviseta Czerny, 1928.

Material. — GRANADA: Sierra de Contraviesa, Rabite, 1300 m, 1 ♂, 2 May 1966; Maitena, 900 m, 1 ♂, 11 July 1960 (J.R.V.).

Distribution. — Described from North Germany and reported from Macedonia by Coe (1958) and from England by Collin (1945). A little known but obviously widely distributed species. New to Spain.

Geomyza tripunctata Fallén, 1823.

Material. — ALMERÍA: Alhama 5 km W, 200—500 m, 1 ♂, 17 March 1966 (W.H.), 1 ♂ 1 ♀, 28 March 1966. — GRANADA: Barranco de Algarrobo 12 km SW Orgiva, 300 m, 3 ♂, 25 April 1966; Rio Guadalfeo, Orgiva, 300 m, 6 ♂ 3 ♀, 2—5 April, 2 ♂, 11 April, 3 ♂ 1 ♀, 18 April 1966; Rio Lanjaron near Lanjaron, 600 m, 1 ♂ 2 ♀, 28 April 1966; Maitena, 900 m, 2 ♂ 1 ♀, 11 July 1960 (J.R.V.); Granada, 700 m, 1 ♂, 9 July, 2 ♂, 13—14 July, 4 ♂ 6 ♀; 18—19 July 1960 (J.R.V.); Rio Lanjaron 9 km NW Orgiva, 1600 m, 2 ♀, 7 May 1966; Sierra Nevada near Alb. Universitaria, 2600 m, 1 ♂, 6 May 1966; N.slope Veleta, Sierra Nevada, 2300—2550 m, 5 ♂ 7 ♀, at 2400 m, 4 ♂ 10 ♀, 27 July; at 2200 m, 1 ♀, 30 July 1960 (J.R.V.).

Distribution. — Most parts of Europe, Cyprus, Turkmenia, North Africa (Hackman, 1958). The commonest species of the genus in the Mediterranean area. Previously known from Southern Spain (Strobl, 1906; Czerny & Strobl, 1909).

SPHAEROCERIDAE

Sphaerocera (s. str.) curvipes Latreille, 1805.

Material. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 10 ♂ 6 ♀, 2 April 1966; Pampineira, 900 m, 2 ♂ 1 ♀, 9 April 1966; Sierra Nevada, Alb. Universitaria, 2600 m, 1 ♀, 6 May 1966.

Distribution. — Europe, N America, East Africa, Japan, Australia. Spanish records: Strobl (1906).

Remarks. — Synanthropous species.

Sphaerocera (Ischiolepta) pusilla (Fallén, 1820).

Material. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 1 ♂ 2 ♀, 2 April 1966.

Distribution. — Europe, N. America, Central Africa. Spanish records by Strobl (1906).

Remarks. — Synanthropous species.

Sphaerocera (Ischiolepta) vaporariorum Haliday, 1836.

Material. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 1 ♂ 3 ♀, 2 April 1966.

Distribution. — Europe, U.S.A. Not earlier reported from Spain.

Copromyza (Crumomyia) glabrifrons (Meigen, 1830).

Material. — ALMERÍA: Alhama 5 km W, 200—500 m, 1 ♂, 19 March 1966. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 1 ♂; Rio Chico 8 km NE Orgiva, 1800 m, 1 ♀, 7 April 1966; Rio Lanjaron 9 km NW Orgiva, 1600 m, 2 ♂, 6 April 1966; Sierra Nevada, Alb. Universitaria, 2600 m, 8 ♂ 6 ♀, 6 May 1966.

Distribution. — Europe, Asia Minor. Recorded from Spain as *Borborus limbinervis* by Czerny & Strobl (1909).

Copromyza (s. str.) equina Fallén, 1820.

Material. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 1 ♂ 2 ♀, 2 April 1966; Pampineira, 900 m, 1 ♂, 9 April 1966.

Distribution. — Europe, Canary Islands, Azores, Siberia, Japan, Central Africa, Hawaii. Spanish records by Strobl (1906).

Remarks. — Synanthropous species.

Copromyza (Borborillus) costalis (Zetterstedt, 1847).

Material. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 2 ♀, 2 April 1966.

Distribution. — Europe, Siberia.

Remarks. — Strobl (1906) mentions *Borborus vitripennis* from Southern Spain, but includes *costalis* Zetterstedt as a synonym. There are various opinions on the interpretation of *vitripennis* Meigen but that of Collin (in litt. 1965 to the author) is obviously the correct one: *vitripennis* Meigen = *nitidifrons* Duda; *longipennis* Haliday = *vitripennis* auctt. (incl. Hackman, 1965) nec Meigen. Strobl's Spanish record might refer to *costalis* Zetterstedt = *vitripennis* Haliday nec Meigen.

Copromyza (Olinea) atra (Meigen, 1830).

Material. — ALMERÍA: Rioja, 50—200 m, 2 ♂, 12 March 1966 (W.H.); Alhama 5 km W 200—500 m, 1 ♀, 19 March 1966. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 12 ♂ 7 ♀, 2—18 April 1966; Rio Lanjaron 9 km NW Orgiva, 1600 m, 5 ♂ 2 ♀, 6—22 April 1966; Pampineira, 900 m, 6 ♂ 2 ♀, 9 April 1966; Rio Mulhacén 5 km N Capileira, 1500 m, 3 ♀, 9 April 1966; Sierra Nevada, Alb. Universitaria, 2600 m, 1 ♂, 6 May 1966; Granada, 700 m, 2 ♂ 2 ♀, 14 July 1960 (J.R.V.).

Distribution. — Europe, Canary Islands, Azores, Afghanistan, N. America. Recorded from Spain by Strobl (1906).

Remarks. — Synanthropous species.

Coproica vagans (Haliday, 1833).

Material. — ALMERÍA: Almería, 0—50 m, 1 ♀, 11 March 1966 (W.H.); Same locality, 2 ♀, 22 March 1966; Rioja, 50—200 m, 1 ♂, 7 March 1966 (W.H.); El Albufera, 0—50 m, 1 ♂ 2 ♀, 23 March 1966; Adra, 0—50 m, 4 ♀, 23 March 1966.

Distribution. — Cosmopolitan. Recorded from Spain as *Limosina albipennis* by Strobl, 1906.

Remarks. — Synanthropous species.

Coproica ferruginata (Stenhammar, 1854).

Material. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 7 ♂ 9 ♀, 2 April 1966; Sierra de Contraviesa, Rabite, 1300 m, 1 ♀, 2 May 1966.

Distribution. — Cosmopolitan. Recorded from Spain by Czerny & Strobl (1909).

Remarks. — Synanthropous species.

Limosina silvatica (Meigen, 1830).

Material. — GRANADA: Granada, 700 m, 1 ♂, 24 April 1966 (W.H.).

Distribution. — Most parts of Europe. Collected in Sierra Nevada by H. Lindberg in 1926 (not earlier published).

Limosina plumosula Rondani, 1880.

Material. — ALMERÍA: Rioja, 50—200 m, 1 ♂, 7 March 1966 (W.H.). — GRANADA: Maitena, 900 m, 2 ♀, 10 July 1960 (J.R.V.).

Distribution. — Most parts of Europe, Canary Islands, Azores, Madeira, Central Africa. Several Spanish records (Duda, 1918).

Limosina flavipes (Meigen, 1830).

Material. — ALMERÍA: Almería, 0—50 m, 1 ♂, 11 March 1966 (W.H.); Same locality, 1 ♂, 22 March 1966.

Distribution: Most parts of Europe, North and South Africa, Juan Fernandez Island, New Zealand. Recorded from Spain as *Limosina minutissima* by Strobl (1906).

Remarks. — Synanthropous species.

Limosina heteroneura Haliday, 1836.

Material. — ALMERÍA: Almería, 0—50 m, 1 ♀, 11 March 1966 (W.H.); Same locality, 2 ♂ 3 ♀, 22 March 1966; Rioja, in and outside *Pitymys*-burrows (Hackman, 1967); El Albufera, 0—50 m, 4 ♂ 5 ♀, 8 March 1966; Adra, 0—50 m, 1 ♂, 23 March 1966. — GRANADA: Torrenueva E of Motril, 0—50 m, 1 ♀, 12 April 1966; Rio Guadalfeo, Orgiva, 300 m, 2 ♀, 3 April 1966; Rio Chico 8 km NE Orgiva, 1800 m, 1 ♂, 7 April 1966.

Distribution. — Almost cosmopolitan. Records from Spain by Strobl (1906).

Remarks. — Synanthropous species.

Limosina fungicola Haliday, 1836.

Material. — GRANADA: Rio Lanjaron near Lanjaron, 600 m, 1 ♀; N slope Veleta, Sierra Nevada, 2400 m, 2 ♀, 26 July 1960 (J.R.V.).

Distribution. — Most parts of Europe, Central and South Africa. Mentioned by Strobl (1906) from Spain, but this record refers to *Leptocera (Opacifrons) coxata* Stenhammar.

Limosina brevicostata Duda, 1918.

Material. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 2 ♂ 2 ♀, 2 April 1966.

Distribution. — Central and Southern Europe, East Mediter-

ranean, Canary Islands, Madeira, Africa, Formosa, New Guinea, Micronesia. Records from Spain by Duda (1918).

Limosina pullula Zetterstedt, 1847.

Material. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 1 ♀, 3 April 1966.

Distribution. — Most parts of Europe. New to Spain.

Limosina bifrons Stenhammar, 1854.

Material. — GRANADA: Maitena, 900 m, 1 ♀, 10 July 1960 (J.R.V.).

Distribution. — Most parts of the Old World. I have seen no earlier Spanish records.

Limosina crassimana Haliday, 1836.

Material. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 7 ♂ 8 ♀, 2—11 April 1966; Rio Chico, Orgiva, 450 m, 1 ♀, 2 April 1966; Rio Lanjaron 9 km NW Orgiva, 1600 m, 2 ♀, 15 April 1966; Pampineira, 900 m, 2 ♂ 6 ♀, 9 April 1966; Sierra Nevada, Alb. Universitaria, 2600 m, 1 ♂ 2 ♀, 6 May 1966; 20 km NE of Granada, 2 ♀, 24 April 1966 (W.H.); Granada, 700 m, 1 ♂, 10 July, 1 ♂ 2 ♀, 19 July 1960 (J.R.V.); N slope Veleta, Sierra Nevada, 2800—3000 m, 1 ♀, 20 July 1960 (J.R.V.).

Distribution. — Europe, North America, Central Africa, Seychelles. Recorded from Spain by Strobl (1906).

Remarks. — Synanthropous species.

Limosina penetralis Collin, 1925.

Material. — ALMERÍA: Almería, 0—50 m, 1 ♂, 22 March 1966. — GRANADA: Sierra Nevada near Padul, 1300 m, 1 ♂, 4 May 1966; N slope Veleta, Sierra Nevada, 2500 m, 1 ♀, 24 July 1960 (J.R.V.).

Distribution. — Europe, Afghanistan. New to Spain.

Limosina talparum Richards, 1927.

Material. — ALMERÍA: Rioja, 1 ♂ in a *Pitymys*-burrow, 12 March 1966 (see Hackman, 1967).

Distribution. — In small mammal burrows in Europe and temperate parts of Asia.

Limosina beckeri Duda, 1918.

Material. — GRANADA: N slope Veleta, Sierra Nevada, 2200 m, 1 ♀, 30 July 1960 (J.R.V.).

Distribution. — Canary Islands, Central Africa. New to Spain.

Limosina spinipennis Haliday, 1836.

Material. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 3 ♂ 3 ♀, 2 April 1966; N slope Veleta, Sierra Nevada, 2500 m, 4 ♂ 3 ♀, 11 July 1960 (J.R.V.).

Distribution. — Holarctic, widely distributed. Recorded from Spain as *Limosina obtusipennis* by Strobl (1906).

Remarks. — Until now the name *Leptocera (Halidayina) spinipennis* has been used for this species, but I have preferred to treat the species as a *Limosina*. The long bristle at the base of costa is a weak basis for keeping the species in a separate subgenus.

Leptocera (Opacifrons) coxata (Stenhammar, 1854).

Material. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 5 ♂ 4 ♀, 2—18 April 1966; Sierra Nevada, Alb. Universitaria, 2600 m, 2 ♂ 3 ♀, 6 May 1966.

Distribution. — Most parts of Europe, Canary Islands, Azores, Madeira, Southern and Eastern Mediterranean, East and South Africa, Congo area, Formosa and Western U.S.A. Recorded from Spain as *Limosina fungicola* by Strobl (1906) (nec *fungicola* Haliday).

Leptocera (Opacifrons) humida (Haliday, 1836).

Material. — ALMERÍA: Rioja, 50—200 m, 1 ♀, 11 March 1966. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 1 ♂ 1 ♀, 2—11 April 1966; Granada, 700 m, 1 ♀, 8 July, 2 ♂ 1 ♀, 19 July 1960 (J.R.V.); N slope Veleta, Sierra Nevada, 2300—2550 m, 7 ♂ 2 ♀, 22—25 July, 2200—2400 m, 1 ♂ 1 ♀, 30 July 1960 (J.R.V.).

Distribution. — Most parts of Europe, Canary Islands, Azores, Madeira, Eastern and Southern Mediterranean. Recorded from Spain by Strobl (1906).

Remarks. — I have considered the subgenus *Spinotarsella* Duda as a synonym to *Opacifrons* Duda (Hackman, 1968).

Leptocera (s. str.) fontinalis Fallén, 1826.

Material. — ALMERÍA: Rioja, 50—200 m, 1 ♂, 11 March 1966 (W.H.); Rio Andarax, Fondón, 600 m, 1 ♂, 18 March 1966; Alhama 5 km W, 200—500 m, 1 ♀, 28 March 1966. — GRANADA: Torrenueva E Motril, 0—50 m, 1 ♂, 17 April 1966; Rio Guadalfeo, Orgiva, 300 m, 7 ♂ 5 ♀, 3—18 April 1966; Barranco de Algarrobo

12 km SW Orgiva, 300 m, 1 ♂ 1 ♀, 25 April 1966; Rio Chico, Orgiva, 450 m, 1 ♂, 2 April 1966; Pampineira, 900 m, 1 ♀, 9 April 1966; N slope Veleta, Sierra Nevada, 2300—2550 m, 13 ♂ 11 ♀, 20—27 July 1960 (J.R.V.); Sierra Nevada, Alb. Universitaria, 2600 m, 1 ♂ 1 ♀, 6 May 1966; Granada, 20 km NE, 1000—1500 m, 4 ♂ 4 ♀, 24 April 1966 (W.H.); Granada, 700 m, 10 ♂ 11 ♀, 10—19 July 1960 (J.R.V.).

Distribution. — Europe, North and Central America, Central Africa. Recorded from Spain by Strobl (1906).

Leptocera (s. str.) curvipennis (Stenhammar, 1854).

Material. — ALMERÍA: Pechina, 50—200 m, 1 ♀, 5 March, 2 ♀, 9 March 1966 (also W.H.); Rioja, 50—200 m, 1 ♂ 2 ♀, 25 March 1966. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 3 ♂ 3 ♀, 18 April 1966; Sierra de Contraviesa, Rabite, 1300 m, 1 ♀, 2 May 1966; Sierra Nevada Highway, 1200 m, 5 ♂ 8 ♀, 27 July 1960 (J.R.V.); Sierra Nevada near Padul, 1300 m, 1 ♂, 4 May 1966; Sierra Nevada, Alb. Universitaria, 2600 m, 1 ♂, 6 May 1966; N slope Veleta, Sierra Nevada, 2300—3000 m, 33 ♂ 28 ♀, 20—30 July 1960 (J.R.V.); Granada, 700 m, 5 ♂ 5 ♀, 13—14 July 1960 (J.R.V.); Maitena, 900 m, 7 ♂ 3 ♀, 10 July 1960 (J.R.V.).

Distribution. — Most parts of the Old World, but in Europe not found north of Southern Sweden. A very common species in the Mediterranean area. Recorded from Spain as *Limosina roralis* by Strobl (1906).

Leptocera (s.str.) caenosa (Rondani, 1880).

Material. — ALMERÍA: Almería, 0—50 m, 1 ♀, 22 March 1966. — GRANADA: 20 km NE Granada, 1000—1500 m, 1 ♀, 24 April 1966 (W.H.).

Distribution. — Almost cosmopolitan. New to Spain.

Remarks. — Synanthropous species.

Leptocera (Rachispoda) modesta (Duda, 1923).

Material. — ALMERÍA: Rioja, 50—200 m, 3 ♀, 9—25 March 1966. — GRANADA: Almunecar, 1 ♀, 16 July 1960 (J.R.V.); N slope Veleta, Sierra Nevada, 2400 m, 1 ♂, 25 July 1960 (J.R.V.).

Distribution. — Central, Southern and SE Europe, Afghanistan. New to Spain.

Leptocera (Rachispoda) fuscipennis (Haliday, 1833).

Material. — ALMERÍA: El Albufera, 0—50 m, 2 ♀, 23 March 1966. — GRANADA: Almunecar, 1 ♂, 16 July 1960 (J.R.V.).

Distribution. — Mainly a litoral species and widely distributed in the Holarctic region. Also known from New Zealand. Recorded from Spain by Strobl (1906).

DIASTATIDAE

Campichoeta grandiloba McAlpine, 1962.

Material. — ALMERÍA: Rioja, 50—200 m, 1 ♂, 7 March 1966 (W.H.) — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 1 ♂ 4 ♀; 4—11 April 1966; Rio Lanjaron near Lanjaron, 600 m, 1 ♂ 1 ♀, 26 April 1966; Pampineira, 900 m, 1 ♂, 9 April 1966; 2 paratypes from Granada, leg. Vockeroth.

Distribution. — Spain (McAlpine, 1962).

Remarks. — *Campichoeta punctum* Meigen, *C. fumigata* Duda and *C. grandiloba* McAlpine form a close group of allopatric species. The male genitalia are distinctly different in these species. The females are very similar, and the presence or absence of a mesonotal stripe pattern is a less reliable character.

Campichoeta obscuripennis (Meigen, 1830).

Material. — ALMERÍA: Rioja, 50—200 m, 1 ♀, 11 March 1966. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 4 ♀, 5—19 April 1966.

Distribution. — Central and South Europe, England, France, and in Asia from Nepal (Duda, 1934; McAlpine, 1962; Okada, 1966). I have seen specimens from Torino in Italy (leg. Frey). Mentioned by Czerny & Strobl (1909: 282) from the Sierra Nevada: "oberes Geniltal".

Euthychaeta spectabilis Loew, 1864.

Material. — GRANADA: N slope Veleta, Sierra Nevada, 2200 m, 1 ♂ 1 ♀, 22 July 1960 (J.R.V.).

Distribution. — Central and South Europe (Duda, 1934). New to Spain.

DROSOPHILIDAE

Cacoxenus indagator Loew, 1858.

Material. — ALMERÍA: Rioja, 10 km N, 200—500 m, 1 ♂, 12 March 1966.

Distribution. — Recorded from localities in Central, West and Southeast Europe. Terra typica: Silesia. New to Spain.

Remarks. — There are reasons to suspect that more than one

species is included under the name: *indagator* (Hardy & Wheeler, 1960). The genitalia of the present specimen (Figs. 3—5) do not fully agree with the figures given by Hardy & Wheeler (op. cit.). More material is needed to show the range of a possible infraspecific variation.

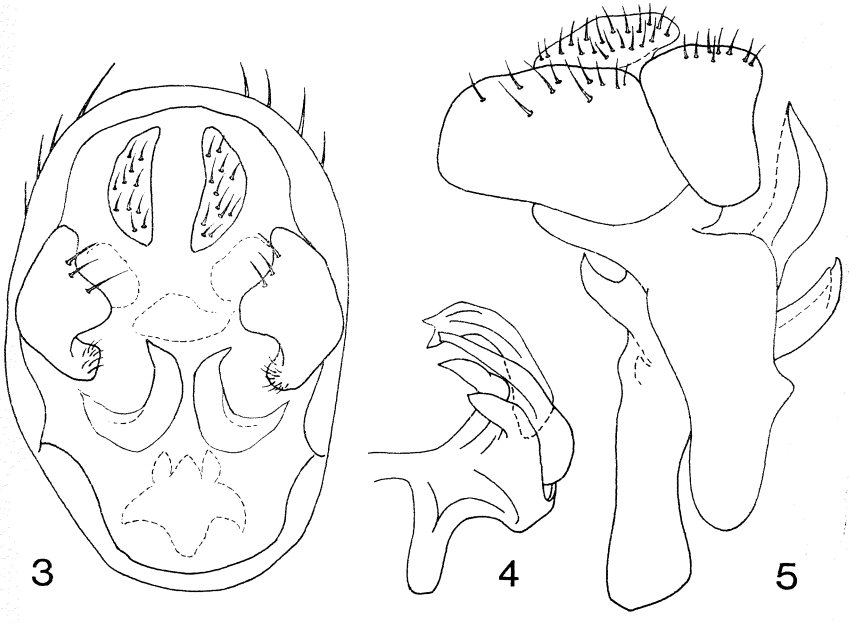
Leucophenga maculata (Dufour, 1839).

Material. — GRANADA:: Rio Lanjaron near Lanjaron, 600 m, 1 ♂, 28 April 1966.

Distribution. — Widely distributed in Europe, reaching southern Sweden in the North. Most records are from Central Europe and Northern Italy (Oldenberg, 1914; Duda, 1935). It is recorded from Japan by Okada (1956) which indicates a very wide distribution in the Palaearctic Region. New to Spain.

Scaptomyza (Parascaptomyza) pallida (Zetterstedt, 1847).

Material. — ALMERÍA: Albufera, 0—50 m, 1 ♂, 8 March 1966; Cabo de Gata, 0—50 m, 1 ♀, 31 March 1966; Pechina, 50—200 m, 6 ♂ 14 ♀, 5—9 March 1966; Rioja, 50—200 m, 15 ♂ 61 ♀,



Figs. 3—5. Male genitalia of *Cacoxenus indigator* Loew from Spain 1. Ventro-caudal view of hypopygium; 2. Distal parts of phallic organ; 3. Hypopygium in profile.

7 March—4 April 1966; Rioja 10 km N, 200—500 m, 1 ♀, 12 March 1966; Alhama del Almería 5 km W, 200—500 m, 6 ♂ 5 ♀, 17—28 March 1966. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 8 ♂ 1 ♀, 3 April — 3 May 1966; Rio Lanjaron near Lanjaron, 600 m, 1 ♀, 26 April 1966; Pampineira, 900 m, 1 ♀, 9 April 1966; Granada, 700 m, 1 ♀, 13 July 1960 (J.R.V.).

Distribution. — A cosmopolitan species (Hackman, 1959). The records of *S. graminum* from Southern Spain given by Czerny & Strobl (1909: 279) refer to this species (see also Basden, 1961).

Scaptomyza (s. str.) graminum (Fallén, 1823).

Material. — ALMERÍA: Pechina, 50—200 m, 1 ♂, 5 March 1966; Rioja, 50—200 m, 1 ♂ 1 ♀, 7 March 1966. — GRANADA: Barranco de Algarrobo 12 km SW Orgiva, 300 m, 1 ♂ 1 ♀, 25 April 1966; Rio Lanjaron near Lanjaron, 600 m, 2 ♂, 28 April 1966; Rio Sucio 5 km NW of Orgiva, 700 m, 1 ♂, 3 April 1966; Pampineira, 900 m, 2 ♀, 9 April 1966; Rio Lanjaron 9 km NW Orgiva, 1600 m, 1 ♂ 4 ♀, 6 April — 7 May 1966; Rio Mulhacén 5 km N Capileira, 1500 m, 1 ♀, 9 April 1966; Sierra Nevada near Padul, 1300 m, 2 ♂, 4 May 1966; Sierra Nevada near Alb. Universitaria, 2600 m, 1 ♀, 6 May 1966; N slope Veleta, Sierra Nevada, 2200—2400 m, 2 ♂ 1 ♀, 26—30 July 1960 (J.R.V.).

Distribution. — A widely distributed, holarctic species (Hackman, 1959; Wheeler & Takada, 1966). I have seen further specimens from Algeciras and Sierra de Cordoba collected by H. Lindberg in 1926. The specimens recorded as *Scaptomyza tetrasticha* Becker by Czerny & Strobl (1909:280) from Algeciras, "oberes Geniltal", and Moreda probably belong to this species.

Scaptomyza (s. str.) apicalis Hardy, 1850.

Material. — ALMERÍA: Almería, 0—50 m, 1 ♀, 22 March 1966; Rioja, 50—200 m, 2 ♂ 3 ♀, 7—25 March 1966; Alhama del Almería 5 km W, 200—500 m, 1 ♀, 28 March 1966.

Distribution. — Europe-Siberia, Canary Islands, Azores and Madeira.

Remarks. — I have preferred to use the name *apicalis* Hardy instead of the older, but dubious name *flaveola* Meigen (cf. Basden, 1961). There are both yellow, grey and intermediately patterned specimens in the above material. *S. apicalis* belongs to a difficult complex of species which have not yet been worked out satisfactorily (cf. Hackman, 1959; Wheeler & Takada, 1966).

Drosophila (Lordiphosa) andalusiaca Strobl, 1906.

Material. — ALMERÍA: Pechina, 50—200 m, 1 ♂, 5 March 1966; Rioja, 50—200 m, 2 ♀, 25 March 1966. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 1 ♂, 4 April 1966; Rio Lanjaron near Lanjaron, 600 m, 1 ♀, 26 April 1966; Pampineira, 900 m, 1 ♀, 9 April 1966; Rio Lanjaron 9 km NW Orgiva, 1600 m, 1 ♀, 7 May 1966; Granada, 700 m, 1 ♀, 2 July 1960 (J.R.V.); Maitena, 900 m, 4 ♂ 6 ♀, 11 July 1960 (J.R.V.); Sierra Nevada Highway, 1200 m, 1 ♂, 27 July 1960 (J.R.V.).

Distribution. — Spain (Terra typica: Algeciras), Great Britain, Holland, West Germany, Denmark, Yugoslavia, Cyprus, Morocco, Canary Islands Azores and Madeira (Frydenberg, 1956; Coe, 1959; Hackman, 1960).

Remarks. — Strobl's type material was investigated by Basden (1961), who found that *D. forcipata* Collin is a synonym of *andalusiaca.*

Drosophila (Sophophora) melanogaster Meigen, 1830.

Material. — ALMERÍA: Almería, 0—50 m, 3 ♂ 6 ♀, 22 March 1966; Rioja 10 km N, 200—500 m, 1 ♀, 12 March 1966. — GRANADA: Rio Chico, Orgiva, 450 m, 2 ♀, 2 April 1966; Granada, 700 m, 1 ♂ 1 ♀, 14 July 1960 (J.R.V.).

Distribution. — Cosmopolitan, synanthropous. Reported from Spain by Strobl (1906).

Drosophila (Sophophora) subobscura Collin, 1936.

Material. — ALMERÍA: Pechina, 50—200 m, 1 ♂ 1 ♀, 9 March 1966; Rioja, 50—200 m, 3 ♀, 7 March 1966; Alhama del Almería 5 km W, 200—500 m, 2 ♂ 1 ♀, 17—28 March 1966; Rioja 10 km N, 200—500 m, 2 ♂ 4 ♀, 12 March 1966. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 1 ♂ 2 ♀, 4—11 April 1966; Granada, 700 m, 1 ♂ 1 ♀, 9 July, 6 ♂ 7 ♀, 14 July 1960 (J.R.V.).

Distribution. — Most parts of Europe, Canary Islands, Azores, Madeira. Strobl's (1900 and 1906) records of *D. obscura* from Spain refer to *subobscura* (Basden, 1961).

Drosophila (s. str.) phalerata Meigen, 1830.

Material. — GRANADA: Granada, 700 m, 1 ♀, 19 July 1960 (J.R.V.).

Distribution. — Most parts of Europe. Strobl's (1906) Spanish record of this species (from Malgrat) is probably correct.

Drosophila (s. str.) funebris (Fabricius, 1787).

Material. — ALMERÍA: Rioja 10 km N, 200—500 m, 1 ♀, 12 March 1966.

Distribution. — A cosmopolitan, synanthropous species. Mentioned from Tarifa in Southern Spain by Czerny & Strobl (1909: 279).

Drosophila (s. str.) immigrans Sturtevant, 1921.

Material. — ALMERÍA: Almería, 0—50 m, 1 ♀, 6 March 1966 (W.H.); Same locality, 1 ♂, 22 March 1966.

Distribution. — Worldwide. Not common everywhere in Europe, and rather sporadic (Burla, 1951).

Drosophila (s. str.) hydei Sturtevant, 1921.

Material. — ALMERÍA: Rioja 10 km N, 200—500 m, 4 ♀, 12 March 1966.

Distribution. — A cosmopolitan species.

Remarks. — The very closely related species: *D. repleta* Wollaston was reported by Czerny & Strobl (1909: 279) from Algeciras, but there are no specimens left in Strobl's collection (Basden, 1961). The record can thus not be checked. *D. repleta* and *hydei* have repeatedly been confused, and in Europe *hydei* seems to be commoner in the free than *repleta* (Burla, 1951).

Drosophila (s. str.) buzzatii Patterson & Wheeler, 1942.

Material. — GRANADA: Granada, 700 m, 1 ♀, 14 July 1960 (J.R.V.).

Distribution. — Described from Argentina. European records from Portugal (Hadorn & al., 1952) and Sicily (Burla, 1951). Some specimens from the Canary Islands in Coll. Frey may belong here.

Remarks. — The species is considered smaller than *repleta* Wollaston but for the rest very close to that species. Sturtevant (1946) mentions that there is some doubt whether the type material of *repleta* (from Madeira) has been interpreted correctly. I am leaving this question open.

SCATOPHAGIDAE

Norellia sp. (**spinipes** auctt.).

Material. — GRANADA: Granada, 700 m, 12 ♂ 18 ♀, 19 July 1960 (J.R.V.).

Remarks. — Mr. J. R. Vockeroth has informed me in a letter (1968) that English and Mediterranean specimens of *Norellia spinipes* Meigen differ in certain characters and that probably two species or subspecies are involved. I am therefore leaving the name of the *Norellia* in the present collection open.

Scatophaga lutaria (Fabricius, 1794).

Material. — GRANADA: Granada, 700 m, 10 ♂ 6 ♀, 18—19 July 1960 (J.R.V.).

Distribution. — Widely distributed in Europe. Recorded from Spain as *Scopeuma maculipes* by Czerny & Strobl (1909).

Scatophaga stercoraria (Linné, 1758).

Material. — ALMERÍA: Pechina, 50—200 m, 2 ♀, 5—9 March 1966; Rioja, 50—200 m, 1 ♀, 7 March, 1 ♂ 1 ♀, 25 March 1966; El Albufera, 0—50 m, 1 ♀, 22 March 1966; Alhama 5 km W, 200—500 m, 1 ♂ 2 ♀, 19—29 March 1966. — GRANADA: Torrenueva E Motril, 0—50 m, 2 ♂ 5 ♀, 10—17 April 1966; Rio Guadalfeo, Orgiva, 300 m, 2 ♂ 1 ♀, 3—14 April 1966; Sierra de Contraviesa, Rabite, 1300 m, 6 ♂ 1 ♀, 2 May 1966; Rio Lanjaron 9 km NW Orgiva, 1600 m, 2 ♀, 15 April — 7 May 1966; Sierra Nevada near Padul, 1300 m, 1 ♀, 1 May 1966; N slope Veleta, Sierra Nevada, 2400 m, 2 ♂ 1 ♀, 27 July 1960 (J.R.V.); Granada, 700 m, 1 ♀, 14 July 1960 (J.R.V.).

Distribution. — Most parts of the Holarctic Region, Haiti. Recorded from Spain as *Scopeuma stercorarium & merdarium* by Czerny & Strobl (1909).

HIPPOBOSCIDAE

Hippobosca equina Linné, 1758.

Material. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 3 ♂ 5 ♀, 7—18 April 1966; Rio Lanjaron 9 km NW Orgiva, 1600 m, 1 ♂, 22 April 1966.

Distribution. — Palaearctic Region and western part of the Oriental Region, introduced and established in the Fiji, New Caledonia, New Hebrides and Moluccan Islands (Maa, 1963). Records from Spain by Strobl (1906).

Summary.

The paper presents records of 13 species of Heleomyzidae, 3 species of Opomyzidae, 28 species of Sphaeroceridae, 3 species of Diastatidae, 13 species of Drosophilidae, 3 species of Scatophagidae and 1 species

of Hippoboscidae, all collected in Southern Spain in 1960 and 1966. New taxon is *Acantholeria vockerothi* n. sp. Further 17 species are recorded from Spain for the first time.

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On some Fanniidae (Diptera) from Spain.

By
Adrian C. Pont
British Museum (Natural History), London, England.

Records of Spanish Fanniidae are extremely sparse. Rosenhauer (1856: 380) recorded *canicularis* Linné and *scalaris* Fabricius. Bigot (1885: 283) described *Homalomyia hispanica* from "Hispania", now treated as a junior synonym of *Fannia incisurata* Zetterstedt. Stein (1899: 19) described *Euryomma hispaniense* from Algeciras, now recognised as a junior synonym of *Euryomma peregrinum* Meigen. The most important contributions to the Spanish fauna were made by Strobl (1899 and 1906; in Czerny and Strobl, 1909) who studied considerable collections made not only by himself during his three expeditions to Spain but also by Spanish Dipterists. He recorded six species of *Fannia* Robineau-Desvoidy, viz. *scalaris* Fabricius, *canicularis* Linné, *difficilis* Stein, *glaucescens* Zetterstedt, *incisurata* Zetterstedt, and *nitida* Stein. In his catalogue of Spanish Diptera, Encobet (1912) listed these six species of *Fannia* and *Euryomma peregrinum,* and added *Platycoenosia mikii* Strobl to the Spanish list. Séguy (1929) also recorded *canicularis.* The majority of these records have been summarised by Hennig (1955).

It therefore gave me considerable pleasure to study and report upon the collections made by Dr. Leif Lyneborg, with his assistants Ole Martin and Søren Langemark, and by Dr. Walter Hackman in Southern Spain from March to May, 1966. This collection of 100 specimens includes six species, two of which have not been recorded previously from Spain, *aequilineata* Ringdahl and *mutica* Zetterstedt. I have also studied a collection of 68 Fanniidae made by Dr. J. R. Vockeroth in Southern Spain in July and August, 1960, kindly made available by the late Dr. J. G. Chillcott and Dr. Lyneborg. This collection contains six species, and includes a further two species not previously recorded from Spain, *monilis*

Haliday and *postica* Stein. As the second part of this report I have also included a list of the Fanniidae from Spain in the British Museum (Natural History), London, which includes a further five species new to Spain, *armata* Meigen, *fuscula* Fallén, *ornata* Meigen, *rondanii* Strobl and *sociella* Zetterstedt: four of these were collected by the author during two day's collecting in the Sierra de Guadarrama north of Madrid. The number of Fanniidae known from Spain is thus raised from 8 to 17.

The material collected by Dr. Hackman is in the Zoological Museum, Helsinki. Dr. Lyneborg's and Dr. Vockeroth's collections are in the Zoological Museum, Copenhagen, and the Canadian National Collection of Insects, Ottawa, respectively, with duplicates in the British Museum (Natural History), London.

1. Species from Southern Spain.

Euryomma peregrinum Meigen, 1826.

Material. — ALMERIA: Almeria, 0—50 m, 2 ♀, 22 March 1966.

Distribution. — Cosmopolitan, most abundant in tropical and subtropical regions. Recorded from Spain by Stein (1899: 19), as *hispaniense* Stein.

Fannia aequilineata Ringdahl, 1945.

Material. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 1 ♂, 18 April 1966; Rio Lanjaron near Lanjaron, 600 m, 2 ♂, 28 April 1966.

Distribution. — A little-known species, recorded only from South Sweden, England and Germany. New to Spain.

Remarks. — These males have been carefully compared with British males of this species and agree in every respect. The species is easily distinguished from other males of the *canicularis*-group by the dark abdomen, the comparatively long bushy pubescence beneath mid tibia, the longest of which equals half tibial depth, the long *pv* setae on hind femur, and the absence of *ad* setae above the submedian *ad* seta on hind tibia. One of the males, from Rio Lanjaron, has several short but conspicuous proclinate parafacial setulae. This is clearly an aberrant feature.

Fannia canicularis Linné, 1761.

Material. — ALMERIA: Almeria, 0—50 m, 1 ♂, 4 March 1966; Pechina, 50—200 m, 2 ♀, 5 March 1966; Rioja, 50—200 m, 13 ♂

4 ♀, 9—25 March 1966; Alhama 5 km W, 200—500 m, 1 ♂, 17 March 1966; Alhama, 200—500 m, 1 ♂ 1 ♀, 22 March 1966; Rio Andarax, Fondón, 600 m, 2 ♀, 18 March 1966. — GRANADA: Torrenueva E Motril, 0—50 m, 4 ♂, 10 April 1966; Rio Guadalfeo, Orgiva, 300 m, 28 ♂ 11 ♀, 2 April — 3 May 1966; Rambla de Aculas 10 km E Orgiva, 400 m, 2 ♂, 27 April 1966; Rio Lanjaron near Lanjaron, 600 m, 8 ♂ 3 ♀, 26—28 April 1966; Granada, 700 m, 8 ♂, 9 July 1960, and 23 ♂, 1 ♀, 14 July 1960; Sierra Nevada Highway, 1800 m, 1 ♀, 27 July 1960.

Distribution. — Cosmopolitan, most abundant in the northern hemisphere. Previously recorded from Spain by Rosenhauer (1856: 380), by Strobl (1899: 220; 1906: 348; in Czerny and Strobl, 1909: 240) and by Séguy (1929: 20).

Fannia incisurata Zetterstedt, 1838.

Material. — ALMERIA: Rioja 10 km N, 200—500 m, 1 ♂, 12 March 1966. — GRANADA: Granada, 700 m, 7 ♂ 1 ♀, 9—19 July 1960.

Distribution. — Palaearctic, Nearctic and Neotropical regions. Recorded from Spain by Bigot (1885: 283), as *hispanica* Bigot, and by Strobl (1906: 348; in Czerny and Strobl, 1909: 240).

Fannia monilis Haliday, 1838.

Material. — GRANADA: Granada, 700 m, 5 ♂ 5 ♀, 14 July 1960, and 2 ♀, 19 July 1960.

Distribution. -- Throughout Europe. New to Spain.

Fannia mutica Zetterstedt, 1845.

Material. — ALMERIA: Alhama 5 km W, 200—500 m, 1 ♂, 28 March 1966. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 2 ♀, 11 and 19 April 1966; Rio Lanjaron near Lanjaron, 600 m, 1 ♀, 28 April 1966; Granada, 700 m, 1 ♂ 3 ♀, 14 and 19 July 1960.

Distribution. — Common in Europe (Finland to Sicily to England to Hungary); North America. New to Spain.

Remarks. — Dissection of the male genitalia confirmed the identity of these males. The males do not differ in any way from British males of this species. Hennig (1955: 64) drew attention to two males from Italy (Acquasanta) with a lighter mesonotum: the Spanish males have a typically deep matt black mesonotum, but the dusting on the humeri and notopleura is grey rather than brownish-grey. The female from Rio Guadalfeo, 19 April, has the

tiny proclinate parafrontal setulae descending down on to the parafacialia, to the level of insertion of arista. Such aberrant females are rare, but may be immediately distinguished from other *Fannia* females with parafacial setulae — the *canicularis*-group — by the presence of an *av* seta on mid tibia.

Fannia postica Stein, 1895.

Material. — GRANADA: N slope Veleta, Sierra Nevada, 2200 m, 1 ♂, 30 July 1960.

Distribution. — Northern Europe, British Isles, Germany, France, Alps; North America. New to Spain.

Remarks. — This male has creamy-white squamae, and thus belongs to true *postica* Stein (= *parapostica* Hennig); see Fonseca (1968: 88).

Fannia scalaris Fabricius, 1794.

Material. — ALMERIA: Alhama, 200—500 m, 8 ♂, 22 March 1966. — GRANADA: Rio Lanjaron near Lanjaron, 600 m, 1 ♀, 28 April 1966; Granada, 700 m, 6 ♂ 1 ♀, 9 and 14 July 1960; Maitena, 900 m, 1 ♀, 11 July 1960.

Distribution. — Cosmopolitan, most abundant in the northern hemisphere. Recorded from Spain by Rosenhauer (1856: 380) and by Strobl (in Czerny and Strobl, 1909: 240).

2. Species from Spain in the British Museum (Nat. Hist.), London.

Fannia armata Meigen, 1826.

C. SPAIN: Sierra de Guadarrama, swept around stream near Gudillos, c 1400 m, 1 ♂, 18 August 1963 (A. C. Pont).

N. SPAIN: Gerona, Las Planas, 1 ♀, 12—18 July 1965 (A. M. Hutson).

Fannia canicularis Linné, 1761.

SPAIN: On board ship off Vigo, 1 ♀, October 1926 (F. & M. Edwards).

Fannia fuscula Fallén, 1825.

N. SPAIN: Gerona, Las Planas, 1 ♀, 12—18 July 1965 (A. M. Hutson).

Fannia ornata Meigen, 1826.

C. SPAIN: Sierra de Guadarrama, San Rafael, pine forest and bracken hills, 1260—1500 m, 1 ♀, 19 August 1963 (A. C. Pont).

Fannia rondanii Strobl, 1893.

C. SPAIN: Sierra de Guadarrama, San Rafael, pine forest and bracken hills, 1260—1500 m, 1 ♀, 19 August 1963 (A. C. Pont).

Fannia sociella Zetterstedt, 1845.

C. SPAIN: Sierra de Guadarrama, swept around stream near Gudillos, c 1400 m, 4 ♀, 18 August 1963 (A. C. Pont).

Summary

8 species of Fanniidae are recorded from Southern Spain on basis of material collected in 1960 and 1966. 4 of these, *Fannia aequilineata* Ringd., *mutica* Zett., *monilis* Hal., and *postica* Stein are new to the Spanish list. Also included is a list of the Fanniidae from Spain in the British Museum (Nat. Hist.), which adds 5 further species new to Spain, *Fannia armata* Meig., *fuscula* Fall., *ornata* Meig., *rondanii* Strobl, and *sociella* Zett. The number of Fanniidae known from Spain is raised from 8 to 17.

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Some Tipulidae from Southern Spain.

By
Bernhard Mannheims
Zoologisches Forschungsinstitut und Museum
Alexander Koenig, Bonn, Germany.

The Tipulidae (Tipulinae) collected during the expeditions of the Copenhagen and Helsingfors museums to southern Spain (provinces Granada and Almeria) in 1966 number 51 specimens of 13 species. An additional 5 species were collected in the same provinces in July 1960 by Dr. J. R. Vockeroth.

I wish to express my thanks to my colleagues Leif Lyneborg, Ole Martin and Søren Langemark (Copenhagen), Walter Hackman (Helsingfors) and J. R. Vockeroth (Ottawa) for the opportunity to study this material enlarging our knowledge to the cranefly fauna of Spain. The material is in the respective museums.

Nephrotoma maculosa (Meigen, 1818).
maculata (Meigen, 1804), nec (Linné, 1758).

Material. — GRANADA: Rio Lanjaron 9 km NW Orgiva, 1600 m, 1 ♀, 6 April 1966.

Distribution. — Throughout Europe.

Nephrotoma submaculosa Edwards, 1928.

Material. — ALMERIA: Rioja, 50—200 m, 1 ♂ 1 ♀, 25 March 1966. — GRANADA: Rio Sucio 5 km NW Orgiva, 700 m, 2 ♂ 2 ♀, 3 April 1966; Rio Guadalfeo, Orgiva, 300 m, 1 ♂, 2 April 1966.

Distribution. — Throughout Europe, but restricted to sandy regions.

Nephrotoma cornicina (Linné, 1758).

Material. — GRANADA: Granada, 700 m, 2 ♂ 6 ♀, 9—18 July 1960 (J. R. Vockeroth).

Distribution. — Throughout Europe.

Nephrotoma guestfalica (Westhoff, 1880).

Material. — ALMERIA: Rioja, 50—200 m, 1 ♂, 25 March 1966. — GRANADA: Rio Guadalfeo, 300 m, 1 ♀, 4 April 1966.

Distribution. — Throughout Europe except in the north.

Nephrotoma scalaris (Meigen, 1818).
imperialis (Meigen, 1818).

Material. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 2 ♂ 4 ♀, 4 April — 3 May 1966; Pampineira, 900 m, 1 ♂, 9 April 1966.

Distribution. — Southern Europe, southeastern Asia.

Nephrotoma luteata (Meigen, 1818).
castellana (Strobl, 1906); *zonata* (Pierre, 1919).

Material. — GRANADA: Rio Sucio 5 km NW Orgiva, 700 m, 1 ♂, 3 April 1966.

Distribution. — Iberian Peninsula and southern France.

Nephrotoma lindneri (Mannheims, 1951).

Material. — GRANADA: Rio Lanjaron 9 km NW Orgiva, 1600 m, 1 ♀, 7 May 1966.

Distribution. — Southern Europe.

Tipula (Tipula) mediterranea Lackschewitz, 1930.

Material. — ALMERIA: Almeria, 0—50 m, 1 ♀, 11—20 April 1966; Rio Andarax, Fondón, 600 m, 1 ♂, 18 March 1966. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 5 ♂ 4 ♀, 2—7 April 1966; Pampineira, 900 m, 1 ♂ 1 ♀, 9 April 1966; Rio Lanjaron near Lanjaron, 600 m, 1 ♂ 1 ♀, 26 April 1966; Rio Lanjaron 9 km NW Orgiva, 1600 m, 2 ♂, 15 April 1966.

Distribution. — West Mediterranean area: Italy, Spain, North Africa.

Tipula (Yamatotipula) lateralis Meigen, 1818.
montium Lackschewitz, 1923, nec Egger, 1863.

Material. — ALMERIA: Rio Andarax, Fondón, 600 m, 1 ♂, 18 March 1966. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 1 ♀, 21 April 1966; Rio Lanjaron near Lanjaron, 600 m, 1 ♂, 26 April 1966; Sierra Nevada, 2400 m, 1 ♀, 24 July 1960 (J. R. Vockeroth).

Distribution. — Throughout Europe, North Africa, Asia Minor.

Tipula (Acutipula) maxima Poda, 1761.
gigantea Schrank, 1776; *sinuata* Fabricius, 1782;
pseudogigantea Strobl, 1900.

Material. — GRANADA: Rio Lanjaron near Lanjaron, 600 m, 1 ♂ 2 ♀, 26 and 28 April 1966.

Distribution. — Throughout Europe, near running water.

Tipula (Acutipula) fulvipennis Degeer, 1776.
lutescens Fabricius, 1805.

Material. — GRANADA: N. slope Veleta, Sierra Nevada, 2400 m, 1 ♀, 24 July 1960 (J. R. Vockeroth).

Distribution. — Throughout Europe.

Tipula (Lunatipula) gibbifera Strobl, 1906.
adpes Riedel, 1913.

Material. — GRANADA: Orgiva 5 km SE, 500 m, 1 ♂, 15 March 1966.

Distribution. — Spain and southeastern France (near Volonne sur Durance and Avignon).

Tipula (Lunatipula) pilicauda Pierre, 1921.

Material. — GRANADA: N. slope Veleta, Sierra Nevada, 2550 m, 1 ♂, 24 July 1960 (J. R. Vockeroth).

Distribution. — Southern France and Spain.

Tipula (Lunatipula) ampullifera Mannheims, 1965.

Material. — GRANADA: N. slope Veleta, Sierra Nevada, 2300—2550 m, 1 ♀ paratype, 22 July 1960 (J. R. Vockeroth).

Distribution. — Spain.

Tipula (Lunatipula) trifasciculata Strobl, 1900.

Material. — GRANADA: Rio Lanjaron 9 km NW Orgiva, 1600 m, 1 ♀, 7 May 1966.

Distribution. — Middle and Southern Spain.

Tipula (Lunatipula) dolores Mannheims, 1967.

Material. — GRANADA: Rio Mulhacén 5 km N Capileira, 1500 m, 2 ♂ paratypes, 9 April 1966.

Distribution. — Southern Spain.

Tipula (Lunatipula) pseudocinerascens Strobl, 1906.

Material. — ALMERIA: Almeria, Alcazaba, 0—50, 1 ♂, 8 April

1966 (W. Hackman); Alhama 5 km W, 200—500 m, 1 ♂ 1 ♀, 17—21 March 1966; Tabernas 8 km N, 200—500 m, 14 March 1966. — GRANADA: Orgiva 4 km SE, 400 m, 1 ♂, 15 March 1966.

Distribution. — Spain.

Tipula (Savtshenkia) atlas Pierre, 1924.
breviantennata Lackschewitz, 1933.

Material. — GRANADA: N. slope Veleta, Sierra Nevada, 2400 m, 1 ♀, 24 July 1960 (J. R. Vockeroth).

Distribution. — Known from North Africa (Grand Atlas), southern Spain (Sierra Nevada), northern Spain (Pyrenees), French Alps (Massif de Chartreuse) and central Italy (Monte Falterone).

Summary

The paper brings records from southern Spain of 18 species of Tipulidae, viz. 7 species of *Nephrotoma* and 11 species of *Tipula*.

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A. G. Carolsfeld-Krausé.
22.12.1905—14.1.1969.

Overlærer Carolsfeld-Krausé var meget tidligt indstillet på entomologi, da hans far, der var fotograf i Roskilde, også samlede sommerfugle og gav ham de første impulser. Efter hans fars tidlige død blev han udskrevet fra latinskolens 2.g. og fortsatte som fotograf, indtil han på J. P. Kryger's tilskyndelse begyndte studiet til lærer på Blågårds seminarium i 1937, og efter forskellige vikariater blev han ansat på Katrinedalsskolen.

Han specialiserede sig efterhånden på slægten *Nepticula* og indførte sig derved i den kreds af lærere, som har bidraget så meget til studiet af den danske fauna. I 1940 blev han medlem af Entomologisk Forening og virkede som sekretær 1949—53. Han nedskrev omhyggeligt sine iagttagelser, men publicerede mindre end man kunne ønske, da han ikke var indstillet på at fremstille dem i koncentreret form. Derimod stod han i forbindelse med andre specialister indenfor microlepidoptererne, bl. a. Hering (Berlin), Klimesch (Wien) og Jacobs (London), og da han gerne gav oplysninger videre, kan man finde disse citeret, f. ex. i I.R.P. Heslop, 1964: 58—59: Library edition of "Revised indexed Check-List of the British Lepidoptera. — Ent. Gazette 1959—63", og enkeltvise klækninger i H. P. S. Sønderup 1949: Fortegnelse over de danske Miner. — Spol. Zool. Mus. Hauniensis, 10.

Som lærer talte Krausé motorisk og gerne. Ofte med dramatisk krydret fremstilling i overensstemmelse med hans tro på, at den mundtlige undervisning var det væsentlige for elevernes tilegnelse af stoffet. Derfor var han aldrig kedelig at høre på, når man som jeg kom i hans gæstfrie hjem gennem mange år. Hans kundskaber i fysik og andre områder var omfattende og hans mange præparater fremstillede med megen teknisk færdighed. Hans skrivemåde kan man bedst se i en nekrolog over J. P. Kryger, 1959. — Jul i Roskilde, 34:11—14.

Krausé's markante skikkelse vil blive savnet; han efterlader sig hustru, Margit og datter Susanne.

O. Bakkendorf.

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Some Trypetidae (Diptera) from Southern Spain.

By
Ferenc Mihályi
Zoological Department of the Hungarian Natural History Museum,
Budapest, Hungary.

Dr. Leif Lyneborg has kindly requested me to study the material of Trypetidae originating from a collecting trip to Spain in 1966. Dr. Lyneborg also suggested that the trypetids collected in the same area by Dr. J. R. Vockeroth in 1960 should be named and published together with his collection. A total of 150 specimens were available for study: 70 were collected by Leif Lyneborg, Ole Martin and Søren Langemark of the Zoological Museum, Copenhagen; 6 by Walter Hackman of the Zoological Museum, Helsinki; and 74 by J. R. Vockeroth of the Entomology Research Institute, Ottawa. The material comprises 33 species, plus two taxa which could not be identified due to lack of comparative material.

Regarding fruit flies, Spain is a rather well investigated country. A list of Spanish Diptera was compiled from the literature and issued as early as 1912 by Encobet. In his 1912 a paper he listed 63 species of Trypetidae and, in his 1912 b paper he added 10 more. The list was completed by Hering (1933) after his collecting trip in Spain. Also the monographs of Hendel (1927) and Séguy (1934) contain many references to the Spanish fauna.

As the library at my disposal is rather incomplete in faunistical papers on Spanish Diptera, there has been some doubt as to which species of the present material are new to the country. I assume that four of the species listed below (*Hypenidium novaki* Strobl, *Actinoptera filaginis* Loew, *Acanthiophilus ramulosus* Loew and *Tephritis posis* Hering) may be new to Spain.

I express my thanks to Dr. Leif Lyneborg and Dr. J. F. McAlpine for giving me the opportunity to study this very interesting material.

Dacus oleae Gmelin, 1788

Material. — ALMERIA: Rioja, 50—100 m, 1 ♀, 7—14 March 1966 (W. Hackman); Alhama 5 km W, 200—500 m, 1 ♂, 19 March 1966. — GRANADA: Barranco de Miranda 8 km SW Orgiva, 300 m, 2 ♂ 1 ♀, 20 April 1966; Rio Guadalfeo, Orgiva, 300 m, 1 ♀, 5 April 1966; Rio Lanjaron 9 km NW Orgiva, 1600 m, 1 ♀, 15 April 1966.

Distribution. — The entire Mediterranean area, Canary Islands, western Asia, Himalaya, India, North, East and South Africa (Hendel, 1927:31). Recorded from Spain by Encobet (1912: 133).

Hypenidium novaki Strobl, 1893

Material. — GRANADA: Sierra Nevada Highway, 1650 m, 1 ♂, 27 July 1960 (J. R. Vockeroth).

Distribution. — Dalmatia (Yugoslavia), Hungary (Mihályi, 1959: 339). Probably new to Spain.

Euribia affinis Frauenfeld, 1856

Material. — GRANADA: Pinus Puente 15 km NW Granada, 500—1000 m, 1 ♂ 1 ♀, 27 April 1966.

Distribution. — Central Europe (Hendel, 1927: 40). Reported from Spain by Encobet (1912: 67).

Euribia stylata Fabricius, 1775

Material. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 1 ♂ 1 ♀, 11 April 1966.

Distribution. — Europe. Recorded from Spain by Encobet (1912: 157) and Hering (1933: 249).

Ceratitis capitata Wiedemann, 1824

Material. — ALMERIA: Almeria, 0—50 m, 1 ♂, 26 April 1966 (W. Hackman).

Distribution. — Troughout the world in subtropical and tropical countries. Recorded from Spain by Encobet (1912: 81).

Oedaspis fissa Loew, 1862

Material. — ALMERIA: Tabernas 8 km N, 200—500 m, 4 ♂ 5 ♀, 14 March 1966 (also W. Hackman).

Distribution. — Recorded from Spain by Encobet (1912: 99) and Hendel (1927: 85).

Philophylla heraclei Linné, 1758

Material. — GRANADA: Granada, 700 m, 1 ♀, 13 July 1960 (J. R. Vockeroth).

Distribution. — Europe (Sicily), Asia Minor, Caucasus (Hendel, 1927: 99). Recorded from Spain by Encobet (1912: 108), Hering (1933: 249).

Remarks. — The specimen is reddish-yellow, therefore it belongs to the form *Ph. heraclei* L. s. str. (syn. *onopordinis* Fabr.).

Spheniscomyia filiola Loew, 1869

Material. — GRANADA: Barranco de Miranda 8 km SW Orgiva, 300 m, 1 ♂, 23 April 1966; Almunecar, 0—30 m, 1 ♂, 16 July 1960 (J. R. Vockeroth).

Distribution. — Recorded from Spain by Encobet (1912: 99). Canary Islands, Egypt (Hendel, 1927: 106).

Aciura coryli Rossi, 1792

Material. — GRANADA: Maitena, 900 m, 1 ♂, 11 July 1960 (J. R. Vockeroth).

Distribution. — Mediterranean area: Southern Europe, North Africa, Asia Minor, Canary Islands; Central Asia (Hendel, 1927: 109). Recorded from Spain by Hering (1933: 249).

Oxyaciura tibialis Robineau-Desvoidy, 1830

Material. — GRANADA: Sierra Nevada near Padul, 1300 m, 1 ♀, 1 May 1966; Maitena, 900 m, 1 ♀, 10 July 1960 (J. R. Vockeroth).

Distribution. — Mediterranean area: Southern Europe, North Africa, Madeira, Persia (Hendel, 1927: 112). Recorded from Spain by Encobet (1912: 160).

Spathulina tristis Loew, 1869

Material. — ALMERIA: Alhama, 200—500 m, 1 ♂ 1 ♀, 22 March 1966; Alhama 5 km W, 200—500 m, 1 ♂, 19 March 1966. — GRANADA: Barranco de Algarrobo 12 km SW Orgiva, 300 m, 1 ♂, 25 April 1966; Barranco de Miranda 8 km SW Orgiva, 300 m, 3 ♂ 1 ♀, 16—20 April 1966; Rio Lanjaron near Lanjaron, 600 m, 2 ♀, 26—28 April 1966.

Distribution. — Spain, Sicily, Dalmatia, Canary Islands (Hendel, 1927: 118). Recorded from Spain by Hering (1933: 249).

Chaetorellia jaceae Robineau-Desvoidy, 1830

Material. — GRANADA: Rio Lanjaron near Lanjaron, 600 m, 1 ♂, 26 April 1966.

Distribution. — Europe, Asia Minor, Persia (Hendel, 1927: 123). Recorded from Spain by Encobet (1912: 113).

Terellia longicauda Meigen, 1838

Material. — GRANADA: Sierra Nevada Highway, 1800 m, 1 ♀, 27 July 1960 (J. R. Vockeroth).

Distribution. — Central Europe, North Africa, Canary Islands, Siberia (Hendel, 1927: 127). Recorded from Spain by Seyrig, Antiga (according to Séguy, 1934: 131).

Terellia serratulae Linné, 1758

Material. — GRANADA: N. slope Veleta, Sierra Nevada, 2800—3000 m, 1 ♀, 20 July 1960 (J. R. Vockeroth).

Distribution. Throughout Europe, North Africa, Syria, Persia, (Hendel, 1927: 128). Recorded from Spain by Encobet (1912: 152).

Stylia ? aragonensis Hering, 1933

Material. — GRANADA: N. slope Veleta, Sierra Nevada, 2200—2550 m, 3 ♀, 20—30 July 1960 (J. R. Vockeroth).

Distribution. — Described from Spain by Hering (1933: 250).

Remarks. — With their short ovipositor, darkened antennae and wing pattern, the specimens correspond to the original description and drawing of Hering (1933: 250), but in Csm there are two to four dots before the ta vein, and not two. As I have no comparative material, I give this species here with a question mark.

Stylia sp.

Material. — GRANADA: N. slope Veleta, Sierra Nevada, 2200 m, 1 ♂, 30 July 1960 (J. R. Vockeroth).

Remarks. — It may be *S. difficilis* Hering. There is a smaller white spot at the ending of r_1 vein, half as broad as the Cm cell.

Stylia sororcula Wiedemann, 1830

Material. — GRANADA: Barranco de Algarrobo 12 km SW Orgiva, 300 m, 2 ♂ 1 ♀, 25 April 1966; Almunecar, 0—30 m, 4 ♂ 4 ♀, 16 July 1960 (J. R. Vockeroth).

Distribution. — In the tropical and subtropical parts of both the Old and New World.

Stylia tesselata Loew, 1844

Material. — GRANADA: Barranco de Miranda 8 km SW Orgiva, 300 m, 1 ♀, 16 April 1966; Rio Guadalfeo, Orgiva, 300 m, 1 ♂, 4 April 1966; N. slope Veleta, Sierra Nevada, 2300—2550 m, 2 ♂ 8 ♀, 20—30 July 1960 (J. R. Vockeroth).

Distribution. — Europe, North Africa, Canary Islands, Asia Minor and Central Asia (Hendel, 1927: 160). Recorded from Spain by Encobet (1912: 160) and Hering (1933: 250).

Actinoptera ? filaginis Loew, 1862

Material. — GRANADA: Sierra de Contraviesa, Rabite, 1300 m, 1 ♂, 2 May 1966; Maitena, 900 m, 1 ♂, 10 July 1960 (J. R. Vockeroth).

Distribution. — Central Europe, northern Italy (Hendel, 1927: 163). Probably new to Spain. It is possible that *Urellia mamulae* Frfld. in the list of Encobet (1912: 121) is the same species.

Remarks. — The specimens do not correspond exactly to any of the descriptions of European species in Hendel's monograph. The dark band from Csc to ta is very oblique as in *discoidea* Fall., but the two white spots in the Cm do not touch the r_{2+3}, and there is a dark spot in Cc as found in *filaginis*. *A. discoidea* is distributed in northern and central Europe, *filaginis* in central and southern Europe. The Spanish specimens resemble even more *A. espunensis* Hering, 1933, the wing pattern being practically the same, but *espunensis* has one ori while the Spanish specimens have two. It is, therefore, with some hesitation that I treat the specimens as *filaginis* Lw.

Ensina sonchi Linné, 1767

Material. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 1 ♂, 19 April 1966; Maitena, 900 m, 2 ♂ 1 ♀, 10—11 July 1960 (J. R. Vockeroth); N. slope Veleta, Sierra Nevada, 2400 m, 1 ♂ 2 ♀, 22—30 July 1960 (J. R. Vockeroth).

Distribution. — Throughout Europe (Hendel, 1927: 172). Recorded from Spain by Encobet (1912: 154).

Tephritis conjuncta Loew, 1862
= *separata* f. *conjuncta* Rondani, 1871

Material. — GRANADA: N. slope Veleta, Sierra Nevada, 2300—2550 m, 1 ♀, 22 July 1960 (J. R. Vockeroth).

Distribution. — Greece, Italy, Spain, southern Russia, Siberia (Hendel, 1927: 185). Recorded from Spain by Encobet (1912: 87).

Tephritis formosa Loew, 1844

Material. — ALMERIA: Rioja, 50—200 m, 1 ♂, 7 March 1966. — GRANADA: Barranco de Miranda 8 km SW Orgiva, 300 m, 1 ♀, 16 April 1966.

Distribution. — Southern and central Europe. Spain: Saragosse (L. Navas after Séguy, 1934: 159), Albarracin (Hering, 1933: 251); also recorded by Encobet (1912: 101).

Tephritis matricariae Loew, 1844

Material. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 1 ♀, 3 May 1966; Sierra de Contraviesa, Rabite, 1300 m, 2 ♀, 2 May 1966.

Distribution. — Mediterranean area, including Asia Minor (Hendel, 1927: 190). Recorded from Spain by Hering (1933: 251).

Tephritis nigricauda Loew, 1856

Material. — ALMERIA: Pechina, 50—200 m, 1 ♂, 5 March 1966. — GRANADA: N. slope Veleta, Sierra Nevada, 2400 m, 1 ♀, 25 July 1960 (J. R. Vockeroth).

Distribution. — Throughout Europe, North Africa, Syria, Asia Minor (Hendel, 1927: 192). Recorded from Spain by Hering (1933: 251).

Remarks. — Not typical specimens. In the Cd there is only one white dot in the dark border of tp, as in *dioscurea* Lw., buth the dark pattern in Cp_3 reaches the hinder border of the cell and is connected with the dark spot at the root of the anal vein.

Tephritis poecilura Loew, 1869

Material. — GRANADA: Maitena, 900 m, 1 ♂ 1 ♀, 10 July 1960 (J. R. Vockeroth); N. slope Veleta, Sierra Nevada, 2550—3000 m, 4 ♂ 1 ♀, 20 July 1960 (J. R. Vockeroth); Sierra Nevada Highway, 1650 m, 1 ♂ 2 ♀, 27 July 1960 (J. R. Vockeroth); Almunecar, 0—30 m, 1 ♀, 16 July 1960 (J. R. Vockeroth).

Distribution. — Southern Europe, North Africa (Hendel, 1927: 193). Recorded from Spain by Encobet (1912: 139).

Tephritis posis Hering, 1939

Material. — ALMERIA: Cabo de Gata, 0—50 m, 1 ♀, 26 March 1966; Alhama 5 km W, 200—500 m, 1 ♂, 19 March 1966.

Distribution. Mediterranean area (Hering, 1944: 28), Hungary (in the collection of the Hungarian Natural History Museum). Probably new to Spain.

Remarks. — The two specimens have a dark coloration and are thus rather typical. As *T. posis* Her. and *postica* Lw. differ only in coloration and many intermediate specimens between the two forms occur, I regard the dark *posis* as the ancestral form from which *postica* Lw. has developed.

Tephritis postica Loew, 1844

Material. — GRANADA: Sierra Nevada Highway, 1650 m, 1 ♀, 27 July 1960 (J. R. Vockeroth).

Distribution. — Central and southern Europe (Hendel, 1927: 193). Recorded from Spain by Encobet (1912: 139) and Hering (1933: 251).

Remarks. — The specimen has yellow pleura, abdomen, and legs, and orange-coloured ovipositor as in typical specimens.

Tephritis praecox Loew, 1844

Material. — ALMERIA: Pechina, 50—200 m, 1 ♂, 9 March 1966; Alhama 5 km W, 200—500 m, 1 ♂ 1 ♀, 17 March 1966; Tabernas 8 km N, 200—500 m, 1 ♀, 14 March 1966. — GRANADA: Sierra de Contraviesa, Rabite, 1300 m, 1 ♀, 2 May 1966; Rio Lanjaron 9 km NW Orgiva, 1600 m, 1 ♀, 7 May 1966; N. slope Veleta, Sierra Nevada, 2200—2550 m, 3 ♀, 22—30 July 1960 (J. R. Vockeroth); Sierra Nevada Highway, 1650 m, 1 ♂ 1 ♀, 27 July 1960 (J. R. Vockeroth); Almunecar, 0—30 m, 2 ♂ 1 ♀, 16 July 1960 (J. R. Vockeroth).

Distribution. — Southern Europe, Asia Minor, North Africa, Canary Islands (Hendel, 1927: 194). Recorded from Spain by Encobet (1912: 139).

Remarks. — There are only colour differences between *T. praecox* Lw. and *poecilura* Lw. and I have some doubt whether they are really different species, because intermediate specimens occur.

Tephritis pulchra Loew, 1844

Material. — GRANADA: Sierra Nevada near Padul, 1300 m, 1 ♂, 4 May 1966.

Distribution. —Central Europe, Mediterranean area including Asia Minor (Hendel, 1927: 194). Recorded from Spain by Encobet (1912: 141).

Tephritis simplex Loew, 1844

Material. — ALMERIA: Albufera, 0—50 m, 2 ♀, 8 March 1966. — GRANADA: Torrenueva E. Motril, 0—50 m, 1 ♀, 12 April 1966;

Barranco de Algarrobo 12 km SW Orgiva, 300 m, 1 ♂ 1 ♀, 25 April 1966; Barranco de Miranda 8 km SW Orgiva, 300 m, 2 ♂ 3 ♀, 16—23 April 1966; Rio Guadalfeo, Orgiva, 300 m, 2 ♂ 1 ♀, 3—18 April 1966. — GIBRALTAR: 2 ♀, 4 August 1960 (J. R. Vockeroth).

Distribution. — Asia Minor, Dalmatia, Spain, Tunesia (Hendel, 1927: 195).

Tephritis sp.

Material. — GRANADA: Maitena, 900 m, 1 ♂ 1 ♀, 10—11 July 1960 (J. R. Vockeroth).

Remarks: The two specimens resemble *T. formosa* Lw. but surely do not belong to this species. They have much more regular round spots and there is a big transparent drop before ta in the Csm.

Trupanea amoena Frauenfeld, 1856

Material. — GRANADA: Torrenueva E Motril, 0—50 m, 2 ♀, 14—17 April 1966; Barranco de Miranda 8 km SW Orgiva, 300 m, 1 ♀, 16 April 1966; N. slope Veleta, Sierra Nevada, 2200 m, 1 ♂, 30 July 1960 (J. R. Vockeroth).

Distribution. — Central and southern Europe, Canary Islands, North Africa, Persia, Central Asia, India, Philippine Islands, Formosa (Hendel, 1927: 199). Recorded from Spain by Encobet (1912: 69).

Trupanea stellata Fuessly, 1775

Material. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 1 ♂, 2 April 1966; Sierra Nevada, Alb. Universitaria, 2600 m, 1 ♂, 6 May 1966; N. slope Veleta, Sierra Nevada, 2400—3000 m, 5 ♂ 2 ♀, 20—30 July 1960 (J. R. Vockeroth).

Distribution. — Europe, North and East Africa, Canary Islands, Asia Minor, Central Asia, Persia, ? Australia (Hendel, 1927: 202). Recorded from Spain by Encobet (1912: 155) and Hering (1933: 252).

Acanthiophilus helianthi Rossi, 1790

Material. — GRANADA: Maitena, 900 m, 1 ♂ 2 ♀, 10—11 July 1960 (J. R. Vockeroth); N. slope Veleta, Sierra Nevada, 2400 m, 1 ♀, 25 July 1960 (J. R. Vockeroth).

Distribution. — Europe, North Africa, Asia Minor, Turkmenia, Persia, Central Asia, Erythrea, Canary Islands (Hendel, 1927: 204). Recorded from Spain by Hering (1933: 252).

Acanthiophilus ramulosus Loew, 1844

Material. — GRANADA: Barranco de Miranda 8 km SW Orgiva, 300 m, 2 ♂ 1 ♀, 16—20 April 1966; Sierra Nevada near Padul, 1300 m, 1 ♂, 4 May 1966.

Distribution. — Dalmatia, Sicily, Canary Islands, Syria, Egypt, Algeria (Hendel, 1927: 205). May be new to Spain.

Summary

Thirty-three species of Trypetidae are recorded from southern Spain based on collections made in 1960 and 1966. Two more taxa occur but are not identified to species due to lack of comparative material. Four of the species are recorded from Spain for the first time.

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Some Simuliidae (Diptera) from Southern Spain.

By
Gunnar Carlsson
Kurirgatan 9, Hälsingborg, Sweden.

In March, April and May 1966 an expedition from the Zoological Museums in Copenhagen and Helsinki visited Southern Spain, where the members brought together a collection of, among other things, black flies. This was later completed with Dr. J. R. Vockeroth's material of Simuliidae, collected in July 1960 in the same area. Some of this 1960 material was identified by Dr. Vockeroth. This is indicated by (V) below. During the years some records of Simuliidae from Spain have been published, viz., Grenier & Bertrand, 1954 (15 species mentioned), and Doby, David & Raul, 1964. More thorough investigations on black flies in Spain will probably at least double the number of species mentioned by Grenier & Bertrand. In the present material there are at least twelve species represented. Three of these are probably new to science and an additional two are new to Spain.

I am indebted to Mr. Leif Lyneborg for his permission to work up this material and to Dr. Vockeroth for allowing me to examine his collection of black flies.

Prosimulium inflatum Davies, 1957

Material. — GRANADA: Rio Lanjaron 9 km NW Orgiva, 1600 m, 1 ♂, 7 May 1966.

Distribution. — Europe, especially Britain, Scandinavia and USSR (Komi ASSR). New to Spain.

Remarks. — The species-complex *P. hirtipes* has previously been divided into some new species of which *P. inflatum* is considered to be closely allied to the true *P. hirtipes* Fries, 1824.

Prosimulium rufipes Meigen, 1830

Material. — GRANADA: N. slope Veleta, Sierra Nevada, 2200—2400 m, 8 ♂ 4 ♀, 30 July 1960 (J. R. Vockeroth).

Distribution. — Middle and southern Europe. New to Spain.

Remarks. — Very similar to *P. hirtipes* and often mistaken for this species. For descriptions and differences see Davies (1957), Rubtzov (1964) and Knoz (1965).

Cnephia sp.

Material. — ALMERIA: Rioja 10 km N, 200—500 m, 1 ♀, 12 March 1966.

Remarks. — This *Cnephia* female is closely related to *C. tredecimata* Edwards, but seems to represent an undescribed species. However, in the genus *Cnephia* it is impossible to make a description on basis of a single female. The females are too alike and the variation within one and the same species is considerable.

Eusimulium latipes Meigen, 1804

Material. — GRANADA: N. slope Veleta, Sierra Nevada, 2400 m, 17 p 95 l, 25—30 July 1960 (J. R. Vockeroth).

Distribution. — Holarctic.

Remarks. — A species with a broad ecological range and probably three generations a year. The examined larvae differ from typical *E. latipes* in having more indistinct head markings and more expressed lateral and median teeth on the hypostomium. Number of primary rays of cephalic fan 33—45 against usually 40—50.

Wilhelmia mediterranea Puri, 1925

Material. — GRANADA: Barranco de Miranda 8 km SW Orgiva, 300 m, 10 ♀, 16—23 April 1966; Rio Guadalfeo, Orgiva, 300 m, 8 ♀, 3 April — 3 May 1966; Sierra de Contraviesa 5 km SE Orgiva, 500 m, 2 ♀, 18 April 1966; Rio Lanjaron near Lanjaron, 600 m, 1 ♀, 26 April 1966; Almunecar, 0—30 m, 50 ♂ 32 ♀ 19 p 12 l, 16—19 July 1960.

Distribution. — Mediterranean region.

Remarks. — This species shows a large degree of variability in most characters at all stages. This is also the case with the present material, especially in regard to the length, which varies between 2.6 and 3.7 mm. The hairs covering the abdomen are usually dense, but in some of the above recorded specimens they are sparse. The colour of the abdominal hairs varies from light golden (most common) to silvery.

Wilhelmia salopiensis Edwards, 1927

Material. — ALMERIA: Alhama 5 km W, 200—500 m, 2 ♀, 28 March 1966. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 1 ♂ 6 ♀, 7—19 April 1966.

Distribution: Europe.

Remarks. — Originally described from England where it appears in July-August. The species is probably complex. However, the examined material shows little variability. Differences from *W. mediterranea:* smaller; stripes of female thorax without anterior lighter spots; male genitalia different.

Schönbaueria sp.

Material. — GRANADA: Rio Lanjaron near Lanjaron, 600 m, 1 ♂, 28 April 1966.

Remarks. — This male is a typical *Schönbaueria* species with exception of the parameral hooks: these are 5 on each side against the usual 2. In other respects the male is like *Schönbaueria pusilla* Fries, 1824.

Odagmia ornata Meigen, 1818

Material. — GRANADA: Torrenueva E Motril, 0—50 m, 1 ♂, 17 April 1966; Barranco de Algarrobo 12 km SW Orgiva, 300 m, 25 April 1966; Barranco de Miranda 8 km SW Orgiva, 300 m, 3 ♀, 16—23 April 1966; Rio Guadalfeo, Orgiva, 300 m, 3 ♀, 3—11 April 1966; Sierra de Contraviesa 5 km SE Orgiva, 500 m, 1 ♀, 18 April 1966; Sierra Nevada near Padul, 1300 m, 1 ♀, 1 May 1966; Rio Lanjaron 9 km NW Orgiva, 1600 m, 1 ♀, 15 April 1966; Granada, 700 m, 3 ♂ ♀, 10—14 July 1960 (J. R. Vockeroth); Iznalloz, 1 ♂, 9 July 1960 (J. R. Vockeroth); Sierra Nevada Highway, 1650 m, 2 ♂, 27 July 1960 (J. R. Vockeroth); N. slope Veleta, Sierra Nevada, 2300—2550 m, 1 ♂, 22 July 1960 (J. R. Vockeroth); Almunecar, 0—30 m, 58 ♂ 37 ♀ 25 p 100 l, 16—17 July 1960 (J. R. Vockeroth).

Distribution. — Europe and possibly Siberia.

Remarks. — A widely distributed species which very often is mentioned in the literature. However, many of these records are wrong, and karyological investigations on what at the present is considered as *O. ornata* will probably divide the species into many siblings.

Odagmia monticola Friedrichs, 1920

Material. — GRANADA: Rio Lanjaron 9 km NW Orgiva, 1600

m, 2 ♀, 13—15 April 1966; N. slope Veleta, Sierra Nevada, 2400 m, 24 l, 26—30 July 1960 (J. R. Vockeroth).

Distribution. — Europe.

Remarks. — A typical mountain species which in its early stages prefers fast running rills and smaller streams. The species has recently been divided into many subspecies, some of which may be of specific value. The two recorded females agree in most "stable" characters with the true *O. monticola* (see Carlsson, 1963).

Odagmia variegata Meigen, 1818

Material. — GRANADA: N. slope Veleta, Sierra Nevada, 2200—2400 m, 3 ♂ 3 ♀, 25—30 July 1960 (V), (J. R. Vockeroth); Granada, 700 m, 26 l, 13 July 1960 (J. R. Vockeroth).

Distribution. — Europe with the exception of the northern parts.

Odagmia sp.

Material. — GRANADA: Barranco de Algarrobo 12 km SW Orgiva, 300 m, 1 ♀, 25 April 1966; Rio Guadalfeo, Orgiva, 300 m, 2 ♀, 3 & 18 April 1966; Sierra de Contraviesa 5 km SE Orgiva, 500 m, 1 ♀, 18 April 1966.

Remarks. — The four females recorded above belong to the genus *Odagmia* but have different thoracic markings compared with the *ornata*- and *monticola*-groups. They are generally duller and with three distinct stripes on the mesonotum. Of hitherto described *Odagmia* species they show some relationship with the *O. bimaculata*-group of Rubtzov (1964).

Tetisimulium bezzii Corti, 1916

Material. — GRANADA: Barranco de Miranda 8 km SW Orgiva, 300 m, 1 ♂, 20 April 1966; Granada, 700 m, 1 ♀, 14 July 1960 (V), (J. R. Vockeroth).

Distribution. — Mediterranean subregion.

Remarks. — The collected male is undoubtly *T. bezzii*. However, according to Grenier & Bertrand (1954) and Rubtzov (1964), the normal flying period for this species should be August.

The collection also contains further two males which have lost necessary parts for species-classification. One of the specimens seems to belong to the genus *Obuchovia* Rubtzov, 1956, the other is probably a *Simulium* (s. str.) species.

Summary

The study of the present small material of Simuliidae from Southern Spain seems to indicate that the black flies of Spain are still very poorly known. Twelve species are recorded. Three species (of the genera *Cnephia, Schönbaueria,* and *Odagmia*) are probably new to science, but will not be described due to lack of sufficient material. Two species of *Prosimulium* are new to Spain.

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Records of Tachinidae (incl. Rhinophorinae) and Oestridae (Diptera) from Southern Spain, with descriptions of two new species.

By
Benno Herting
Commonwealth Institute of Biological Control,
Delémont, Switzerland.

The material reported upon was partly collected in 1966 by Dr. Leif Lyneborg and his assistents of the Zoological Museum, Copenhagen, and by Dr. W. Hackman of the Zoological Museum, Helsinki, and partly in 1960 by Dr. J. R. Vockeroth, Entomology Research Institute, Ottawa.

Exorista segregata Rondani, 1859

Material. — GRANADA: Sierra Nevada near Padul, 1300 m, 1 ♀, 4 May 1966; N slope Veleta, Sierra Nevada, 2400 m, 1 ♀, 25 July 1960 (J. R. Vockeroth).

Distribution. — Mediterranean. Recorded from Spain by Stein (1924: 115) as *Tricholyga segregata* Rond.

Exorista rustica Fallén, 1810

Material. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 2 ♂, 3 May 1966.

Distribution. — Almost all parts of Europe. Recorded from Spain by Czerny & Strobl (1909: 213) as *Tachina rustica* Mg.

Spoggosia echinura Robineau-Desvoidy, 1830

Material. — GRANADA: Sierra de Contraviesa near Rabite, 1300 m, 1 ♂, 2 May 1966.

Distribution. — Central and southern Europe.

Spoggosia filipalpis Rondani, 1859

Material. — GRANADA: Salobreña 6 km W Motril, 0—50 m, 1 ♂, 24 April 1966; Barranco de Miranda 8 km SW Orgiva, 300 m, 3 ♂ 3 ♀, 16 and 23 April 1966; Sierra de Contraviesa 5 km SE Orgiva, 500 m, 2 ♂, 18 April 1966; Rambla de Aculas 10 km E Orgiva, 400 m, 2 ♂, 27 April 1966.

Distribution. — Southern Europe, local in warm and dry areas of central Europe. Recorded from Spain by Czerny & Strobl (1909: 214) as *Stomatomyia filipalpis* Rond.

Meigenia sp.

Material. — GRANADA: Rio Lanjaron near Lanjaron, 600 m, 1 ♀, 28 April 1966.

Remarks. —Probably, the specimen is either *M. mutabilis* Fallén, 1810 or *M. pilosa* Baranoff, 1927, the females of which cannot be identified. Both species are widely distributed in Europe. This species-complex is recorded from Spain by Czerny & Strobl (1909: 212) as *M. bisignata* Mg. and *M. floralis* Mg.

Picconia incurva Zetterstedt, 1844

Material. — ALMERIA: Tabernas, 200—500 m, 1 ♂, 12 April 1966 (W. Hackman).

Distribution. — Southern Europe and warmer localities in central Europe. Recorded from Spain by Czerny & Strobl (1909: 221) as *Thryptocera incurva* Zett.

Ligeria angusticornis Loew, 1847

Material. — ALMERIA: 8 km N Tabernas, 200—500 m, 1 ♀, 14 March 1966. — GRANADA: Barranco de Miranda 8 km SW Orgiva, 300 m, 1 ♂ 1 ♀, 20 April and 5 May 1966; Rio Guadalfeo, Orgiva, 300 m, 1 ♀, 3 April 1966; Sierra de Contraviesa near Rabite, 1300 m, 1 ♂ 1 ♀, 2 May 1966.

Distribution. — Europe except Scandinavia, more common in the south. Recorded from Spain by Czerny & Strobl (1909: 220) as *Anachaetopsis ocypterina* Zett.

Erynniopsis rondanii Townsend, 1926

Material. — GRANADA: Granada, 700 m, 1 ♀, 9 July 1960 (J. R. Vockeroth).

Distribution. — Southern Europe.

Compsilura concinnata Meigen, 1824

Material. — GRANADA: N slope Veleta, Sierra Nevada, 2200 m, 1 ♂, 30 July 1960 (J. R. Vockeroth).

Distribution. — Central and southern Europe. Recorded from Spain as a parasite of *Aglaope infausta* L. (Lep. Zygaenidae) by Benlloch & Cañizo (1934).

Gastrolepta anthracina Meigen, 1826

Material. — GRANADA: Barranco de Miranda 8 km SW Orgiva, 300 m, 1 ♂, 16 April 1966; Sierra de Contraviesa near Rabite, 1300 m, 1 ♂, 2 May 1966.

Distribution. — Central and southern Europe. Recorded from Spain by Czerny & Strobl (1909: 229) as *Morinia anthracina* Mg.

Myiothyria benoisti Mesnil, 1959

Material. — GRANADA: Barranco de Miranda 8 km SW Orgiva, 300 m, 2 ♀, 16 and 20 April 1966.

Distribution. — The species was described from Morocco, and has also been found as a parasite of grasshoppers by Mr. J. C. Léonide in southern France. Czerny & Strobl (1909: 225) have recorded from Spain (Alicante and Escorial) a so-called variety of *Acemyia acuticornis* Meigen, which in the opinion of Villeneuve was a distinct species. The characters mentioned agree with *M. benoisti*.

Ethilla bisetosa Brauer & Bergenstamm, 1891

Material. — GRANADA: Sierra de Contraviesa near Rabite, 1300 m, 1 ♀, 2 May 1966.

Distribution. — Southern Europe and warmer areas of central Europe.

Atylomyia loewi Brauer, 1898

Material. — ALMERIA: Cabo de Gata, 0—50 m, 1 ♂, 26 March 1966; 5 km W Alhama, 200—500 m, 1 ♂, 28 March 1966.

Distribution. — Southern Europe and warmer areas of central Europe. Recorded from Spain by Czerny & Strobl (1909: 222).

Nemorilla maculosa Meigen, 1824

Material. — GRANADA: Torrenueva E Motril, 0—50 m, 3 ♂, 12 and 17 April 1966; Salobreña 6 km W Motril, 0—50 m, 1 ♂, 24 April 1966; Sierra de Contraviesa 5 km SE Orgiva, 500 m, 1 ♀, 18 April 1966.

Distribution. — Central and southern Europe. Recorded from Spain by Czerny & Strobl (1909: 213).

Aplomyia confinis Fallén, 1820

Material. — ALMERIA: 5 km W Alhama, 200—500 m, 2 ♀, 19 and 21 March 1966. — GRANADA: Rio Lanjaron 9 km NW Orgiva, 1600 m, 1 ♀, 7 May 1966; Maitena, 900 m, 11 July 1960 (J. R. Vockeroth).

Distribution. — Almost all parts of Europe. Recorded from Spain by Strobl (1906: 336) as *Exorista confinis* Fall.

Phryxe vulgaris Fallén, 1810

Material. — GRANADA: Rio Sucio 5 km NW Orgiva, 700 m, 1 ♂, 3 April 1966.

Distribution. — Almost everywhere in Europe.

Ceratochaetops triseta Villeneuve, 1922

Material. — GRANADA: Rio Lanjaron 9 km NW Orgiva, 1600 m, 2 ♂, 6 April and 7 May 1966.

Distribution. — Southern Europe, rare. New for Spain.

Drino inconspicua Meigen, 1830

Material. — GRANADA: Granada, 700 m, 1 ♂, 9 July 1960 (J. R. Vockeroth).

Distribution. — Central and southern Europe. Recorded from Spain as a parasite of *Diprion pini* L. by Ceballos & Zarco (1952).

Carcelia lucorum Meigen, 1824

Material. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 1 ♀, 5 April 1966.

Distribution. — Central and southern Europe. Recorded from Spain by Strobl (1906: 336) as *Exorista cheloniae* Rond.

Zenillia pullata Meigen, 1824

Material. — GRANADA: Baranco de Miranda 8 km SW Orgiva, 300 m, 2 ♂, 20 April 1966; Sierra de Contraviesa near Rabite, 1300 m, 1 ♂, 2 May 1966.

Distribution. — Central and southern Europe. Recorded from Spain by Czerny & Strobl (1909: 213) as *Phorocera (Tritochaeta) pullata* Mg.

Pales pavida Meigen, 1824

Material. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 3 ♂

1 ♀, 5—19 April 1966; Rio Lanjaron near Lanjaron, 600 m, 1 ♂, 28 April 1966.

Distribution. — Almost all parts of Europe. Recorded from Spain by Czerny & Strobl (1909: 213) as *Phorocera pavida* Mg.

Gonia ornata Meigen, 1826

Material. — GRANADA: Rio Lanjaron 9 km NW Orgiva, 1600 m, 6 ♂ 1 ♀, 22 April and 7 May 1966.

Distribution. — Central and southern Europe. Recorded from Spain by Czerny & Strobl (1909: 214).

Gonia cilipeda Rondani, 1859

Material. — ALMERIA: Pechina, 50—200 m, 1 ♀, 5 March 1966; Rio Andarax, Fondón, 600 m, 1 ♀, 18 March 1966; Cabo de Gata, 0—50 m, 1 ♀, 26 March 1966. GRANADA: Torrenueva E Motril, 0—50 m, 1 ♀, 17 April 1966; Rio Guadalfeo, Orgiva, 300 m, 2 ♀, 4 and 14 April 1966.

Distribution. — Localities with extreme Mediterranean climate. Recorded from Spain by Strobl (1899: 213).

Spallanzania alpestris Rondani, 1861

Material. — GRANADA: Barranco de Miranda 8 km SW Orgiva, 300 m, 3 ♂, 16 and 21 April 1966; Rio Lanjaron near Lanjaron, 600 m, 1 ♂, 28 April 1966.

Distribution. — Southern Europe. Recorded from Spain by Mesnil (1944f: 552).

Spallanzania ? multisetosa Rondani, 1861

Material. — GRANADA: N slope Veleta, Sierra Nevada, 2200 m, 1 ♂, 30 July 1960 (J. R. Vockeroth).

Remarks. — The specimen agrees in the chaetotaxy and pruinosity of the abdomen with the typical *multisetosa Rond.* from Italy, but the third antennal joint is longer than the second.

Baumhaueria goniaeformis Meigen, 1824.

Material. — GRANADA: Rio Mulhacén 5 km N Capileira, 1500 m, 1 ♀, 9 April 1966.

Distribution. — Southern and central Europe. Recorded from Spain by Czerny & Strobl (1909: 214).

Rhacodineura pallipes Fallén, 1820

Material. — ALMERIA: 5 km W Alhama, 200—500 m, 1 ♂, 17 March 1966.

Distribution. — Almost all parts of Europe. Recorded from Spain by Strobl (1899: 213) as *Roeselia antiqua* Mg.

Echinomyia fera Linnaeus, 1758

Material. — GRANADA: Barranco de Miranda 8 km SW Orgiva, 300 m, 1 ♂ 1 ♀, 16 April 1966; Rio Guadalfeo, Orgiva, 300 m, 1 ♀, 21 April 1966.

Distribution. — Almost all parts of Europe. Recorded from Spain by Strobl (1906: 339).

Echinomyia magnicornis Zetterstedt, 1844

Material. — ALMERIA: 5 km W Alhama, 200—500 m, 3 ♂, 17—19 March 1966. — GRANADA: Barranco de Miranda 8 km SW Orgiva, 300 m, 8 ♂, 16 and 21 April 1966; Rio Guadalfeo, Orgiva, 300 m, 1 ♂, 18 April 1966; Rio Lanjaron near Lanjaron, 600 m, 2 ♂, 26 April 1966; Rio Lanjaron 9 km NW Orgiva, 1600 m, 1 ♂ 1 ♀, 15 April and 7 May 1966; Sierra Nevada near Padul, 1300 m, 2 ♀, 4 May 1966.

Distribution. — Europe except the British Isles. Recorded from Spain by Strobl (1906: 339).

Echinomyia lurida Fabricius, 1781

Material. — GRANADA: Rio Lanjaron 9 km NW Orgiva, 1600 m, 2 ♂, 15 April 1966.

Distribution. — Europe except Scandinavia.

Peletieria nigricornis Meigen, 1838

Material. — ALMERIA: Cabo de Gata, 0—50 m, 1 ♂ 2 ♀, 24 March 1966 (W. Hackman). — GRANADA: Torrenueva E Motril, 0—50 m, 2 ♂, 10 April 1966; Barranco de Miranda 8 km SW Orgiva, 300 m, 8 ♂ 1 ♀, 16—23 April 1966; Rio Guadalfeo, Orgiva, 300 m, 7 ♀, 2—19 April and 3 May 1966; Rambla de Aculas 10 km E Orgiva, 400 m, 1 ♂, 27 April 1966; Rio Lanjaron near Lanjaron, 600 m, 3 ♂ 1 ♀, 26—28 April 1966; Rio Lanjaron 9 km NW Orgiva, 1600 m, 1 ♂ 2 ♀, 6 April—7 May 1966; Rio Mulhacén 5 km N Capileira, 1500 m, 1 ♀, 9 April 1966; Sierra Nevada near Padul, 1300 m, 1 ♂ 1 ♀, 4 May 1966.

Distribution. — Southern Europe, warm and dry localities in central and even northern Europe. Recorded from Spain by Strobl (1906: 339) as *Echinomyia tessellata* Fbr.

Linnaemyia soror Zimin, 1954

Material. — GRANADA: Torrenueva E Motril, 0—50 m, 2 ♂ 2 ♀, 10—14 April 1966; Sierra de Contraviesa 5 km SE Orgiva, 500 m, 1 ♀, 18 April 1966.

Distribution. — Localities with extreme Mediterranean climate.

Ernestia castellana Strobl, 1906

Material. — GRANADA: Rio Mulhacén 5 km N Capileira, 1500 m, 1 ♀, 9 April 1966.

Distribution. — Described from Spain (Strobl, 1906: 338) as *Erigone castellana* n. sp.

Gymnochaeta viridis Fallén, 1810

Material. — GRANADA: Rio Lanjaron 9 km NW Orgiva, 1600 m, 4 ♂ 1 ♀, 22 April and 7 May 1966.

Distribution. — Almost all parts of Europe. Recorded from Spain by Czerny & Strobl (1909: 212).

Zophomyia temula Scopoli, 1763

Material. — GRANADA: Rio Lanjaron near Lanjaron, 600 m, 1 ♀, 28 April 1966.

Distribution. — Almost all parts of Europe. Recorded from Spain by Czerny & Strobl (1909: 212).

Macquartia brevicornis Macquart, 1838

Material. — ALMERIA: 8 km N Tabernas, 200—500 m, 7 ♂, 14 March 1966; 5 km W Alhama, 200—500 m, 2 ♂, 21 March 1966. — GRANADA: 4 km E Orgiva, 300 m, 1 ♀, 15 March 1966; Barranco de Miranda 8 km SW Orgiva, 300 m, 7 ♂, 16 April to 5 May 1966; Sierra de Contraviesa near Rabite, 1300 m, 4 ♂, 8 April and 2 May 1966; Rio Lanjaron near Lanjaron, 600 m, 1 ♂, 26 April 1966; Rio Sucio 5 km NW Orgiva, 700 m, 3 ♂, 3 April 1966; Rio Lanjaron 9 km NW Orgiva, 1600 m, 1 ♂, 22 April 1966; N slope Veleta, Sierra Nevada, 2200 and 2550 m, 2 ♀, 30 July 1960 (J. R. Vockeroth).

Distribution. — Southern Europe, local in warm areas of central Europe. Recorded from Spain by Strobl (1899: 213) as *Macquartia occlusa* Rond.

Macquartia chalconota Meigen, 1824

Material. — GRANADA: Barranco de Miranda 8 km SW Orgiva, 300 m, 3 ♂ 2 ♀, 16 and 20 April 1966; Rio Guadalfeo, Orgiva,

300 m, 8 ♂ 10 ♀, 2—21 April 1966; Rio Sucio 5 km NW Orgiva, 700 m, 1 ♂, 3 April 1966; Rio Lanjaron 9 km NW Orgiva, 1600 m, 3 ♀, 15 April and 7 May 1966.

Distribution. — Warmer parts of Europe, more common in the south. Recorded from Spain by Strobl (1906: 337).

Macquartia tenebricosa Meigen, 1824

Material. — GRANADA: Rio Lanjaron near Lanjaron, 600 m, 1 ♀, 28 April 1966.

Distribution. — Almost all parts of Europe. Recorded from Spain by Czerny & Strobl (1909: 215) as *Macquartia chalconota* Mg. var. *nitida* Zett.

Macquartia dispar Fallén, 1820

Material. — GRANADA: Barranco de Miranda 8 km SW Orgiva, 300 m, 2 ♂, 20 April 1966; Rio Guadalfeo, Orgiva, 300 m, 1 ♀, 4 April 1966; Rio Lanjaron near Lanjaron, 600 m, 1 ♀, 28 April 1966.

Distribution. — Most parts of Europe.

Macquartia viridana Robineau-Desvoidy, 1863

Material. — GRANADA: Rio Lanjaron 9 km NW Orgiva, 1600 m, 7 ♂ 2 ♀, 15—22 April and 7 May 1966.

Distribution. — Southern and central Europe including southern England.

Remarks. — Described by Strobl (in Czerny & Strobl, 1909: 214) from Spain as *Macquartia maculifemur* n. sp. In another paper (Herting, 1968) the author has shown that *M. maculifemur* Strobl is only a melanic form of *M. flavipes* auct. (nec Meigen), the valid name of which is *M. viridana* R. D. (nov. syn.).

Macquartia praefica Meigen, 1824

Material. — GRANADA: Sierra de Contraviesa 5 km SE Orgiva, 500 m, 1 ♀, 18 April 1966.

Distribution. — Central and southern Europe.

Digonochaeta setipennis Fallén, 1810

Material. — GRANADA: Barranco de Miranda 8 km SW Orgiva, 300 m, 1 ♀, 5 May 1966; Rio Guadalfeo, Orgiva, 300 m, 1 ♂, 30 April 1966; Rio Lanjaron 9 km NW Orgiva, 1600 m, 1 ♂, 7 May 1966.

Distribution. — Almost all parts of Europe.

Remarks. — The male from 1600 m has black palps, the other specimens yellow ones. The number of presutural dorsocentral bristles varies from two to three as it often does in this species. It may be different on the two sides of the same specimen.

Heraultia albipennis Villeneuve, 1920

Material. — GRANADA: Rio Lanjaron near Lanjaron, 600 m, 3 ♀, 28 April 1966.

Distribution. — Recorded only from the Mediterranean part of France. New to Spain.

Graphogaster andalusiaca Strobl, 1909

Material. — ALMERIA: Almeria, 0—50 m, 2 ♂, 4—10 March 1966; Albufera, 0—50 m, 2 ♂, 29 March 1966; 10 km N Rioja, 200—500 m, 1 ♂, 12 March 1966; 5 km W Alhama, 200—500 m, 1 ♀, 21 March 1966. — GRANADA: Torrenueva E Motril, 0—50 m, 1 ♂ 1 ♀, 14 and 17 April 1966; Barranco de Algarrobo 12 km SW Orgiva, 300 m, 1 ♀, 25 April 1966; Barranco de Miranda 8 km SW Orgiva, 300 m, 1 ♂, 23 April 1966; Rio Guadalfeo, Orgiva, 300 m, 1 ♂ 1 ♀, 18—19 April 1966; Rio Lanjaron near Lanjaron, 600 m, 1 ♂, 26 April 1966; Sierra Nevada Highway, 900 m, 1 ♀, 27 July 1960 (J. R. Vockeroth).

Distribution. — Spain (Strobl & Czerny, 1909: 223).

Remarks. — *G. andalusiaca* is possibly only a geographic race of the Italian *G. vestita* Rondani, as suggested by Strobl. *G. vestita* was described from a single male, and I have not seen material from the terra typica. Specimens collected by Prof. J. de Beaumont at Mazzara, Sicily, differ from *andalusiaca* in the length of the third antennal joint and especially in the pruinosity of the female abdomen.

Siphona geniculata Degeer, 1776

Material. — GRANADA: Barranco de Algarrobo 12 km SW Orgiva, 300 m, 1 ♀, 25 April 1966; Pampineira, 900 m, 1 ♀, 9 April 1966; Granada, 700 m, 1 ♀, 14 July 1960 (J. R. Vockeroth); N slope Veleta, Sierra Nevada, 2300—2550 m, 1 ♀, 22 July 1960 (J. R. Vockeroth); Sierra Nevada Highway, 900 m, 1 ♀, 27 July 1960 (J. R. Vockeroth).

Distribution. — Almost all parts of Europe. Recorded from Spain by Strobl (1899: 213).

Siphona confusa Mesnil, 1961

Material. — ALMERIA: Almeria, Alcazaba, 0—50 m, 1 ♀, 21 April 1966 (W. Hackman); Pechina, 50—200 m, 1 ♂ 6 ♀, 5—9 March 1966; Rioja, 50—200 m, 1 ♂ 4 ♀, 7—25 March 1966; 10 km N Rioja, 200—500 m, 1 ♀, 12 March 1966; 8 km N Tabernas, 200—500 m, 1 ♀, 14 March 1966; Alhama, 200—500 m, 3 ♀, 22 March 1966; 5 km W Alhama, 200—500 m, 1 ♂, 21 March 1966. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 1 ♂, 19 April 1966; Rio Lanjaron near Lanjaron, 600 m, 1 ♂, 26 April 1966; Rio Sucio 5 km NW Orgiva, 700 m, 1 ♀, 3 April 1966.

Distribution. — Northern and central Europe. New to Spain.

Siphona rossica Mesnil, 1961

Material. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 4 ♂ 3 ♀, 2—11 April and 3 May 1966; Rio Lanjaron near Lanjaron, 600 m, 1 ♀, 26 April 1966.

Distribution. — Described from the Leningrad area. I have seen specimens from southern Sweden and found it once near Visp in the Swiss Valais. New to Spain.

Strobliomyia apicalis Robineau-Desvoidy, 1863

Material. — GRANADA: N slope Veleta, Sierra Nevada, 2300—2550 m, 1 ♂, 22 July 1960 (J. R. Vockeroth).

Distribution. — Central and southern Europe. New to Spain.

Remarks. — This species has only recently been recognized as distinct from the closely related *S. tibialis* R.D. (Herting, 1968).

Aphria longirostris Meigen, 1824

Material. — GRANADA: Barranco de Miranda 8 km SW Orgiva, 300 m, 1 ♂, 23 April 1966; Sierra de Contraviesa near Rabite, 1300 m, 1 ♀, 2 May 1966; Rambla de Aculas 10 km NE Orgiva, 400 m, 1 ♂, 27 April 1966; Sierra Nevada near Padul, 1300 m, 1 ♀, 1 May 1966; N slope Veleta, Sierra Nevada, 2400 m, 1 ♂, 25 July 1960 (J. R. Vockeroth).

Distribution. — Central and southern Europe.

Mintho rufiventris Fallén, 1816

Material. — GRANADA: Barranco de Miranda 8 km SW Orgiva, 300 m, 2 ♂ 1 ♀, 20—23 April 1966; Rambla de Aculas, 10 km E Orgiva, 1 ♂, 27 April 1966.

Distribution. — Almost all parts of Europe, in rocky places and

near houses. Recorded from Spain by Strobl (1906: 337) as *Mintho lacera* Rond.

Billaea biserialis Portshinskii, 1882

Material. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 2 ♂, 2 and 19 April 1966.

Distribution. — Southern Russia, Persia, Palestine, Turkey, Rhodes. Recorded from Spain by Czerny & Strobl (1909: 233) as *Myxodexia macronychia* B.B.

Rhamphina longirostris Strobl, 1909

Material. — GRANADA: Torrenueva E Motril, 0—50 m, 1 ♂, 17 April 1966; Mecina Bombarón, 800 m, 1 ♂, 8 May 1966.

Distribution. — Described as a new species, *Czernya longirostris,* from Spain by Strobl (in Czerny & Strobl, 1909: 217).

Wagneria alpina Villeneuve, 1910

Material. — GRANADA: N slope Veleta, Sierra Nevada, 2400 m, 1 ♀, 25 July 1960 (J. R. Vockeroth).

Distribution. — Recorded so far from the Alps and Lappland. New to Spain.

Wagneria cunctans Meigen, 1824

Material. — GRANADA: Rio Lanjaron 9 km NW Orgiva, 1600 m, 1 ♂ 1 ♀, 15 April and 7 May 1966.

Distribution. — Southern Europe, rare in warm and dry localities in central Europe. Recorded from Spain by Czerny & Strobl (1909: 220) as *Phorichaeta lacrimans* Rond.

Wagneria nigrans Meigen, 1826

Material. — GRANADA: Rio Mulhacén 5 km N Capileira, 1500 m, 2 ♂, 9 April 1966.

Distribution. — Stony or sandy localities in various parts of Europe. Recorded from Spain by Strobl (1906: 345) as *Scopolia carbonaria* Pz. var. *fuliginaria* Rond.

Wagneria prunicia n. sp.

Material. — ALMERIA: Tabernas, 200—500 m, 1 ♂, 14 March 1966 (W. Hackman); Alhama, 200—500 m, 1 ♂, 22 March 1966; 5 km W Alhama, 200—500 m, 1 ♀, 17 March 1966. — GRANADA: Sierra de Contraviesa near Rabite, 1300 m, 8 ♂, 8 April and 2 May 1966; Rio Lanjaron near Lanjaron, 600 m, 1 ♂, 28 April 1966; Rio Lanjaron 9 km NW Orgiva, 1600 m, 3 ♀, 15 April to

7 May 1966; Rio Chico 8 km NE Orgiva, 1800 m, 1 ♂, 7 April 1966; Rio Mulhacén 5 km N Capileira, 1500 m, 2 ♀, 9 April 1966.

Description. — The new species is very similar to *Wagneria prunaria* Rondani (*carbonaria* Meigen nec Panzer) and differs only in a few characters as follows:

Hind tibia with only two dorsal apical spurs. Height of peristome slightly more than one half of the vertical diameter of the eye. Frontal band not narrower than the parafrontalia. Third antennal joint of female at least three times as long as the second joint. First radial vein of the wing bare (typical form) or bristled ..... *prunicia* n. sp.

Hind tibia with three dorsal apical spurs. Peristome narrower than one half of the diameter of the eye. Frontal band behind lunula considerably narrower than the parafrontalia. Third antennal joint of female not much over two times as long as the second joint. First radial vein bristled ..... *prunaria* Rond.

Holotype of *prunicia* (♂) from the Sierra de Contraviesa near Rabite, 8 April 1966, in the collection of the Zoological Museum, Copenhagen.

Remarks. — I have found several specimens of *W. prunicia* in a pine forest near Sierre (Swiss Valais), 14 and 17 May 1963. This Swiss population has, as a rule, the first radial vein bristled, but in one male collected at the same time and place, it is bare as it is in all the Spanish specimens.

Wagneria schnabli Brauer & Bergenstamm, 1891

Material. — GRANADA: Rio Lanjaron 9 km NW Orgiva, 1600 m, 1 ♂, 22 April 1966.

Distribution. — Brauer & Bergenstamm (1891: 356) mention Poland and Fiume as localities, but only the specimen from Fiume (Rijeka), which I have designated as lectotype, is present in the collection of the Vienna museum. *Periscepsia pyrenaica* Mesnil (1963: 50) from the French Pyrenees is the same species (nov. syn.).

Voria ruralis Fallén, 1810

Material. — GRANADA: Rio Lanjaron near Lanjaron, 600 m, 1 ♂, 26 April 1966.

Distribution. — Almost all parts of Europe. Recorded from Spain by Strobl (1899: 213) as *Plagia ruralis* Fall.

Cyrtophleba ruricola Meigen, 1824

Material. — GRANADA: Barranco de Miranda 8 km SW Orgiva, 300 m, 1 ♂, 21 April 1966; Rio Guadalfeo, Orgiva, 300 m, 1 ♂, 4 April 1966; Rambla de Aculas 10 km E Orgiva, 400 m, 1 ♂, 27 April 1966.

Distribution. — Southern and central Europe. Recorded from Spain by Czerny & Strobl (1909: 220).

Nanoplagia hilfi Strobl, 1902

Material. — GRANADA: Torrenueva E Motril, 0—50 m, 1 ♀, 12 April 1966.

Distribution. — Macedonia, Algeria, Morocco. New to Spain.

Dufouria nigrita Fallén, 1810

Material. — GRANADA: Barranco de Algarrobo 12 km SW Orgiva, 300 m, 1 ♀, 25 April 1966.

Distribution. — Most parts of Europe. Recorded from Spain by Strobl (1906: 337) as *Macquartia nigrita* Fall.

Rondania rubens n. sp.

Material. — GRANADA: Barranco de Miranda 8 km SW Orgiva, 300 m, 1 ♂ holotype, 20 April 1966. In Zoological Museum, Copenhagen.

Description. — This species is closely related to *Rondania fasciata* Macquart (*Graphogaster* auct.). The differences are as follows:

Antennae, palps and halteres yellow, calyptrae pale-brown. Abdomen reddish-yellow, each segment with a mediodorsal black spot which occupies the posterior half and is narrower than 1/3 of the width of the abdomen. Wing: Bend of median vein not much rounded, apical cross-vein straight and joining r_{4+5} at the right angle ..... *rubens* n.sp.

Antennae black; palps, halteres and calyptrae very dark brown. Abdomen reddish-yellow, each segment on hind margin with a black band which in the median line extends forwards over the entire length of the segment. Bend of median vein very broadly rounded so that only the tip of the apical cross-vein is straight and rectangular on r_{4+5} ..... *fasciata* Macq. ♂

The male of *rubens* shows the same coloration of antennae, palps, halteres and calyptrae as the female of *fasciata;* it is gynecomorph in these characters. The conspicuous black markings of

the abdomen, present in both sexes of *fasciata,* are much reduced in *rubens.* In structural characters both species are almost identical.

Pandelleia sexpunctata Pandellé, 1896

Material. — GRANADA: N slope Veleta, Sierra Nevada, 2500 m, 1 ♂ 1 ♀, 25 and 30 July 1960 (J. R. Vockeroth).

Distribution. — Recorded from the Pyrenees, the Saar and Thuringia.

Heliozeta pellucens Fallén, 1820

Material. — GRANADA: Rambla de Aculas 10 km E Orgiva, 400 m, 1 ♂, 27 April 1966.

Distribution. — Most parts of Europe.

Phasia (Clytiophasia) mesnili Kugler, 1968

Material. — GRANADA: Sierra de Contraviesa near Rabite, 1300 m, 1 ♂, 2 May 1966.

Distribution. — Described from Israel. New to Spain.

Phasia oblonga Robineau-Desvoidy, 1830

Material. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 1 ♂, 14 April 1966.

Distribution. — Southern Europe and warmer localities of central Europe.

Remarks. — This species has been confused with *P. crassipennis* Fabricius until Dupuis (1963: 112, under the name *Ectophasia rubra* Girschner) has shown its separate status and its distinctive characters. The specimen from Orgiva is a typical big male with entirely red abdomen.

Gymnosoma rotundatum Linnaeus, 1758

Material. — GRANADA: Rio Lanjaron near Lanjaron, 600 m, 1 ♂, 28 April 1966.

Distribution. — Most parts of Europe. Recorded from Spain by Strobl (1906: 340), but this record may include also the two following species which have only recently been recognized as distinct from *rotundatum.*

Gymnosoma verbekei Mesnil, 1952

Material. — GRANADA: Barranco de Miranda 8 km SW Orgiva, 300 m, 1 ♂, 16 April 1966; Sierra de Contraviesa near Rabite, 1300 m, 1 ♂, 8 April 1966; Maitena, 900 m, 1 ♀, 11 July 1960 (J. R. Vockeroth).

Distribution. — Southern and central Europe including southern Scandinavia.

Gymnosoma inornatum Zimin, 1966

Material. — ALMERIA: 5 km W Alhama, 200—500 m, 1 ♂, 28 March 1966.

Distribution. — Described from the southern zone of the U.S.S.R. I have found it in the Tessin (southern Switzerland). New to Spain.

Gymnosoma nitens Meigen, 1824

Material. — GRANADA: Granada, 700 m, 1 ♂ 1 ♀, 10 and 13 July 1960 (J. R. Vockeroth).

Distribution. — Southern Europe and drier areas of central Europe. Recorded from Spain by Czerny & Strobl (1909: 222) as *Stylogymnomyia nitens* Mg.

Alophora pusilla Meigen, 1824

Material. — ALMERIA: 5 km W Alhama, 200—500 m, 1 ♂, 21 March 1966.

Distribution. — Most parts of Europe. Recorded from Spain by Strobl (1899: 217).

Leucostoma sp.

Material. — GRANADA: Salobreña 6 km W Motril, 0—50 m, 1 ♂, 24 April 1966.

Remarks. — This small specimen is similar to, or conspecific with, *Leucostoma engeddense* Kugler from Palestine. No material of the latter was available for comparison, so the question of identity remains open.

Labigaster forcipata Meigen, 1824

Material. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 1 ♀, 4 April 1966.

Distribution. — Southern Europe and warmer localities in central Europe.

Clairvillia biguttata Meigen, 1824

Material. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 1 ♀, 3 April 1966.

Distribution. — Southern Europe and locally in warm and dry areas in central Europe.

Cylindromyia brassicaria Fabricius, 1775

Material. — GRANADA: Barranco de Miranda 8 km SW Orgiva,

300 m, 1 ♂, 23 April 1966; N slope Veleta, Sierra Nevada, 2400 m, 1 ♂, 25 July 1960 (J. R. Vockeroth).

Distribution. — Central and southern Europe. Recorded from Spain by Strobl (1906: 337) as *Ocyptera brassicaria* Fbr.

Cylindromyia brevicornis Loew, 1844

Material. — GRANADA: N slope Veleta, Sierra Nevada, 2550 m, 1 ♂, 20 July 1960 (J. R. Vockeroth).

Distribution. — Southern Europe.

Cylindromyia bicolor Olivier, 1811

Material. — GRANADA: Granada, 700 m, 1 ♂, 14 July 1960 (J. R. Vockeroth).

Distribution. — Southern Europe. Recorded from Spain by Czerny & Strobl (1909: 216) as *Ocyptera bicolor* Ol.

Cylindromyia intermedia Meigen, 1824

Material. — ALMERIA: Almeria, 0—50 m, 1 ♂, 1—10 April 1966 (W. Hackman); 5 km W Alhama, 200—500 m, 2 ♂ 1 ♀, 17 and 19 March 1966.

Distribution. — Southern Europe, local in warm and dry places in central Europe. Recorded from Spain by Strobl (1906: 337) as *Ocyptera excisa* Loew.

Cylindromyia rufipes Meigen, 1824

Material. — CADIZ: La Linea, 1 ♂, 2 August 1960 (J. R. Vockeroth).

Distribution. — Southern Europe, restricted to a typical Mediterranean climate. Recorded from Spain by Strobl (1906: 337) as *Ocyptera rufipes* Mg.

Cylindromyia pusilla Meigen, 1824

Material. — GRANADA: Pinus Puente 15 km NW GRANADA, 500—1000 m, 1 ♂, 27 April 1966; Granada, 700 m, 2 ♂, 15 July 1960 (J. R. Vockeroth).

Distribution. — Europe except for the northwestern and arctic regions. Recorded from Spain by Strobl (1906: 337) as *Ocypterula pusilla* Mg.

Besseria anthophila Loew, 1871

Material. — GRANADA: Torrenueva E Motril, 0—50 m, 3 ♂, 14 and 17 April 1966; Barranco de Miranda 8 km SW Orgiva, 300 m, 1 ♂, 23 April 1966.

Distribution. — Southern Europe, rarely found in warm and dry localities in central Europe.

RHINOPHORINAE

Hoplisa aterrima Strobl, 1899

Material. — ALMERIA: 5 km W Alhama, 200—500 m, 12 ♂ 4 ♀, 17—28 March 1966; Rio Andarax, Fondón, 200—500 m, 18 March 1966. — GRANADA: Barranco de Algarrobo 12 km SW Orgiva, 300 m, 1 ♂, 25 April 1966; Barranco de Miranda 8 km SW Orgiva, 300 m, 2 ♂ 3 ♀, 16 April 1966; Rio Guadalfeo, Orgiva, 300 m, 6 ♂ 3 ♀, 4—19 April 1966; Rio Lanjaron near Lanjaron, 600 m, 3 ♂ 2 ♀, 26 and 28 April 1966; Rio Sucio 5 km NW Orgiva, 700 m, 1 ♂, 3 April 1966; Pinus Puente 15 km NW Granada, 500—1000 m, 1 ♂, 27 April 1966.

Distribution. — Described from southern Spain by Strobl (1899: 215) as a new species, *Melanomelia aterrima*.

Phyto melanocephala Meigen, 1824

Material. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 10 ♂ 1 ♀, 3—21 April 1966.

Distribution. — Most parts of Europe. Recorded from Spain by Czerny & Strobl (1909: 224).

Phyto discrepans Pandellé, 1896

Material. — ALMERIA: El Alquian, 0—50 m, 1 ♂, 3 March 1966.

Distribution. — Southwestern France to Morocco. Recorded from Spain by Czerny & Strobl (1909: 224).

Melanophora roralis Linnaeus, 1758

Material. — ALMERIA: Rioja, 50—200 m, 1 ♀, 15 April 1966 (W. Hackman).

Distribution. — Almost all parts of Europe, often around houses and in gardens. Recorded from Spain by Czerny & Strobl (1909: 225).

OESTRIDAE

Oestrus ovis Linnaeus, 1758

Material. — GRANADA: Rio Lanjaron near Lanjaron, 600 m, 1 ♂, 26 April 1966.

Distribution. — Most parts of Europe.

Summary

Eighty-five species of Tachinidae (incl. Rhinophorinae) and one species of Oestridae are recorded from southern Spain (predominantly from the provinces Almeria and Granada) based on collections made in 1960 and 1966. Two species are described as new: *Wagneria prunicia* and *Rondania rubens*. Two new synonyms are established, and at least nine species are recorded from Spain for the first time.

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(Noona Dan Papers No. 85.)

Les Ephéméroptères récoltés par la mission danoise du Noona Dan aux îles Philippines et Bismarck.

Par
Georges Demoulin
Institut royal des Sciences naturelles de Belgique.

Les Ephéméroptères vivant dans les régions explorées par la Noona Dan Expédition (Petersen, 1966; Wolff, 1966) sont encore fort peu inventoriés. Laissant de côté les descriptions occasionnelles et souvent insuffisantes dues à L. Navas, je ne connais guère que les données récentes de W. L. Peters (1967) sur les Prosopistomatidae.

Les autres familles d'Ephéméroptères récoltées par la mission danoise sont au nombre de trois et cosmopolites; mais elles sont représentées par des formes mal connues, voire inédites. Je remercie très vivement M. le Dr. B. Petersen (Copenhague) qui m'a aimablement fourni l'occasion d'étudier ces nouveautés et de les faire connaître.

Famille **BAETIDAE**

Ainsi que je l'ai déjà signalé incidemment à plusieurs reprises, les caractères génériques des Baetidae attendent une revision sérieuse. L'attribution des espèces décrites ci-dessous à tel ou tel genre est donc provisoire, et ce d'autant plus que — dans la plupart des cas — seules les larves sont connues.

Genre **Baetis** Leach

Comme je l'ai indiqué en 1964 et 1965, je placerai dans le genre *Baetis* les larves à lamelles trachéobranchiales simples et à mandibules dépourvues d'une frange de cils entre les canines et la mola. A ces caractères, j'ajouterai la présence d'un paracerque.

En principe, les adultes des *Baetis* possèdent des ailes postérieures, mais on connaît déjà au moins un cas (dans le sous-genre

Acentrella) où le ♂ est «diptère». Comme on le verra ci-dessous, l'absence d'ailes postérieures dans ce genre n'est pas unique.

Baetis sp. 1 (Fig. 1)

Archipel Bismarck, NEW BRITAIN: Yalom, St. 16, small river, 1000 m, 2.V.1962, 5 larves; même localité, mais St. 26, ditch, 15.V. 1962, 12 larves et larvules; Komgi, St. 19, brook in rainforest, 14.V.1962, 3 larves; Vaisisi, St. 83, 9.VII.1962, 2 larves. — MUSSAU: Lake Taletasi, St. 31, 140 m, 6.VI.1962, 1 larve.

Description. Larve. Détails anatomiques: fig. 1. Le paracerque semble subégal aux cerques. Il n'y a ni ptérothèques II ni trachéobranchies I.

Coloration générale blanchâtre. Tête (régions frontale et occipitale) et tergites thoraciques légèrement brunâtres. Tergites abdominaux concolores, avec parfois une légère touche de brunâtre clair sur les urites II—IV et VI—VII. Chez la larve ♂ mature, les futurs yeux en turban montrent une coloration brun orange.

Longueur du corps (larve mature ♀): env. 7 mm (sans les cerques).

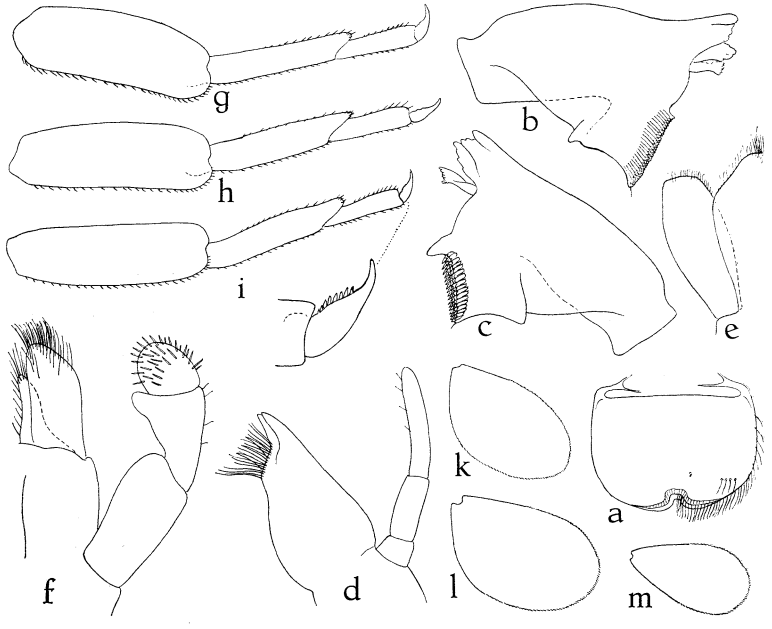


Fig. 1. — *Baetis* sp. 1, larve. (a—f) Labre, mandibules droite et gauche, maxille, hypopharynx, labium; × 25; (g—i) Pattes I, II, III; × 20; (k—m) Trachéobranchies II, IV, VII; × 20.

Remarque. L'absence de ptérothèques II tendrait à faire placer cette espèce dans le genre *Pseudocloeon,* mais le développement du paracerque s'y oppose et la structure du palpe labial est bien du type *Baetis* banal.

Baetis sp. 2 (Fig. 2)

Archipel Bismarck, NEW BRITAIN: Vaisisi, St. 83, 9.VII.1962, 1 larvule.

Description. Larvule. Détails anatomiques: fig. 2. Le paracerque est bien développé. Il n'y a pas de trachéobranchies I. Il n'est pas possible de dire si les ptérothèques II se développeront ultérieurement.

Coloration générale blanchâtre. Trachéobranchies blanchâtres avec trachées foncées. L'exemplaire figuré montre, à l'intérieur de la cuticule mandibulaire, l'ébauche des canines du stade suivant;

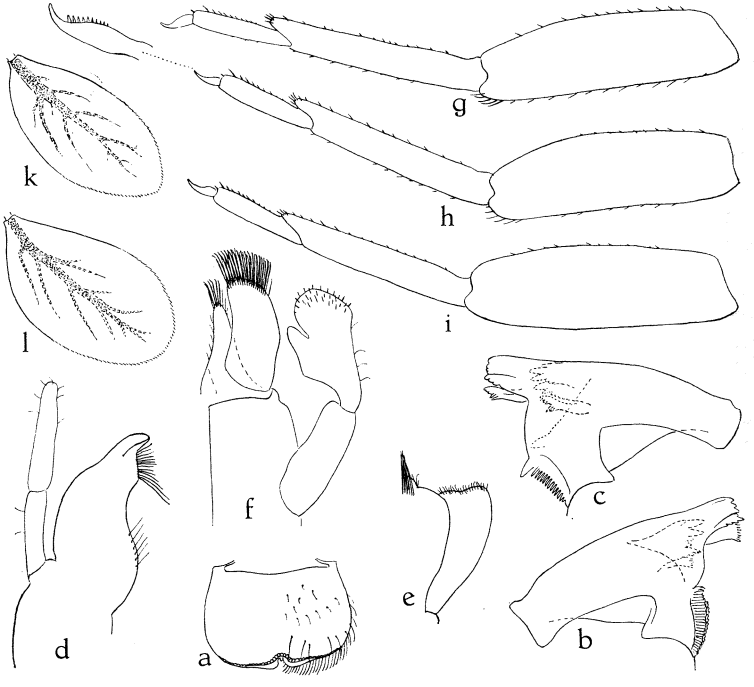


Fig. 2. — *Baetis* sp. 2, larve. (a—f) Labre, mandibules droite et gauche, maxille, hypopharynx, labium; × 83; (g—i) Pattes I, II, III; × 44; (k—l) Trachéobranchies II, IV; × 29,5.

on constate qu'elles seront plus aiguës. On peut se demander si, en réalité, l'aspect plus émoussé des «vieilles canines» n'est pas dû à une usure progressive par la mastication.

Longueur du corps (larvule): 3,5 mm (sans les cerques).

Genre **Pseudocloeon** Klapalek

Ici aussi les lamelles trachéobranchiales sont simples et les mandibules sont dépourvues de frange de cils entre canines et mola. Le paracerque est presque inexistant. Ces caractères se retrouvent chez *Baetiella* Ueno, que R. Kazlauskas (1963) a placé en synonymie de *Pseudocloeon*.

Les adultes sont dépourvus d'ailes postérieures et certains auteurs ont placé dans *Pseudocloeon* des espèces à adultes «diptères» mais à larves pourvues de paracerques bien développés.

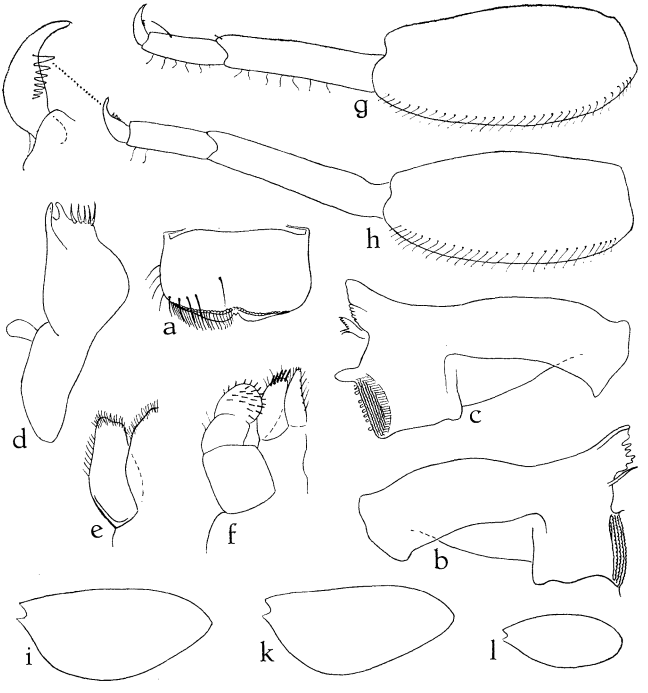


Fig. 3. — *Pseudocloeon* sp. 1, larve. (a—f) Labre, mandibules droite et gauche, maxille, hypopharynx, labium; × 78; (g—h) Pattes I, III; × 41; (i—l) Trachéobranchies II, IV, VII; × 28,8.

Pseudocloeon sp. 1 (Fig. 3)

Archipel Bismarck, NEW BRITAIN: Vaisisi, St. 83, 9.VII.1962, 3 larves.

Philippines. — PALAWAN: Mantalingajan, Pinigisan, 600 m, 13.IX.1961, 1 larvule.

Description. Larve. Détails anatomiques: fig. 3. Le palpe maxillaire n'a pu être examiné avec précision. Le paracerque est réduit à une très courte ébauche et il n'y a pas de trachéobranchies I.

Coloration générale blanchâtre. Parties latérales du bord postérieur des urotergites étroitement ombrées.

Longueur du corps: 4—6 mm (sans les cerques).

Pseudocloeon sp. 2 (Fig. 4)

Archipel Bismarck, NEW BRITAIN: Vaisisi, St. 83, 9.VII.1962, 3 larves.

Description. Larve. Détails anatomiques: fig. 4. Paracerque

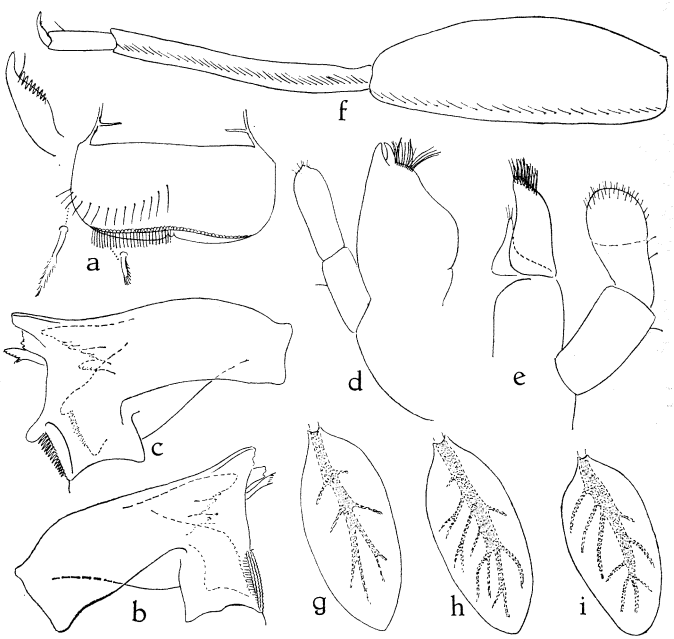


Fig. 4. — *Pseudocloeon* sp. 2, larve. (a—e) Labre, mandibules droite et gauche, maxille, labium; × 100; (f) Patte III; × 33,6; (g—i) Trachéobranchies II, IV, VI; × 88.

comme chez l'espèce précédente. Pas de trachéobranchies I.

Coloration blanchâtre. Urotergites II—VIII avec, de chaque côté, une tache brune à mi-longueur du segment; sur III—IV et VI—VII, ces taches se prolongent transversalement en arrière en direction de la ligne médiane. Pattes (au moins II et III) portant sur le fémur, environ au premier tiers de sa longueur, une grosse tache triangulaire brune. Trachéobranchies à trachées foncées.

Longueur du corps (larves jeunes): 3—4 mm (sans les cerques).

Genre **Cloeon** Leach

Par leur formule tarsale imaginale, les espèces ici décrites appartiennent bien à *Cloeon* s. str.

Cloeon ?samoense Tillyard, 1928 (Fig. 5—6)

Archipel Bismarck, MUSSAU: Lake Taletasi, St. 28, 140 m, 28°C, 5.VI.1962, 2 sub. ♂, 4 sub. ♀, 6 jeunes larves; même localité, St. 31, 6.VI.1962, 7 jeunes larves et larvules.

D e s c r i p t i o n. Subimago. Blanchâtre, y compris les nervures alaires. Tergites thoraciques légèrement brunâtres. Chez le ♂, yeux en turban brun orangé très clair. Nervation et genitalia du ♂: fig. 5 (subimago!).

Larve. Détails anatomiques: fig. 6. 7 paires de trachéobranchies, II—VI doubles.

Coloration générale blanchâtre, tergites thoraciques légèrement brunâtres.

Longueur du corps (jeunes larves): 4 mm (sans les cerques).

R e m a r q u e. Faute de disposer de ♂ imagos, l'attribution spécifique des adultes s'appuie sur la nervulation des ailes et sur les ébauches des genitalia ♂. Les larves sont attribuées à la même espèce que les adultes en raison de la similitude de localité et de date de capture.

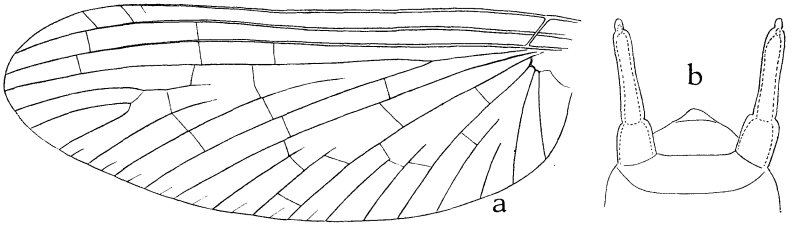


Fig. 5. — *Cloeon ?samoense* Tillyard, ♂ subimago. (a) Aile I; × 19; (b) Genitalia; × 60,5.

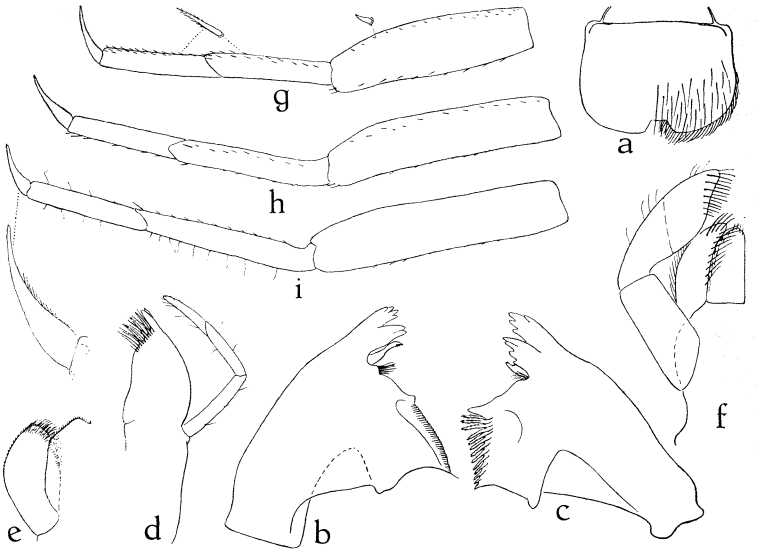


Fig. 6. — *Cloeon ?samoense* Tillyard, larve. (a—f) Labre, mandibules droite et gauche, maxille, hypopharynx, labium; × 36; (g—i) Pattes I, II, III; × 36.

Cloeon longistylus sp. n. (Fig. 7)

Philippines, BALABAC: Dalawan Bay, 9.X.1961, 1 ♂ imago Holotype. — PALAWAN: Brooke's Point, Uring-Uring, 7 et 23. VIII.1961, 2 ♂ imagos Paratypes.

Description. ♂ imago. Détails de la nervation et des genitalia: fig. 7. On notera que les gonostyles sont figurés sous un angle d'environ 45° environ.

Corps blanchâtre; thorax brunâtre. Les yeux en turban sont d'un brun assez foncé, presque contigus sur le dessus de la tête, déprimés en béret basque. Ailes incolores, y compris les nervures.

Longueur du corps: 3,5 mm; de l'aile I: 3,5 mm.

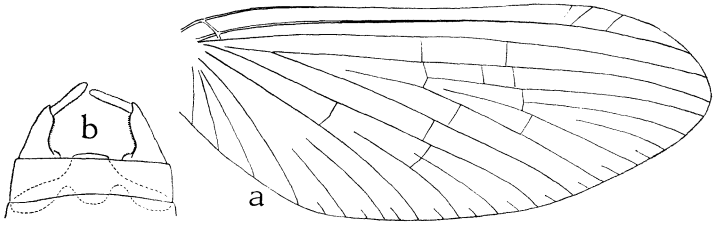


Fig. 7. — *Cloeon longistylus* sp. n., imago ♂. (a) Aile I; × 22; (b) Genitalia; × 71.

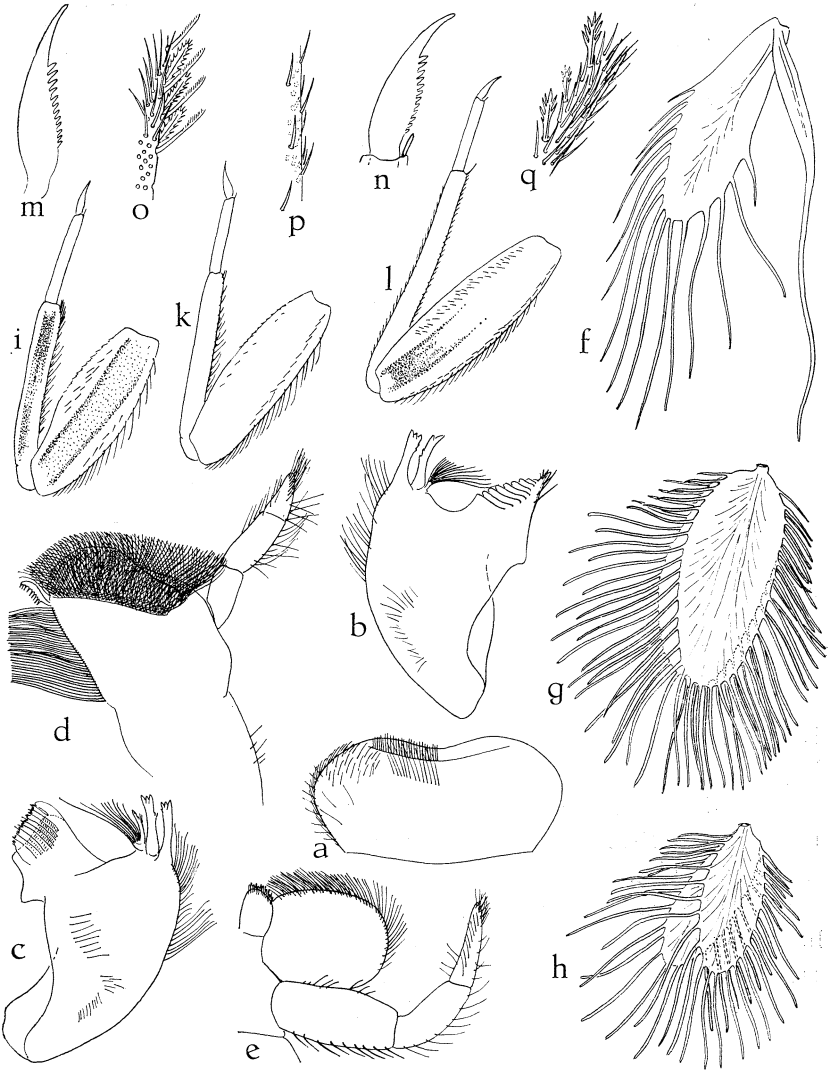


Fig. 8. — *Masharikella duliti* (Demoulin), larve. (a—e) Labre, mandibules droite et gauche, maxille, labium; × 50; (f—h) Labre, mandibules droite et gauche, maxille, labium; × 50; (f—h) Trachéobranchies I, IV, VII; × 31,5; (i—l) Pattes I, II, III; × 22; (m—n) Ongles I, III; × 113; (o—q) Garniture pileuse du bord interno-ventral des tibias I, II, III; × 113.

Famille **LEPTOPHLEBIIDAE**

Genre **Masharikella** Peters, Gillies & Edmunds, 1964

Masharikella duliti (Demoulin, 1954) (Fig. 8)

Archipel Bismarck, NEW BRITAIN: Yalom, St. 16, 1000 m, 2.V. 1962, 3 larves; même localité, mais St. 26, ditch, 15.V.1962, 1 larve. — MANUS: Lorengau, 7.VI.1962, 16 sub. ♂ et 22 sub. ♀; même localité, 15, 17, 19.VI.1962, 5 sub. ♀; même localité, 21.VI.1962, 2 sub. ♂; même localité, St. 49, river above waterfall, 21.VI.1962, 1 larve; même localité, St. 52, brook in secondary forest, 21.VI. 1962, 1 larve.

Description. Subimago. Coloration générale blanchâtre, avec maculation réduite, noirâtre, sur le dessus de la tête et du thorax. Tergites abdominaux brun noir, avec les bords latéraux et les incisions intersegmentaires blanchâtres. Chez le ♂, yeux en turban légèrement orangés. Les exemplaires conservés à sec sont largement brun noirâtre.

Larve. Détails anatomiques: fig. 8. La coloration générale préfigure celle du subimago. Le fémur I est rembruni, de même que le tibia I et l'apex du fémur III.

Longueur du corps (larve mature): 6 mm (sans les cerques).

Remarque. L'attribution spécifique des larves repose sur l'identité de capture (localité et date) avec certains subimagos.

L'espèce était déjà connue de Bornéo, New Guinea, New Ireland.

Genre **Thraulus** Eaton

En dehors de l'espèce type (*Th. bellus* Eaton, Europe), la composition spécifique du genre *Thraulus* est mal connue. Bien de ses espèces initiales en ont été enlevées pour être transférées dans d'autres genres (*Thraulodes, Traverella, Homothraulus,* etc. . .). Outre deux espèces néotropicales qui n'y sont conservées qu'à titre très hypothétique, on en connaît encore trois de l'Inde (dont une seule à peu près certaine et une anonyme) et une citée, mais non nommée, des Philippines.

Les larves décrites ci-dessous semblent bien concorder morphologuement avec celles de *Th. bellus,* seule espèce connue à tous les stades. Par contre, une ♀ subimago n'est rapportée ici au genre *Thraulus* que sur la base de données aimablement fournies par M. le Prof. W. L. Peters (Tallahassee) (in litt., 16.IV.1968), qui a consacré plusieurs années à l'étude des Leptophlebiidae.

Thraulus pacificola sp. n. (Fig. 9)

Archipel Bismarck, MANUS: Lorengau, 7.IV.1962, 1 ♀ subimago Holotype.

Description. ♀ subimago. Tête et pronotum gris jaune largement marquée de noirâtre; yeux et ocelles noirs. Méso- et métanotum jaune pâle, avec les côtés et les sutures noirâtres. Abdomen brunâtre, avec la région postérieure de chaque tergite plus foncée; ce renforcement de couleur bien plus marqué et mieux délimité que les urites I—II. Ces taches foncées se prolongent sur les urosternites. Ailes I et II incolores, sauf la base qui est étroitement rougeâtre. Nervures incolores. Pattes incolores, sauf le fémur qui, sur I est entièrement rouge brun, sur II—III est traversé à mi-longueur et à l'apex par une bande rouge brun.

La morphologie des pattes et des ailes est représentée par la fig. 9.

Longueur du corps: 4 mm; de l'aile I: 5 mm; de l'aile II: 0,5 mm.

Remarque. L'espèce ici décrite semble participer des caractères systématiques des *Neohagenulus* et des *Borinquena* (genres porto-ricains) mais rappelle surtout les premiers par ses ailes antérieures à fourche de MA symétrique et par l'absence d'ovipositeur. On notera toutefois que, ici, la première ICuA se rattache par sa base à CuA et non à CuP. En l'absence d'imago ♂, il n'est guère possible de confirmer la position générique proposée pour cette espèce.

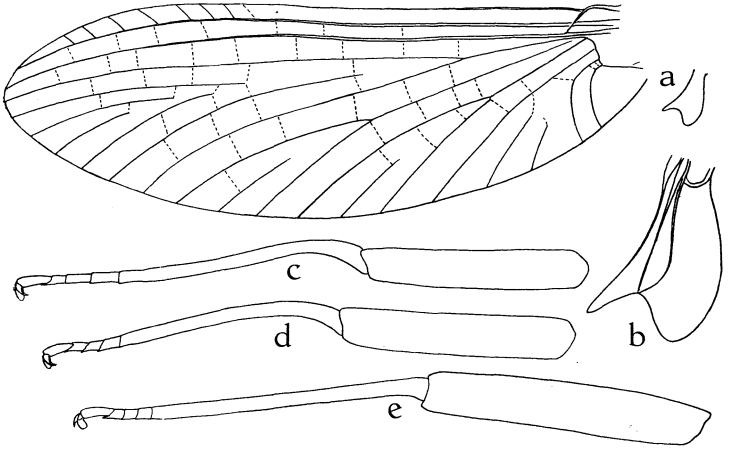


Fig. 9. — *Thraulus pacificola* sp. n., ♀ subimago. (a) Aile I et silhouette de l'aile II; × 17; (b) Aile II; × 58; (c—e) Pattes I, II, III; ×33.



Fig. 10. — *Thraulus* sp., larve. (a—f) Labre, mandibules droite et gauche, maxille, hypopharynx, labium; × 52; (g—i) Trachéobranchies I, II, III; × 52 (k—l) Pattes I, III; × 28; (m—n) Ongles I, III; × 133; (o—p) Garniture pileuse du bord interno-ventral des tibias I, III; × 100.

Thraulus sp. (Fig. 10)

Archipel Bismarck, NEW BRITAIN: Yalom, St. 14, brook, 1000 m, 14°C, 11.V.1962, 4 larves et larvules; même localité, mais St. 26, ditch, 15.V.1962, 6 larves; Komgi, St. 19, brook in rainforest, 14.V.1962, 6 larves et larvules. — MANUS: Lorengau, St. 52, brook in secondary forest, 21.VI.1962, 1 larve.

D e s c r i p t i o n. Larve. Détails morphologiques: fig. 10.

Coloration générale brune, les sutures thoraciques et le bord postérieur des urotergites plus foncé. Pattes claires, avec au moins l'apex du fémur III brun rouge; souvent les fémurs I et II semblablement maculés mais, dans ce cas, une bande transverse de même couleur au milieu du fémur III.

Longueur du corps (larve mature): 5 mm (sans les cerques).

R e m a r q u e. La similitude de localité laisse supposer que ces larves doivent appartenir à *Th. pacificola* sp. n., mais de nouvelles recherches seront nécessaires pour confirmer cette hypothèse.

Genre **Simothraulus** Ulmer

Le genre, monospécifique, a été créé sur la base d'un unique ♂ imago.

Larve. Pièces buccales rappelant celles des *Choroterpes* et des *Maheathraulus;* hypopharynx à langue pourvue de processus latéraux. Pronotum avec des soies sur les angles antéro-latéraux. De courtes soies au bord postérieur de l'urotergite X. Ongles des pattes à moitié apicale recourbée, moitié basale portant au bord interne quelques grosses dents triangulaires (augmentant de taille de la base vers l'apex). Paratergites abdominaux I—VII sans apophyses, VIII avec apophyses à peine marquées, IX avec apophyses nettes mais pas très grandes (atteignant environ la mi-longueur du tergite X). Filaments terminaux incomplètement connus, le paracerque apparemment au moins aussi long que les cerques. Trachéobranchies sur I—VII, doubles, les lamelles longuement rectangulaires et se terminant apicalement par un éventail de caecums en majorité assez longs. Ces derniers plus nombreux sur la lamelle supérieure que sur l'inférieure.

L'identité de la larve a été confirmée par l'étude des ptérothèques (nervures, nervules et macules foncées). On notera toutefois que l'aile II montre un apex un peu plus aigu que celui de l'holotype ♂ imago figuré par G. Ulmer (1939).

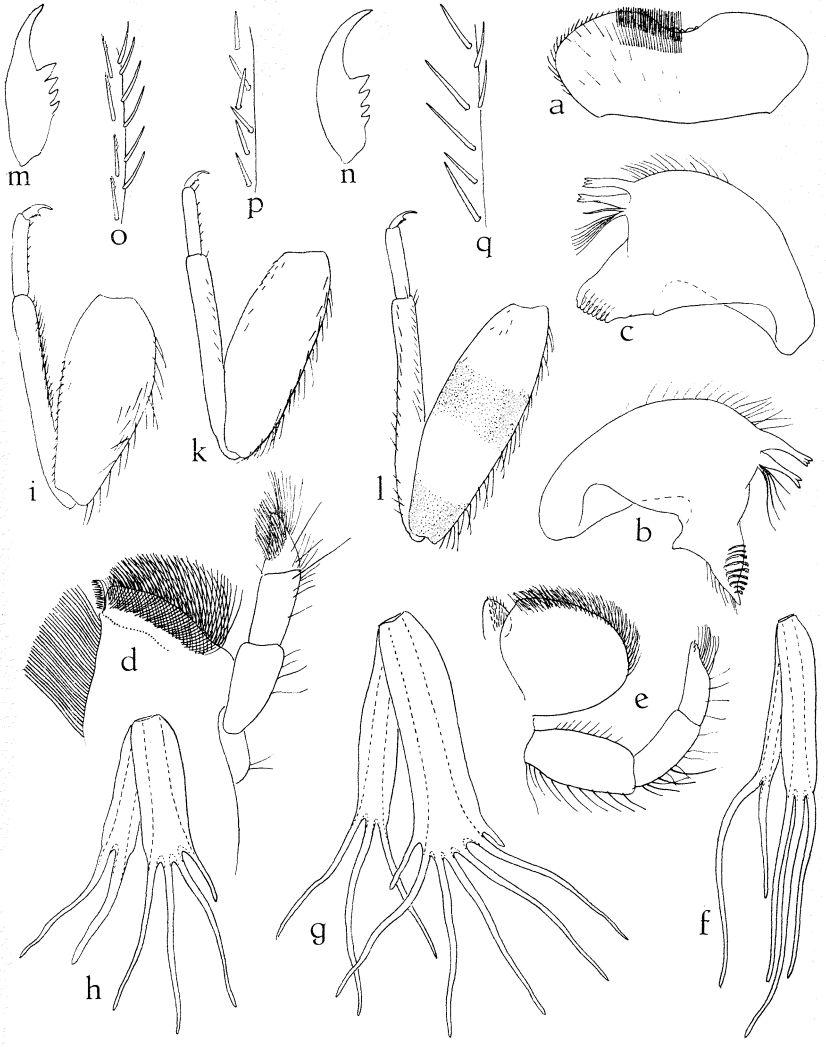


Fig. 11. — ***Simothraulus seminiger*** **Ulmer, larve. (a—e) Labre, mandibules droite et gauche, maxille, labium; × 65; (f—h) Trachéobranchies I, IV, VII; × 65; (i—l) Pattes I, II, III; × 30; (m—n) Ongles I, III; × 158; (o—q) Garniture pileuse du bord interno-ventral des tibias I, II, III; × 158.**

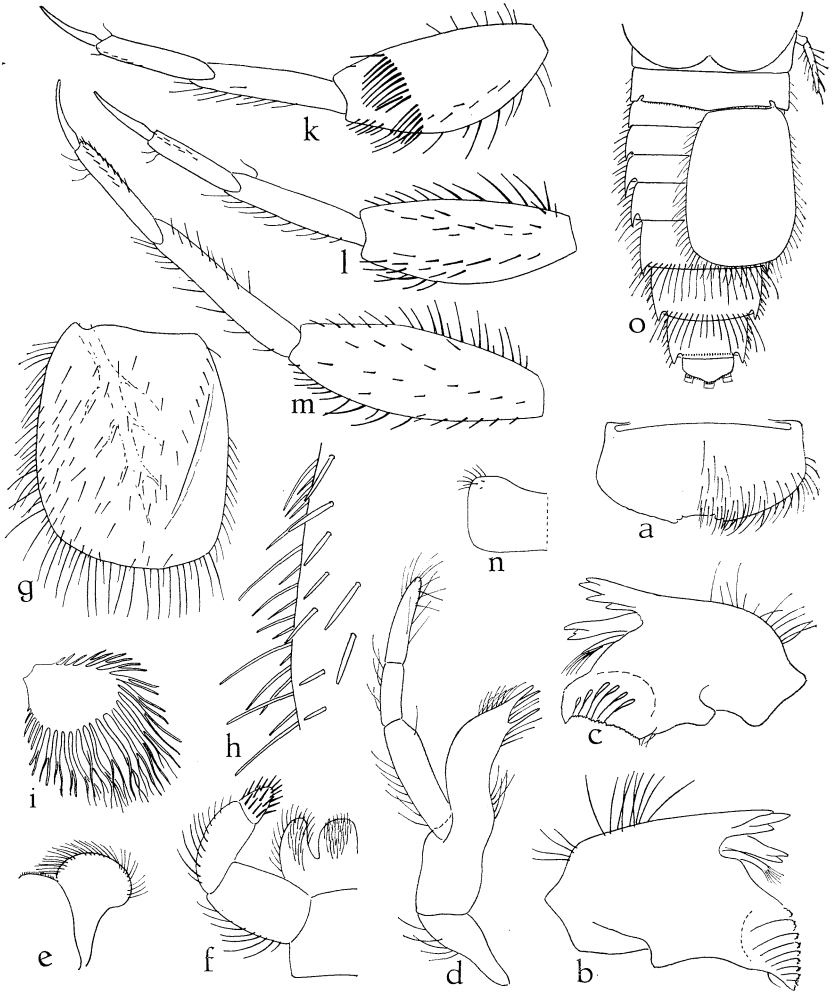


Fig. 12. — *Caenis* sp., larve. (a—f) Labre, mandibules droite et gauche, maxille, hypopharynx, labium; × 107; (g) Trachéobranchie II; × 40; (h) Idem, garniture pileuse de la marge; (i) Trachéobranchie IV; × 40; (k—m) Pattes I, II, III; × 53; (n) Pronotum, moitié gauche; × 25; (o) Abdomen et trachéobranchies I—II; × 25.

Simothraulus seminiger Ulmer, 1939 (Fig. 11)

Archipel Bismarck, NEW BRITAIN: Komgi, St. 19, brook in rainforest, 14.V.1962, 2 larves.

Description. Larve. Détails anatomiques: fig. 11. La forme des ongles est caractéristique et celle des trachéobranchies l'est plus encore. Chez ces dernières, la lamelle inférieure est plus faible que la supérieure et porte des caecums moins nombreux (supérieure: 3—7; inférieure: 2—3).

Famille **CAENIDAE**

Genre **Caenis** Stephens

Caenis sp. (Fig. 12)

Archipel Bismarck, NEW BRITAIN: Yalom, St. 14, brook, 1000 m, 14°C, 11.V.1962, 6 larves et larvules.

Description. Larve. Détails anatomiques: fig. 12. Opercules trachéobranchiaux II à suture en Y faible.

Coloration générale blanc brunâtre pâle; les ptérothèques I plus foncées.

Longueur du corps (larve mature): 3,2 mm (sans les cerques).

Genre **Caenomedea** Thew

Caenomedea insularis sp. n. (Fig. 13)

Archipel Bismarck, MUSSAU: Talumalaus, caught by Mercury light, 20, 24, 25, 31.I et 3.II. 1962, 1 ♂ Holotype, 1 ♀ Allotype, 16 ♂ Paratypes, en alcool et à sec. — MANUS: Lorengau, 21.VI. 1962, 1 ♀ Paratype (en alcool).

Description. ♂ imago. La fig. 13 montre les pattes et les genitalia.

Coloration générale brunâtre pâle, thorax plus opaque. Tête

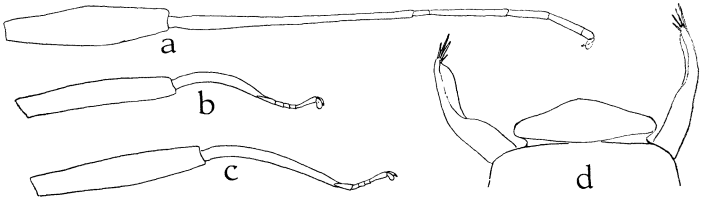


Fig. 13. — *Caenomedea insularis* sp. n., ♂ imago. (a—c) Pattes I, II, III; × 62; (d) Genitalia; × 173.

brun noirâtre. Pattes et cerques translucides. Abdomen avec la partie postérieure des tergites plus foncée.

Longueur du corps: 1,5 mm; de l'aile I: 1,6 mm.

♀ imago. Coloration comme celle du ♂. Longueur du corps: 2,2 mm; de l'aile I: 1,8 mm.

Dans les deux sexes, les ailes sont transparentes, avec le bord costo-subcostal à peine brun rougeâtre. Les exemplaires conservés en liquide sont blanchâtres, avec le thorax un peu jaunâtre.

R e m a r q u e. Le genre *Caenomedea* est surtout africain, mais on en connaît une espèce orientale: *C. novaeguineae* (Bruggen). Cette espèce est nettement plus grande que *C. insularis* sp. n.

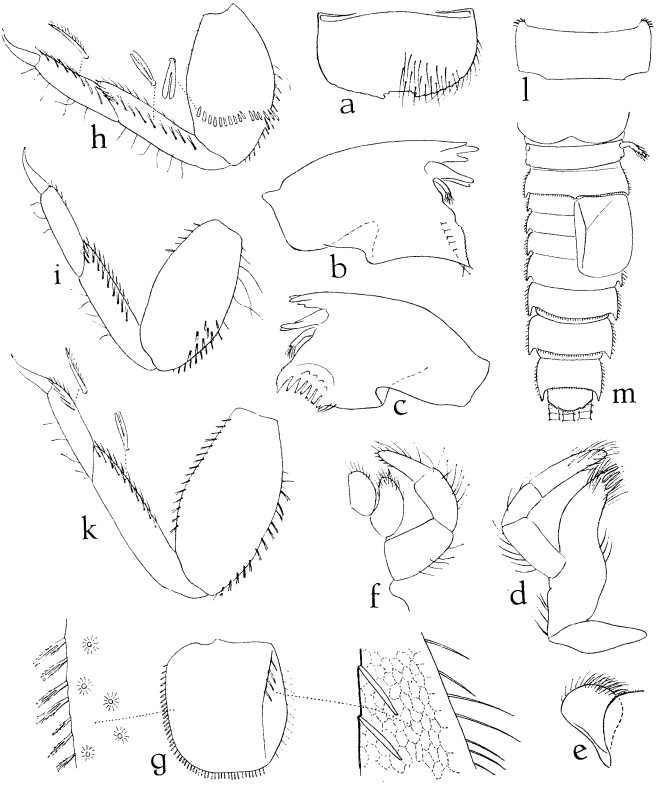


Fig. 14. — *Caenomedea* sp., larve. (a—f) Labre, mandibule droite et gauche, maxille, hypopharynx, labium; × 107; (g) Trachéobranchie II; × 40; (h—k) Pattes I, II, III; × 53; (l) Pronotum; × 25; (m) Abdomen; × 25.

Caenomedea sp. (Fig. 14)

Archipel Bismarck, NEW BRITAIN: Komgi, St. 19, brook in rainforest, 14.V.1962, 1 jeune larve.

Description. Détails anatomiques: fig. 14. On notera les minuscules structures rayonnées qui parsèment la plus grande partie des trachéobranchies II et, sur la partie déclive du même organe (entre la carène en Y et le plan de symétrie du corps), la fine réticulation.

Coloration générale blanc un peu jaunâtre.

Longueur du corps (jeune larve): 1,5 mm (sans les cerques).

Remarque. Faute de matériel suffisant, il n'est pas possible de dire si cette larve appartient ou non à *C. insularis* sp. n.

Summary

Six species are recorded, including *Cloeon longistylus* n. sp. from the Philippines, and *Thraulus pacificola* n. sp. and *Caenomedea insularis* n. sp. from the Bismarck Islands. Further six larval forms are mentioned, one from the Philippines and five from the Bismarck Islands.

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(Noona Dan Papers No. 86.)

Nitidulidae (Col.) collected by the Noona Dan Expedition in the Philippine and Bismarck Islands.

By
Lorin R. Gillogly
3636 Almeria Street, San Pedro, California.

The family Nitidulidae is composed of small clavicorn beetles with transverse coxae. They live in flowers, fungi, fermenting fruits, and stored products. Although this family is of little economic importance, some species create a considerable nuisance by feeding in stored products, drying fruit, and flowers of certain seed crops.

Entomologists of the Danish expedition vessel "Noona Dan" collected 185 beetles of the family Nitidulidae during 1961 and 1962 when they explored the southwestern islands of the Philippine group and the Bismarck Islands in the south-western Pacific Ocean (Petersen, 1966). In this collection 16 genera are represented by 41 species. This sample of the fauna is significant as most of the insects represent extensions to their previously known distribution.

A single female specimen of *Pocadites* from Palawan in the Philippines awaits identification until further collections can be made. According to Hisamatsu in his revision of the genus it is found in various of the Hymenomycetes fungi in Japan and the Ryukyu Islands.

Presented here is a key to the 41 species of Nitidulidae which were collected by the Noona Dan Expedition, a list of determinations and collection data, and a bibliography to the original descriptions of the insects.

The Nitidulidae collected by the Noona Dan Expedition to the southwest Pacific area were made available to me through the kindness of Dr. Børge Petersen of the Zoological Museum of Copenhagen, Denmark.

Key to the Nitidulidae collected.

1. Tibiae: Middle and posterior tibiae with simple outer edges, without keel on upper side, tips rounded or oblique truncate; anterior tibiae crenulate or toothed ..... (Meligethinae) 2
— Tibiae: Middle and posterior tibiae with double outer edges, upper edge rather dorsal, giving effect of keel; all tibiae truncate or with outer angle produced and toothlike 3
2. Prothorax with sides strongly arcuate, base much narrower than middle; male mandible tip simple and with strong basal tooth ..... *Haptognathus minutus*
— Prothorax with sides arcuate, narrowed anteriorly, base hardly narrower than middle; male mandible tips forked ..... *Haptognathus reticulatus*
3. Abdomen with no more than pygidium exposed (occasionally hind margin of penultimate segment visible) 5
— Abdomen with two or more dorsal segments exposed ..... (Carpophilinae) 4
4. Body oval, length about twice width (ventral abdominal segments 2 and 3 short; 1, 4 and 5 long) 7
— Body elongate, length at least three times width 6
5. Labrum concealed by and connate with clypeus ..... (Cryptarchinae) ..... *Cryptarcha maculata*
— Labrum free, not concealed by clypeus ..... (Nitidulinae) 15
6. Tibiae: Anterior pair finely serrate on outer margin, others margined with setae only; prothorax base about as wide as elytra ..... *Brachypeplus kusaiensis*
— Tibiae armed with stout teeth or spines on outer margin; prothorax base narrower than elytra ..... *Cillaeus modiglianii*
7. Metasternum with axillary space behind mesocoxae extending at least one-fourth length of metasternal suture 8
— Metasternum with axillary space extending less than one-fifth length of metasternal suture or absent 11
8. Line marking off axillary space extending beyond middle of metasternal suture 9
— Line not reaching middle of metasternal suture 10
9. Axillary line straight, forming large axillary space ..... *Carpophilus marginellus*
— Axillary line curved to mark off rather small space ..... *Carpophilus davidsoni*
10. Prosternum with sides and disc densely punctate, punctures larger and shallower toward sides ..... *Carpophilus mutilatus*
— Prosternum with sides almost impunctate, disc punctate anterior to process but punctations not reaching to anterior margin of prosternum ..... *Carpophilus maculatus*
11. Pronotum with hind angles prominent, acute, projecting backwards ..... *Carpophilus nigricans*
— Pronotum with hind angles retracted, obtuse or rounded 12
12. Pronotum longer than wide, anterior tibiae armed on outer edge with several teeth ..... *Carpophilus tenuis*
— Pronotum transverse, anterior tibiae unarmed 13
13. Eyes prominent, coarsely faceted; surface of pronotum very finely lightly reticulate ..... *Carpophilus schiodtei*
— Eyes normal, finely faceted; surface of pronotum strongly reticulate 14

14. Head, scutellar region, and tip of elytra dark; body length about 1 mm. ..... *Carpophilus frivolus*
— Dorsum testaceous, elytra somewhat paler; body length .67 — .75 mm. ..... *Carpophilus inconspicuus*
15. Dorsum glabrous 16
— Dorsum pubescent 17
16. Club of antenna compact, symmetrical ..... *Cyllodes fauvelli*
— Club of antenna with segments projecting asymmetrically .... *Parametopia bosschae*
17. Elytra irregularly punctate, without striae 18
— Elytra serially punctate, setose, or striate 36
18. Sides of prothorax and elytra ciliate 19
— Sides of prothorax and elytra without outstanding ciliae 20
19. Color black; Pronotum with vague longitudinal sulcae, disc little shining; elytra fringed with short ciliae . *Amphicrossus bouchardi*
— Color brown; pronotum shining and without sulcae; elytra fringed with long ciliae ..... *Amphicrossus oblongus*
20. Body large, hind tarsi simple, labial palpi filiform 21
— Body small, hind tarsi dilated, terminal segment of labial palpi hemispherical 24
21. Labrum nearly semicircular, feebly bilobed; third antennal segment as long as next three together 22
— Labrum deeply bilobed; third antennal segment somewhat longer than fourth ..... *Trimenus adpressus*
22. Body elongate oval, moderately shining; pronotum transverse and quadrate with anterior angles three-fourths as far apart as posterior angles; elytra with four spots .. *Prometopia quadrimaculata*
— Body broadly oval, shiny; prothorax narrowed anteriorly with anterior angles less than two-thirds as far apart as posterior angles; elytra with two spots or none 23
23. Body depressed, pubescent, piceous; prothorax anterior angles reaching nearly past eyes; anterior angles one-half as far apart as hind angles; elytra without spots ..... *Prometopia rhombus*
— Body convex, nearly glabrous, black; prothorax anterior angles reaching to middle of eyes; anterior angles nearly two-thirds as far apart as hind angles; elytra with spots anterior to middle .... *Prometopia bisignatus*
24. Temples present behind eyes 25
— Temples absent, eyes occupying hind angles of head 30
25. Prothorax with surface of disc smooth between punctures .. .. *Haptoncus opacus*
— Prothorax with surface of disc transversely alutaceous 26
26. Prothorax apex emarginate ..... *Haptoncus albertisi*
— Prothorax apex nearly straight 27
27. Prothorax sides narrowly margined ..... *Haptoncus luteolus*
— Prothorax sides explanate 28
28. Elytra unspotted ..... *Haptoncus flavidus*
— Elytra with maculae 29
29. Body oval, posterior prothoracic angles rectangular, submentum strongly reticulate .....*Haptoncus ocularis*
Body oblong, posterior prothoracic angles obtuse, submentum smooth and shining ..... *Haptoncus barbulus*

30. Prothorax with apex emarginate 31
Prothorax apex nearly straight 32
31. Body color pale; sides of prothorax narrowly margined; elytra tips oblique truncate ..... *Haptoncus epuraeoides*
— Body color dark; sides of prothorax explanate; elytra tips subtruncate ..... *Haptoncus sobrinus*
32. Prothorax with surface of disc smooth between punctures .. 33
— Prothorax surface of disc reticulate between punctures 34
33. Body color pale; hind angles of prothorax rounded; elytra tips obliquely truncate ..... *Haptoncus arcuatus*
— Body color dark; hind angles of prothorax obtuse; elytra tips squarely truncate ..... *Haptoncus murrayi*
34. Prothorax with sides narrowly margined, disc closely punctate ..... *Haptoncus insularis*
— Prothorax sides explanate, disc sparsely punctate 35
35. Body oval; prothorax with hind angles obtuse; elytra coarsely sparsely punctate ..... *Haptoncus opaculus*
— Body elongate; prothorax hind angles rounded; elytra densely punctate ..... *Haptoncus dispersus*
36. Body elongate ..... *Megauchenia interstitialis*
— Body oval 37
37. Claws toothed on base ..... *Macroura brunescens*
— Claws simple 38
38. Hind tarsi simple ..... *Pocadites* sp.
— Hind tarsi dilated, bilobed 39
39. Body broad, depressed, large (over 4 mm.) ..... *Lasiodactylus stelidotoides*
— Body rather convex, small (under 3 mm.) 40
40. Body color reddish testaceous; prothorax, sides of elytra, and spots paler; prothorax with sides explanate, surface rugosely punctate; elytra without spots, costae with silver hairs ..... *Stelidota balanomorpha*
— Body color piceous black; prothorax with sides narrowly margined and reddish, surface closely but not rugosely punctate; elytra with numerous pale spots, costae with golden hairs ..... *Stelidota multiguttata*

List of species.

Haptognathus minutus Gillogly, 1962

Bismarck Is., MUSSAU; Talumalaus, Jan. 20, 1962, caught at Mercury light, one specimen.

Distribution: Guam, Saipan.

Haptognathus reticulatus Gillogly, 1962

Philippines, PALAWAN; Uring Uring, Aug. 14, 1961, caught at Mercury light, one specimen; Pinigisan, 600 meter, Sept. 23, 1961, caught at Mercury light, one specimen; Tagembung, 1150 meter, Sept. 19, 1961, caught at Mercury light, one specimen.

Distribution: Palau, Saipan.

Cillaeus modiglianii Grouvelle, 1897

Bismarck Is., NEW IRELAND; Lemkamin, 900 meters, April 11, 1962, one specimen.

Distribution: Sumatra.

Brachypeplus kusaiensis Gillogly, 1962

Philippines, PALAWAN; Pinigisan, 600 meters, Sept. 23, 1961, one specimen.

Distribution: Eastern Caroline Islands.

Carpophilus davidsoni Dobson, 1952

Philippines, PALAWAN; Pinigisan, 600 meter, Sept. 10, 1961, caught at Mercury light, one specimen.

Distribution: Australia (New South Wales), Mariana Is., Caroline Is., Marshall Is., Gilbert Is.

Carpophilus frivolus Murray, 1864

Philippines, BALABAC; Dalawan Bay, Oct. 5, 1961, caught at Mercury light, one specimen. — TAWI TAWI; Lapid Lapid, Nov. 19, 1961, caught at Mercury light, one specimen.

Distribution: Australia, Palau Is.

Carpophilus inconspicuus Murray, 1864

Bismarck Is., MANUS; Lorengau, June 15, 1962, 36 specimens.

Distribution: Batchian (Batjan in Moluccas).

Carpophilus maculatus Murray, 1864

Bismarck Is., NEW IRELAND; Lemkamin, 900 meters, April 7, 1962, one specimen. — MUSSAU; Boliu, June 4, 1962, one specimen.

Philippines, TAWI TAWI; Tarawakan, Nov. 14, 1961, caught at Mercury light, one specimen.

Distribution: Ceylon, Polynesia, Philippine Is., Mariana Is., Caroline Is., Marshall Is., Gilbert Is.

Carpophilus marginellus Motschulsky, 1858

Philippines, TAWI TAWI; Tarawakan, Oct. 24, 1961, one specimen.

Distribution: West Africa, Madagascar, Ceylon, East Indies, Hongkong, Japan, Bonin Is., Caroline Is., Marshall Is., United States.

Carpophilus mutilatus Erichson, 1843

Philippines, TAWI TAWI; Tarawakan, Nov. 15, 1961, caught at Mercury light, 2 specimens.

Distribution: Iraq, Philippine Is., Mariana Is., Caroline Is., Marshall Is., United States.

Carpophilus nigricans Grouvelle, 1897

Philippines, TAWI TAWI; Tarawakan, Oct. 20, 1961, caught at Mercury light, 7 specimens.

Distribution: Sumatra.

Carpophilus schiodtei Murray, 1864

Philippines, TAWI TAWI; Tarawakan, Nov. 13, 1961, caught at Mercury light, one specimen.

Distribution: Moluccas, Sumatra.

Carpophilus tenuis Murray, 1864

Philippines, PALAWAN; Pinigisan, 600 meters, Sept. 23, 1961, caught at Mercury light, 13 specimens.

Distribution: China, Japan.

Haptoncus albertisi Reitter, 1880

Philippines, TAWI TAWI; Lapid Lapid, Nov. 19, 1961, caught at Mercury light, one specimen.

Distribution: New Guinea, Mariana Is., Caroline Is., Marshall Is., Gilbert Is.

Haptoncus arcuatus Gillogly, 1962

Philippines, TAWI TAWI; Lapid Lapid, Nov. 19, 1961, caught at Mercury light, 4 specimens; Tarawakan, Nov. 13, 1961, one specimen; Nov. 14, one specimen, caught at Mercury light.

Bismarck Isl., MANUS; Lorengau, June 18, 1962, 2 specimens.

Distribution: Caroline Is.

Haptoncus barbulus Gillogly, 1962

Philippines, PALAWAN; Pinigisan, 600 meter, caught at Mercury light; Sept. 7, 1961, 2 specimens; Sept. 9, one specimen; Sept. 19, one specimen; Tagembung, 1150 meter, Sept. 17, 1961, caught at Mercury light, one specimen; Uring Uring, Aug. 14, 1961, caught at Mercury light, one specimen.

Distribution: Mariana Is., Caroline Is.

Haptoncus dispersus Grouvelle, 1906

Philippines, TAWI TAWI; Tarawakan, Oct. 24, 1961, 2 specimens; Nov. 25, 1961, 4 specimens, caught in Malaise trap.

Distribution: Tropical Africa, Madagascar, Palau Is., Caroline Is.

Haptoncus epuraeoides Grouvelle, 1908

Bismarck Is., NEW IRELAND; Lemkamin, 900 meter, April 17 and 21, 1962, caught at Mercury light, 2 specimens.

Philippines, PALAWAN; Pinigisan, 600 meter, Sept. 23, 1961, caught at Mercury light, one specimen. — TAWI TAWI; Tarawakan, Nov. 14, 1961, caught at Mercury light, 1 specimen.

Distribution: Ceylon, S. Mariana Is., Caroline Is., Marshall Is.

Haptoncus flavidus Fairmaire, 1849

Philippines, PALAWAN; Pinigisan, 600 meter, Sept. 18, 1961, caught in Malaise trap inside forest, one specimen.

Distribution: Tahiti.

Haptoncus insularis Grouvelle, 1906

Philippines, TAWI TAWI; Tarawakan, Nov. 14 and 15, 1961, caught at Mercury light, 2 specimens.

Distribution: Timor-Deli, Palau (Koror).

Haptoncus luteolus (Erichson, 1843)

Philippines, PALAWAN; Uring Uring, Aug. 25, 1961, one specimen, Tagembung, 1150 meter, Sept. 19, 1961, caught at Mercury light, 2 specimens.

Bismarck Is., MANUS; Lorengau, June 15, 1962, one specimen.

Distribution: Tropicopolitan.

Haptoncus murrayi Grouvelle, 1905

Philippines, PALAWAN; Pinigisan, 600 meter, Sept. 3, 1961, caught at Mercury light, one specimen.

Distribution: Mentawai Is. (southwest of Sumatra), Guam.

Haptoncus ocularis (Fairmaire, 1849)

Bismarck Is., MUSSAU; Talumalaus, Feb. 2, 1962, one specimen.

Distribution: East Africa, Madagascar, Ceylon, Indo-China, East Indies, Tahiti, Japan, Micronesia, Hawaii.

Haptoncus opaculus Grouvelle, 1905

Bismarck Is., MUSSAU; Talumalaus, Jan. 24, 1962, caught at Mercury light, one specimen.

Distribution: Timor, Palau Is.

Haptoncus opacus (Grouvelle, 1897)

Philippines, PALAWAN; Pinigisan, 600 meter, Sept. 7, 1961, caught at Mercury light, 4 specimens. — TAWI TAWI; Tarawakan, Oct. 25, 1961, caught in Malaise traps, 2 specimens.

Distribution: Sumatra, Caroline Is.

Haptoncus sobrinus (Grouvelle, 1894)

Philippines, TAWI TAWI; Tarawakan, Oct. 20, 1961, caught at Mercury light, one specimen.

Distribution: Bourbon (Reunion), Seychelles, Madagascar, Caroline Is.

Amphicrossus oblongus Grouvelle, 1897

Bismarck Is., NEW IRELAND; Lemkamin, 900 meters, April 21, 1962, one specimen; April 12, 1962, one specimen; April 15, 1962, 26 specimens, caught at Mercury light.

Philippines, TAWI TAWI; Lapid Lapid, Nov. 21, 1961, 3 specimens.

Distribution: Burma, Sumatra.

Amphicrossus bouchardi Grouvelle, 1897

Philippines, TAWI TAWI; Lapid Lapid, Nov. 21, 1961, at sap flow on tree trunk, 6 specimens.

Distribution: Sumatra.

Cyllodes fauveli Grouvelle, 1903

Bismarck Is., NEW IRELAND; Danu, Kalili Bay, April 30, 1952, one specimen.

Distribution: New Caledonia.

Lasiodactylus stelidotoides Olliff, 1883

Bismarck Is., NEW BRITAIN; Valoka, July 8, 1962, 2 specimens.

Distribution: Ceram (Serang in Moluccas), Celebes.

Macroura brunnescens Reitter, 1875

Bismarck Is., MANUS; Lorengau, June 25, 1962, one specimen.

Distribution: Australia.

Megauchenia interstitialis (Reitter, 1880)

Bismarck Is., NEW IRELAND; Lemkamin, 900 meter, April 15, 1962, one specimen.

Distribution: East Indies.

Parametopia bosschai Grouvelle 1892

Philippines, TAWI TAWI; Tarawakan, Nov. 12, 1961, caught in Malaise trap, one specimen.

Distribution: Borneo.

Pocadites sp.

Philippines, PALAWAN; Pinigisan, 600 meter, Sept. 4, 1961, caught in Malaise trap, one female specimen.

Prometopia bisignata Grouvelle, 1906

Bismarck Is., DYAUL; Sumuna, March 4, 1962, caught at Mercury light, one specimen.

Distribution: Ternate (Moluccas).

Prometopia quadrimaculata Motschulsky, 1863

Philippines, PALAWAN; Uring Uring, Aug. 31, 1961, caught in Malaise trap, one specimen; Sept. 17, 1961, one specimen.

Distribution: Ceylon, India, Burma, East Indies, Christmas Is., Guam.

Prometopia rhombus Olliff, 1883

Philippines, TAWI TAWI; Tarawakan, Nov. 11, 1961, one specimen; Nov. 14, 1961, one specimen, caught at light trap.

Distribution: Borneo.

Stelidota multiguttata Reitter, 1877

Bismarck Is., NEW IRELAND; Lemkamin, 900 meter, April 15, 1962, one specimen.

Distribution: India, Japan.

Stelidota balanomorpha (Montrouzier, 1860)

Philippines, PALAWAN; Tagembung, 1150 meter, Sept. 20, 1961, caught in Malaise trap, one specimen.

Distribution: New Caledonia.

Trimenus adpressus Murray, 1864

Philippines, TAWI TAWI; Tarawakan, Oct. 20 and 21, 1961, caught at Mercury light, 2 specimens; Lapid Lapid, Nov. 21, 1961, caught at Mercury light, 2 specimens. Bismarck Is., MANUS:

Lorengau, June 15, 1962, caught at Mercury light, 5 specimens.

Distribution: India, Burma, Malay archipelago, Japan.

Cryptarcha maculata Reitter, 1873

Philippines, TAWI TAWI; Lapid Lapid, Nov. 21, 1961, at sap flow on tree trunk, 10 specimens.

Distribution: Moluccas.

Summary

41 species of 16 genera are recorded; 30 from the Philippines and 17 from the Bismarck Islands. The records represent considerable extensions to the previously known distribution of many of the species. A key to the species is presented.

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A new Microvelia from Australia with a check-list of Australian species (Hemiptera, Veliidae).

By
N. Møller Andersen
(Zoological Museum, Copenhagen)

The new *Microvelia* described below was present in a small collection sent to the author for identification by Mr. I. Lansbury, Oxford. The subsequent check-list summarizes the nomenclatural and distributional knowledge about Australian species of this genus.

Microvelia (s. str.) childi n. sp. (Figs. 1—11)

Colour: Apterous male chiefly blackish with patches of silverish hairs above. Head blackish brown or black with the usual shiny, median stripe reaching hind margin of head; small silvery patches laterally, in front and behind the reddish eyes; antennae dark brownish. Lower parts of head and rostrum brownish yellow save for the last rostral segment which is black and shiny. Pronotum blackish with golden dots and darker punctures; an uninterrupted brownish orange, transverse band a little wider than vertex in middle of pronotum close to the anterior margin, obscured laterally on both sides by a large patch of silverish hairs; antero-lateral area of pronotum and propleura orange. Pro- and mesosternum brownish yellow, metasternum black. Coxae, trochanters and lower parts of rest of the legs yellowish, upper surface brownish except basal parts of femora. Abdominal tergites and inner part of femora. Abdominal tergites and inner part of latero-tergites predominantly blackish with minute golden dots; outer margins of all but 1st latero-tergite narrowly brownish orange. 2nd and 3rd tergites grayish blue with a purple tint except in middle; larger patches of silverish hairs laterally on 1st-3rd and 7th tergites, smaller ones laterally on 4th-6th tergites, and medially

on 1st and 2nd. Abdomen laterally and ventrally grayish black with long, whitish pubescence; connexival margin narrowly brownish orange, 4th-7th segments with small, silvery patches below connexivum; a median stripe on 5th and 6th and most of 7th sterna brownish orange; 8th abdominal and the genital segment dark brownish.

Apterous female (fig. 1) with colour-pattern mostly as in male, but abdomen with some additional spots of grayish blue: A smaller spot in the middle of posterior part of 5th tergite, a larger one on 6th tergite, and small spots on 4th-7th sterna below connexivum; the small silvery patches lacking on 4th-6th tergites; 7th tergite hidden by the inflexed connexiva.

Macropterous female with brownish black or blackish hemielytra with white spots and stripes as follows: Two longer basal stripes, reaching well behind apex of pronotum; one oval spot in each of the two median cells and in the apical open cell; one oval spot at the inner margin before apex (the last one not present in another female). Veins black with golden hairs on basal parts.

Structure: A medium-sized *Microvelia*. Apterous male: Body oval, tapering posteriorly. Total length 2.42 — 2.60 mm; greatest width (at the 3rd abdominal segment) 0.92 — 0.98 mm. Head 0.61 — 0.64 mm across eyes, about two-thirds as long as wide across eyes (31:50 *). Eyes small, width one-third the interocular space (10:29); antennae relatively long and slender, about half the total length; 1st segment thick and curved with two long and erect bristles internally; 3rd and 4th segments slender and long, 2nd shorter and thicker; proportional length of antennal segments (1st-4th): 27:19:28:38. Rostrum reaching middle of mesosternum.

Pronotum rather long, a little more than half as long as wide (39:70), a distinct row of punctures along the anterior and posterior margins of the transverse band; numerous punctures on the disc; additional punctures on propleura. Legs relatively long and slender; proportional length of leg segments:

	Femur	Tibia	Tarsus
Front leg	55	47	25
Middle leg	65	61	13:21
Hind leg	75	82	15:22

* 1 unit = 0.0125 mm.

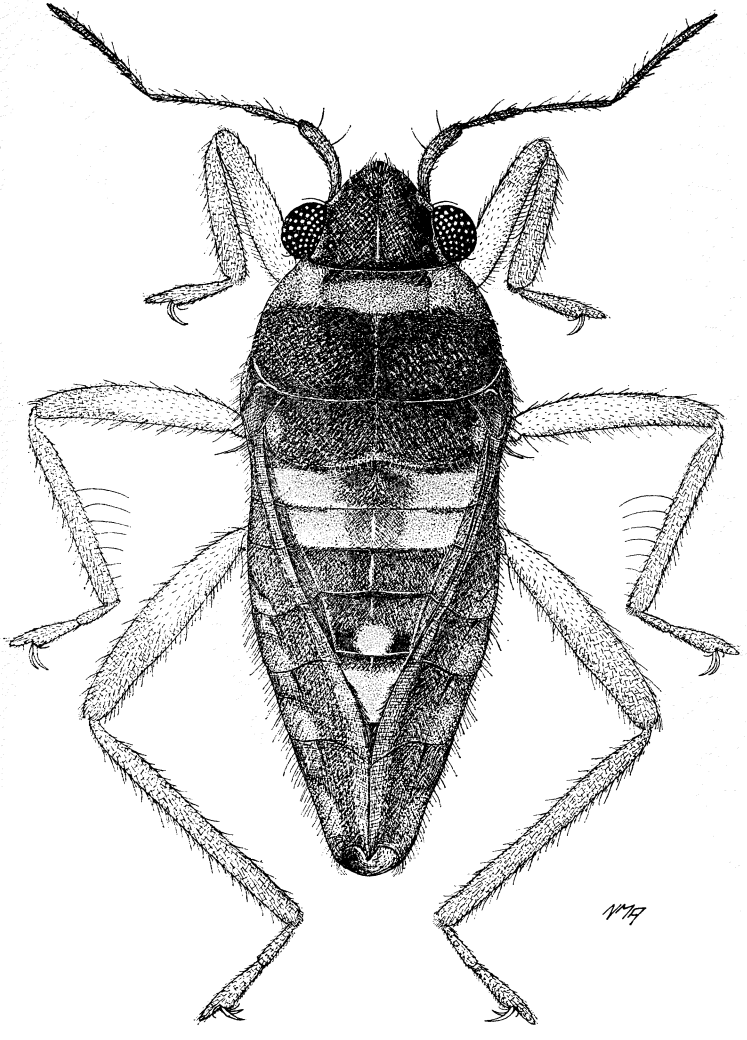
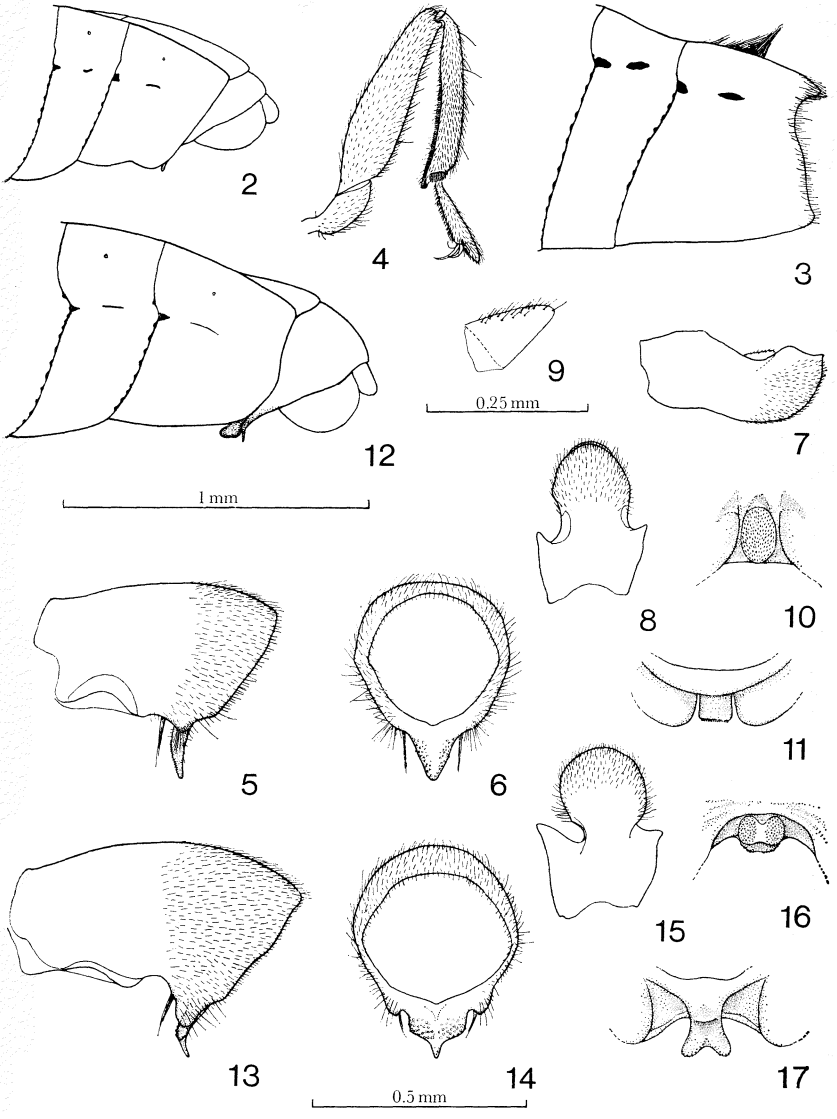


Fig. 1. *Microvelia childi* n. sp. Apterous female. Paratype from Boronia, N. S. Wales.

Front femur moderately incrassate in basal half, a little thicker than middle femur; only front tibia with a comb of pegs (about 80 thicker ones in the straight part of the comb, numerous slender spines in that part which turns around the apex of tibia) occupying about three fifths of tibia length (30:47). Chaetotaxy of middle and hind legs without peculiarities.

Abdominal tergites together a little more than three times as long as pronotum (129:39), evenly tapering in width towards posterior margin of 7th segment; 7th tergite longer than the preceding two segments (39:33); greatest width of connexivum, at the hind margin of 4th segment, one-third the width of the corresponding tergite (16:48); connexivum only slightly raised above the level of tergum. Ventral surface of abdomen with long and suberect hairs and with a shallow depression bordered with longer hairs in the middle of 5th-6th sterna; 7th sternum with apical margin concave and with a deep depression in the middle, narrowing posteriorly; at the hind margin of 7th sternum a shallow, oval tubercle provided with numerous minute denticles (fig. 10) is situated between the raised margins of the groove-shaped depression. 8th segment (fig. 5—6) a little longer than 7th tergite (44:39); ventral, apical margin concave, with a long process, which, in side view (fig. 5) is slightly curved and with numerous denticles on the caudal surface; viewed from behind (fig. 6) with broad base and pointed apex; on each side of this process a low tubercle with long bristles and an additional tuft of long hairs; 8th segment in the resting position nearly completely withdrawn in the preceding segment and the ventral process fits against the low tubercle on 7th sternum described above (fig. 2). 9th segment (pygofer) (fig. 7) relatively small, only slightly asymmetrical, in rest clockwise rotated in the 8th segment; anal cone (fig. 8) with small, asymmetrically developed, lateral wings; the two claspers nearly identical, small, subconical, with numerous small hairs on the antero-dorsally directed surface (fig. 9). Phallus with a very complicated set of ill-defined sclerites, and thus not very useful for taxonomic purposes.

Apterous female (fig. 1): Body more elongate than in male; abdomen tapering. Total length 2.52—2.80 mm; greatest width (across mesothorax) 0.95—1.05 mm. Head 0.65—0.68 mm. Antennae little less than half the total length; antennal formula (1st-4th): 25:19:27:36. Rostrum reaching middle of mesosternum.



Figs. 2—11. *Microvelia childi* n. sp. (2 and 3) Lateral view of apical abdominal segment in apterous male and female, respectively. (4) Right front leg in male. (5 and 6) 8th abdominal segment in male, lateral and caudal view, respectively. (7) Lateral view of 9th segment in male. (8) Anal cone. (9) Left clasper. (10 and 11) Hind margin of 7th abdominal sternum in male, ventral and caudal view, respectively. — Figs. 12—17. *Microvelia mjobergi* Hale. Apterous male holotype. (12) Lateral view of apical abdominal segments. (13 and 14) 8th abdominal segment, lateral and caudal view, respectively. (15) Anal cone. (16 and 17) Hind margin of 7th abdominal sternum, ventral and caudal view, respectively.

Pronotal length a little more than half the width (37:71). Proportional length of leg segments:

	Femur	Tibia	Tarsus
Front leg	51	42	25
Middle leg	63	60	12:21
Hind leg	74	81	14:22

Front femur not thicker than middle femur; front tibia without comb.

Dorsal length of abdomen a little less than four times the pronotal length (140:37). Connexivum vertically raised in anterior half, reflexed and bent inwards in posterior half, meeting in the median line above 7th tergite; margin of one or both of 7th latero-tergites in three of the seven apterous females examined, furnished with a suberect, dense tuft of black bristles as long as an eye-width (fig. 3); 7th sternum long, longer than the preceding two segments together (49:38). Genital segments completely withdrawn into the cylindrical 7th abdominal segment; anal cone bent downwards, covering valvifers.

Macropterous female (macropterous male unknown): Total length 2.82—2.88 mm; greatest width (across humeri) 1.25—1.30 mm; width across eyes 0.66—0.68 mm. Pronotum considerably widened across humeri, wider than long (50:40); disc between and behind humeri relatively long, transversely raised, posterior margin forming a rounded, slightly acute angle. Hemielytra reaching or surpassing tip of abdomen. Venation like fig. 115 C in Lundblad 1933. Connexivum almost vertically raised.

Notes on types: Described from 3 ♂ 2 ♀ apt., 3 ♀ macr. (male holotype and paratypes) together with 25 nymphs (penultimate and ultimate instars) labeled: "Kuringai Chase, 20 miles N. of Sydney; altitude 500′; freshwater stream; April 1966. J. Child", and 5 ♂ 5 ♀ apt. (paratypes) and 1 nymph (ultimate instar) labeled: "Freshwater stream; Boronia PK; N. S. Wales; 7.6.66. J. Child". All of the specimens originally preserved in alcohol, the holotype and most of the paratypes are now mounted dry. Holotype and paratypes in the I. Lansbury collection, Hope Department, University of Oxford. 2 ♂ 1 ♀ apt., 1 ♀ macr. and some nymphs now present in the Zoological Museum of Copenhagen.

Measurements of male holotype: Total length 2.42 mm; greatest width (at the 3rd abdominal segment) 0.95 mm; head width 0.61 mm.

Comparative notes: Among the seven Australian species of *Microvelia* described or quoted by Hale (1925 and 1926), *M. childi* n. sp. seems to be nearest to *M. mjobergi* Hale, *peramoena* Hale, and *howense* Hale. The latter species was not seen by the present author, but has relatively longer legs than the new species and a tibial comb in the male which is about half as long as the tibia. It was described from Lord Howe Island, far from the east coast of Australia, and probably is endemic to that island. *M. peramoena* Hale was more satisfactorily redescribed by Lundblad (1933, p. 324—326, fig. 102). It has the transverse yellowish band on pronotum clearly interrupted in middle, and the male has a very characteristic 8th abdominal segment with two vertical hooks at the ventral hind margin. *M. mjobergi* Hale is apparently the nearest relative to the new species. The author has been able to examine the apterous male type of *M. mjobergi,* which is deposited in Naturhistoriska Riksmuseet in Stockholm. Special attention was given to the male genitalia, which were not mentioned in the original description. *M. mjobergi* Hale is a somewhat larger species than *M. childi* n. sp., with a total length of 3.15 mm (apt. ♂) and 3.14 mm (apt. ♀, placed on the same card as the type); greatest width 0.72 mm and 0.75 mm, respectively. The head is lighter and connexivum yellowish brown, not black as in *childi.* However, the most convincing differences are in the apical abdominal segments of the male, as seen from the accompanying figures (figs. 5—17). The vertical processes on 8th segment is broad basally with a slender and pointed apex, not evenly tapering as in *childi* n.sp. The ventral tubercle at the end of the sternal furrow on 7th abdominal segment is bilobated in *mjobergi,* simple and not so prominent in *childi.* Small differences are also found in the structure of the anal cone. The pygofer and claspers are practically identical; the phallus structure is very complicated in both species and not compared here.

M. mjobergi and *childi* constitute a group of related species which also includes *M. magnifica* Lundblad, 1933 described from Bali (Lundblad 1933, p. 326—328 and 475—476). *M. magnifica* is of about the same size as *M. mjobergi* (3.2 mm); the male has a tibial comb of three-fourths the tibia length and an 8th segment with a very long and pointed process on the apical ventral margin, pointing obliquely forwards.

Check-list of Australian species of Microvelia

Genus *Microvelia* Westwood, 1834.
(*Hydroessa* Burmeister, 1835)

australica Bergroth, 1916 (p.38). (Laird 1956, p.75). — Queensland, S. Australia or N. Territory (Palm Creek).

childi Andersen, 1969 (p. 253). — N. S. Wales.

dubia Hale, 1926 (p. 214). — N. S. Wales, Tasmania.

halei Esaki, 1928 (p. 69). (=*oceanica* Hale, 1926, p. 208 nec Distant, 1914). — Queensland, N. S. Wales, S. Australia, Tasmania, Lord Howe Island.

howense Hale, 1926 (p. 211). — Lord Howe Island.

melancholica Hale, 1925 (p. 5). (Hale 1926, p. 216; Lundblad 1933, p. 320). — Queensland.

mjobergi Hale, 1925 (p. 6). (Hale 1926, p. 213; Laird 1956, p. 75; Andersen 1969, p. 259). — Queensland.

peramoena Hale, 1925 (p. 8). (Hale 1926, p. 213; Lundblad 1933, p. 324; Hale 1935, p. 251; Laird 1956, p. 75). — Queensland, N. S. Wales, Victoria, S. and W. Australia, Tasmania.

Note: The species *M. oceanica* Dist. was originally described from N. Caledonia and Loyalty Islands. The occurrence of this species on the Australian continent, as postulated by Hale (1926, p. 208), was later questioned by Esaki (1928, p. 69), who renamed the Australian species as *M. halei* referring only to the description given by Hale (l.c.; in Hale's 1926 paper the illustrations of *M. oceanica* have been interchanged with those of *peramoena,* the latter being copied from his 1925 paper). However, Lundblad (1933, p. 342) has given evidence that Hale's *oceanica* is a complex of two or more species, and the fixation of the name given by Esaki to one of these species will raise some difficulties.

Without doubt *M. halei* Esaki belongs to the same group of species as *oceanica* Dist. which is characterized by the small size and the yellowish, pronotal hind margin. This group, the *oceanica* group, is widely distributed in the Indo-Australian and Pacific areas, but only few of the species are adequately known. *M. australica* Bergroth is insufficiently described but the yellow-margined pronotum places it readily in the *oceanica* group. Finally, China (in Hawkins 1942, p. 896) reports a "*Microvelia* sp. near *oceanica*" from Norfolk Island.

Acknowledgments

I am indebted to Mr. I. Lansbury, Oxford, for placing the material of the new species at my disposal and to Mr. Per Inge Persson, Stockholm, for the loan of the type of *Microvelia mjobergi* Hale.

Summary

A new species of *Microvelia, M. childi* n. sp., is described from N. S. Wales, Australia, and compared with *M. mjobergi* Hale. Additionally, the author gives an annotated check-list to the eight Australian species of *Microvelia.*

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On some Stratiomyidae, Rhagionidae, Tabanidae, Acroceridae, Therevidae, and Nemestrinidae from Southern Spain (Diptera), with description of a new species.

By
Leif Lyneborg
Zoological Museum, Copenhagen, Denmark.

The paper is based on a material from southern Spain, collected partly in July-August 1960 by Dr. J. R. Vockeroth, partly in March-May 1966 by the author and his assistents and by Dr. W. Hackman. Most of the 1960 material is kept in the Canadian National Collection, Ottawa, with duplicates in the Zoological Museum, Copenhagen. The 1966 material is in the Zoological Museum, Copenhagen, and those specimens collected by W. Hackman are at present in the Zoological Museum, Helsinki.

A total of 18 species is recorded. One of these, *Oxycera hispanica* n. sp., is new to science, and is described. The systematic position of *Thereva xestomyzina* Strobl is discussed. One species of *Hybomitra* and three species of *Thereva* are new to the Spanish list.

The author is grateful to Dr. M. Leclercq, Beyne-Heusay, Belgium, for identification of some of the Tabanidae, and for information on their distribution.

STRATIOMYIDAE

Stratiomys (Hirtea) longicornis Scopoli, 1763.

Material. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 1 ♀, 3 April 1966.

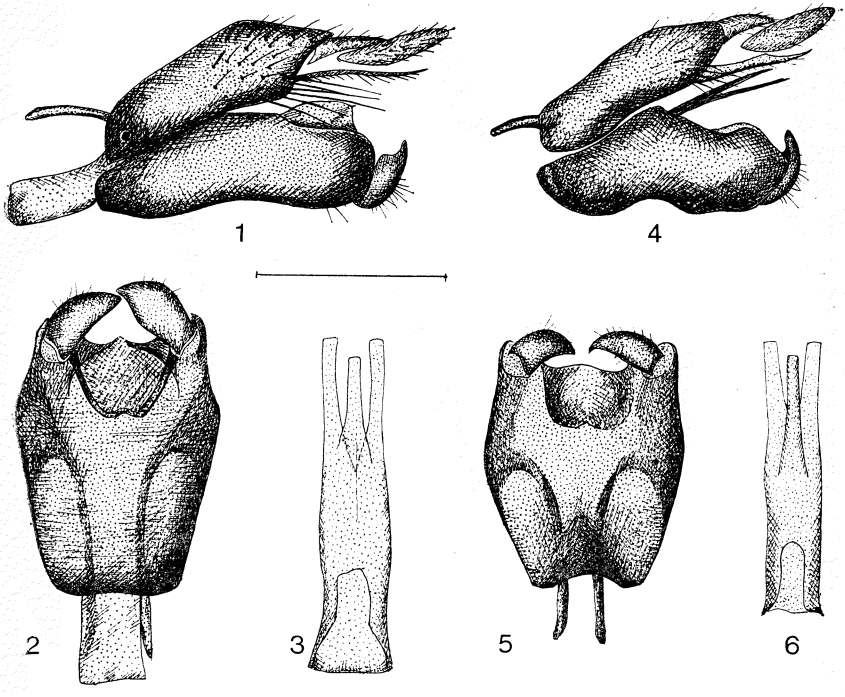
Distribution. — Palaearctic Region from western Europe to Japan, and from southern Scandinavia to North Africa. Earlier recorded from Spain by Strobl (1906:276), Czerny & Strobl (1909: 142).

Oxycera hispanica n. sp. Figs. 4—6

Material. — GRANADA: Sierra Nevada Highway, 1650 m, 1 ♂ holotype, 1 ♂ 3 ♀ paratypes, 27 July 1960 (J. R. Vockeroth). Holotype and two female paratypes in Canadian National Collection, Ottawa. Two paratypes (♂ + ♀) in Zoological Museum, Copenhagen.

Description. Holotype, male. — Head. Entirely blackish, the frontal triangle and a narrow margin along ventral margin of eye silvery-white dusted. Pubescence whitish. Proboscis yellowish. Antennae blackish. Upper part of eye with enlarged ocelli with sharp limit to the smaller facets on lower part.

Thorax. Mesonotum black with comparatively long, whitish pubescence. A narrow, yellowish-white notopleural seam, and postalar calli indistinctly brownish. Scutellum predominantly yellowish-white, only basal third black.



Figs. 1—3. Male terminalia of *Oxycera marginata* Lw., lectotype from Sicily. Figs. 4—6. Male terminalia of *O. hispanica* n. sp., holotype. Figs. 1 and 4, lateral view of terminalia; Figs. 2 and 5, ventral view of the terminalia; Figs. 3 and 6, aedeagus in dorsal view. Scale 0.25 mm.

Wings greyish-hyaline with fore margin more yellowish. Knob of halteres yellowish-white.

Legs. f_1 and f_2 yellowish. f_3 yellowish with a blackish-brown ring occupying basal two-thirds of apical half. t_1 and t_2 yellowish with middle parts blackish-brown darkened, but not forming sharply contrasting rings. t_3 extensively blackish, only paler at base and tip. Fore tarsi blackish. Middle and hind tarsi with first two joints yellowish, rest blackish.

Abdomen black with very narrow, yellowish margin on hind half, and a triangular yellowish-white apical spot. Terminalia. See Figs. 4—6.

Length. Total: 5.2 mm.

The male paratype has lost its head. It agrees well with the above description, but the t_1 is somewhat darker.

Female.

Head. Frontal stripe occupies less than half width of head (index 65:145), with nearly parallel borders. Face and frontal stripe with a blackish middle stripe. On lateral parts of face a broad yellowish-white band which continues on lateral parts of frontal stripe nearly to level of anterior ocellus. At level of one third of length of frontal stripe (measured from antennal bases to anterior ocellus) these bands diverge from eye margins. The broad occipital margin has a pair of yellowish-white spots dorsally, and also the ventral two-thirds are yellowish-white. Proboscis yellowish. Antennae yellowish-brown, becoming darker towards tips. Pubescence of head short and whitish.

Thorax. Mesonotum blackish with two broad, yellowish-white bands. A broad notopleural seam, and also parts of pleura yellowish-white. Scutellum more yellowish-white than in male, only basal fourth black. Pubescence short and whitish.

Wings and legs as in male.

Abdomen. As in male but yellowish-white, marginal band much broader and starting on tergite 2.

Length. 4.6 — 5.2 mm.

Remarks. — *O. hispanica* n. sp. will be identified as *O. marginata* Loew, 1859, after the key in Lindner (1938). This species is at present only known in the type-specimens (♂ + ♀) from Sicily. These were kindly sent for comparison by Dr. H. Schumann, Berlin. It is evident that *marginata* and *hispanica* are closely related species (sister-species). Dr. Erwin Lindner, who

also examined the two species, came to the conclusion (*in litt.* 5 Oct. 1967) that they possibly should be treated as subspecies. However, dissection of the male terminalia of both showed such large differences that it seems justifiable to treat them as two species. Figs. 1—3 show the male terminalia of the male syntype of *O. marginata* Loew, which I hereby designate as lectotype. Figs. 4—6 are of the holotype of *O. hispanica* n. sp. The most distinct difference lies in the shape of the ventral portion of the terminalia (Figs. 2 and 5), and especially in the aedeagus (Figs. 3 and 6). This is much longer in *marginata* than in *hispanica,* its basal part becoming visible in an external view in *marginata* but not in *hispanica.* There are also a few differences in other characters, as summarized in the following:

♂. Frontal triangle not dusted. No sharp limit between larger and smaller facets. Mesonotum with blackish-brown pubescence. Scutellum more black than yellow. Legs extensively dark brownish, only femora and tibiae slightly paler at base and tip.

♀. Yellowish-white bands on frontal stripe narrowly separated from facial bands. All legs, also metatarsi of p_2 and p_3, distinctly darkened (though much paler than in male) ..... *marginata* Lw.

♂. Frontal triangle whitish dusted. A sharp limit between larger and smaller facets. Mesonotum with whitish pubescence. Scutellum more yellow than black. Only f_3 and t_3 extensively darkened; other legs prodominantly yellowish.

♀. Yellowish-white bands on frontal stripe confluent with facial bands. At least f_1, f_2, and metatarsi of p_2 and p_2 exclusively yellowish ..... *hispanica* n. sp.

Nemotelus pantherinus Linné, 1761.

Material. — GRANADA: Maitena, 900 m, 1 ♀, 11 July 1960 (J. R. Vockeroth).

Distribution. — Europe, North Africa, Asia (Siberia). Recorded from Spain by Encobet (1912:136).

RHAGIONIDAE

Rhagio lineola andalusiaca Strobl, 1909.

Material. — GRANADA: Sierra de Contraviesa near Rabite, 1300 m, 1 ♀, 2 May 1966; Rio Lanjaron near Lanjaron, 600 m, 3 ♂ 3 ♀, 26—28 April 1966.

Distribution. — The subspecies is only known from southern

Spain. The nominate form is widely distributed in central and northern Europe.

Remarks. — The subspecies was originally described on the basis of three males from Algeciras. Strobl (in Czerny & Strobl 1909: 167) described the thorax and coxae as blackish. The males from Lanjaron have a thorax not darker than in Danish *lineola,* and the coxae vary from completely greyish-black to nearly all yellowish. The abdomen is completely yellowish with the exception of sternites 6—8, which are blackish. In the terminalia there are no real differences between Spanish and Danish specimens. The females show the same variation in colour of the coxae as the males, and can be separated from females of *lineola lineola* by the presence of only narrow blackish basal bands on the tergites. Also the legs are paler than in the nominate form; they nearly lack darker rings on apical parts of f_1 and f_3.

Chrysopilus splendidus Meigen, 1820.

Material. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 2 ♂, 19 April and 3 May 1966.

Distribution. — Southern and central Europe, towards the north to the Leningrad region and Bornholm. Earlier recorded from Spain by Strobl (1906:304).

Remarks. — The terminalia of one of the Spanish specimens are similar to those figured by Rozkosny & Spitzer (1965, fig. 66) for a Czechoslovakian specimen.

TABANIDAE

Dasyrhamphis ater Rossi, 1790.

Material. — GRANADA: Barranco de Miranda 8 km SW Orgiva, 300 m, 2 ♂ 1 ♀, 20—23 April 1966; Rio Guadalfeo, Orgiva, 300 m, 1 ♂, 19 April 1966; Sierra de Contraviesa near Rabite, 1300 m, 18 ♀, 2 May 1966; Sierra Nevada near Padul, 1200 m, 3 ♀, 4 May 1966. — MALAGA: Torremolinos, 0—50 m, 6 ♂, 3 May 1966.

Distribution. — Morocco, Algeria, Spain, France, Italy, Greece, Albania, Yugoslavia, Switzerland, western Turkey, Corsica, Sardinia.

Tabanus cordiger Meigen, 1820.

Material. — GRANADA: Barranco de Miranda 8 km SW Orgiva, 300 m, 6 ♀, 20 April-5 May 1966; Rio Guadalfeo, Orgiva, 300 m,

1 ♀, 5 April 1966; Rambla de Aculas 10 km E Orgiva, 400 m, 1 ♀, 27 April 1966; Rio Lanjaron near Lanjaron, 600 m, 1 ♀, 26 April 1966.

Distribution. — Europe from Fennoscandia and southern England to the Mediterranean subregion, and especially very common in the countries around the western part of the Mediterranean Sea. Also in many parts of Asia, eastwards to northeastern China and Korea.

Hybomitra tropica Linné, 1758.

Material. — GRANADA: N. slope Veleta, Sierra Nevada, 2400 m, 1 ♀, 25 July 1960 (J. R. Vockeroth).

Distribution. — Denmark, Czechoslovakia, Austria, Yugoslavia, France, Belgium, Japan. New to Spain.

Haematopota hispanica Szilady, 1923.

Material. — GRANADA: Barranco de Miranda 8 km SW Orgiva, 300 m, 1 ♀, 5 May 1966; Rio Guadalfeo, Orgiva, 300 m, 1 ♀, 18 April 1966; N. slope Veleta, Sierra Nevada, 1 ♀, 30 July 1960 (J. R. Vockeroth).

Distribution. — Central and southern Europe, Morocco, Iran, Caucasus area, Kazachstan, western Siberia.

ACROCERIDAE

Opsebius inflatus Loew, 1871.

Material. — GRANADA: N. slope Veleta, Sierra Nevada, 2400 m, 2 ♂, 25 July 1960 (J. R. Vockeroth).

Distribution. — Southern France, Spain.

THEREVIDAE

Apioeicoceras costalis Wiedemann, 1824.

Material. — ALMERIA: Albufera, 0—50 m, 1 ♀, 14 April 1966; Cabo de Gata, 0—50 m, 20 ♂ 10 ♀, 24—31 March (also W. Hackman). — GRANADA: Torrenueva E Motril, 0—50 m, 1 ♀, 14 April 1966. — CADIZ: La Linea, 3 ♂, 2 August 1960 (J. R. Vockeroth).

Distribution. — Morocco, Spain (Czerny & Strobl, 1909: 167).

Remarks. — The species occurred commonly on stony ground with very sparse vegetation in the desert-like dune areas northwest of Cabo de Gata (the village). See also discussion under the following species.

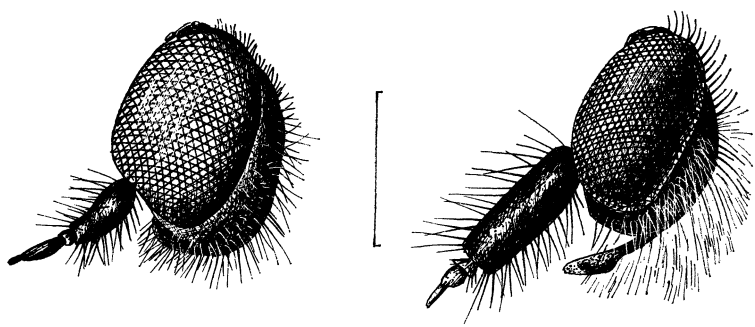
Apioeicoceras xestomyzina Strobl, 1909 (New comb.).

Material. — ALMERIA: Tabernas 5 km N, 200—500 m, 1 ♂, 12 April 1966 (W. Hackman). — GRANADA: Torrenueva E Motril, 0—50 m, 1 ♂, 12 April 1966; Barranco de Miranda 8 km SW Orgiva, 300 m, 10 ♂ 5 ♀, 16 April — 5 May 1966.

Distribution. — Hitherto only known from Spain (Alicante = Terra typica).

Remarks. — The species was described by Strobl (in Czerny and Strobl, 1909:168) as a *Thereva,* though he mentions the close resemblance to *Xestomyza costalis* Wiedemann, 1824, for which Becker (1912: 302) erected the genus *Apioeicoceras.* Also Kröber (1925: 54) treated *xestomyzina* as a *Thereva.* In fact, the here proposed correlation of *xestomyzina* and *costalis* breaks down the suprageneric groups of Becker (l.c.) and Kröber (l.c.). Both authors operate with a *Xestomyza*-group including genera with strongly projecting face, a long and strongly thickened first antennal joint, and often elongated proboscis and palpi. Some preliminary studies of both Palaearctic and Ethiopian *Therevidae* has led the present author to the conclusion that use of adaptive characters in antennae and mouthparts gives no good basis for a phylogenetic system in Therevidae. These studies seem to show that use of characters such as presence or absence of ad and/or pd setae to t_1, number of scutellar setae, certain wing structures, and structures of the terminalia will result in a more natural system.

The two species, *costalis* Wied. and *xestomyzina* Strobl, can at



Figs. 7—8. Heads in lateral view of males of 7. *Apioeicoceras xestomyzina* Strobl, and 8. *A. costalis* Wied. Scale 1 mm.

once be separated by the very different antennae (Figs. 7—8). Moreover, *xestomyzina* has black legs, while in *costalis* the tibiae and tarsi are yellowish. There are several others characters which distinguish the two species. Further details will follow in a planned revision of the Mediterranean Therevidae.

The species occurred in the bottom of the ravine of "Barranco de Miranda", sitting on the small patches of sand and gravel between bigger stones and shrub.

Thereva annulata Fabricius, 1805.

Material. — GRANADA: Barranco de Miranda 8 km SW Orgiva (river banks at Rio Guadalfeo), 300 m, 1 ♀, 23 April 1966.

Distribution. — Europe from northern Fennoscandia to Spain, Italy, Greece. Also Asia Minor and North Africa. Encobet (1912: 71) gives a record from Bilbao.

Thereva cinifera Meigen, 1830
(*subfasciata* Schummel, 1838)

Material. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 1 ♀, 18 April 1966.

Distribution. — Central and southern Europe including southernmost parts of Fennoscandia. Siberia. Not previously recorded from Spain.

Thereva spiloptera Wiedemann, 1824
(*poeciloptera* Loew, 1847)

Material. — ALMERIA: Almeria, 0—50 m, 1 ♂, 6 March 1966; 19 ♂ 3 ♀, 1—14 April 1966 (also W. Hackman); Albufera, 0—50 m, 2 ♂ 1 ♀, 23—29 March 1966; Cabo de Gata, 0—50 m, 3 ♂, 26 March 1966. — GRANADA: Torrenueva E of Motril, 0—50 m, 4 ♂, 14—17 April 1966.

Distribution. — Southern Europe and North Africa. Recorded from Spain by Czerny & Strobl (1909:169).

Remarks. — Common in shrub on plains and hills near the coast.

Thereva vulpina Kröber, 1912.

Material. — ALMERIA: El Alquian, 0—50 m, 1 ♀, 3 March 1966; Alhama, 200—500 m, 2 ♂, 22 March 1966 (W. Hackman). — GRANADA: Torrenueva E of Motril, 0—50 m, 6 ♂ 2 ♀, 12—14 April 1966, Barranco de Algarrobo, 300 m, 1 ♀, 25 April 1966; Sierra Nevada near Padul, 1200 m, 1 ♀, 8 April 1966.

Distribution. — Probably only southern and central Europe.

Remarks. — After examining Kröber's material of *Thereva neglecta* Kröber, 1912, from the museums in Berlin and Vienna, the present author is convinced that Kröber has confused males and females of two different species in *neglecta*. Kröber (1912:407) described *neglecta* on females from Germany, Austria, Hungary, Italy, Crete, Sardinia and Turkestan, and on males from Turkestan only. The females of European origin are conspecific with the Spanish specimens as recorded above. Females from Turkestan were not present in the material seen. In Zoological Museum, Berlin, are three males of *neglecta,* one labelled "Type", the others "Cotype". The first one is selected as lectotype to *neglecta* Kröb. and has been labelled accordingly. It bears a locality label of "Iskanderj" in Russian letters. The European females of Kröber's *neglecta* have been found to represent the hitherto unknown female of *Thereva vulpina* Kröber, 1912, which was described on male specimens alone, originating from Austria, Hungary and Germany. *T. vulpina* Kröb. is represented in the Vienna museum by a good series of specimens some of which were labelled "Cotype". It is possible that *Thereva niveifacies* Kröber, 1912, represents the right female to *neglecta* Kröb.

T. vulpina is very closely related to *bipunctata* Meigen, 1820, and is in fact only to be separated by its larger size and more distinct blackish bands on the abdomen. The male terminalia are also very similar in the two species. *T. bipunctata* Meig. of Strobl (1906:305) and Czerny & Strobl (1909: 169) is *vulpina* Kröb. as has been demonstrated by examination of material received from Strobl's collection through Dr. G. Morge, Eberswalde.

Thereva sp.

Material. — GRANADA: Sierra de Contraviesa near Rabite, 1300 m, 2 ♂, 2 May 1966.

Remarks. — The species shows affinity to *tristis* Lw., *graeca* Kröb., *tuberculata* Lw., *spinulosa* Lw. and others, but the true specific status cannot be established at the moment.

NEMESTRINIDAE

Nemestrellus nigrovillosus Lichtwardt, 1909.

Material. — ALMERIA: Almeria, Alcazaba, 0—50 m, 3 ♂ 1 ♀, 18 April 1966 (W. Hackman).

Distribution. — Spain, North Africa.

Summary

The paper brings records of three species of Stratiomyidae (incl. *Oxycera hispanica* n. sp.), two species of Rhagionidae, four species of Tabanidae (incl. *Hybomitra tropica* Linné, new to Spain), one species of Acroceridae, seven species of Therevidae (incl. *Apioeicoceras xestomyzina* Strobl, new comb., and three species of *Thereva* new to Spain), and one species of Nemestrinidae.

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Nye fund af sjældne biller (Coleoptera) i Jylland.

Af
Ole Jensen
Heibergsvej 12, Grejsdalen, 7100 Vejle.

Nedennævnte fund af sjældne biller i Jylland har jeg ment kunne være af interesse. Sidetallet i parentes efter artsnavnet henviser til Victor Hansens fortegnelse over Danmarks biller i Ent. Meddr., bind 33, 1964.

Bembidion humerale Sturm. (p. 20): 1 eks. Svanemose 15/6-1968 på fugtigt, sterilt sphagnum. 2 eks. Sandfeld ved Brande (efter K. Arevads anvisning) 10/7-1968 på fugtige, sterile tørvepletter mellem lyng.

Ifølge F. Bangsholt (1968, Ent. Meddr., bind 36, side 531) er der i Jylland efter 1930 kun gjort 3 fund (5 eks. fra 1 lok.) af denne art.

Bembidion quinquestriatum Gyll. (p. 20): 1 eks. Grejs ved Vejle 22/8-1968 krybende på en husmur om aftenen.

Meget sjælden og oftest enkeltvis, men dog fundet over hele landet.

Chlaenius nigricornis F. (p. 23): 3 eks. Assendrup ved Vejle 4/6 og 10/6-1968, 2 eks. Svanemose 15/6-1968, på begge lokaliteter på fugtig, tildels græsklædt lerbund.

Ifølge Bangsholt (1968, side 534) er arten i Jylland kun fundet på 6 lokaliteter. Da begge mine fund er på lokaliteter, som er nye for arten, er disse altså en væsentlig forøgelse til kendskabet om artens udbredelse.

Agonum ericeti Panz. (p. 41): 1 eks. Give 19/8-1967 og i antal samme sted 25/5-1968, 1 eks. Svanemose 15/6-1968, 1 eks. Sandfeld ved Brande (efter K. Arevads anvisning) 10/7-1968, 1 eks. Karup 18/8-1968. På alle lokaliteterne løbende fremme i solskin på fugtigt, sterilt sphagnum.

Denne, kun i Jylland fundne art, er meget sjælden, men antagelig mere udbredt i Jyllands hedemoser end almindelig antaget.

Cymindis angularis Gyll. (p. 46): 1 eks. Karup 18/8-1968 på åben sandet-stenet hedebund sammen med bl. a. *Bembidion nigricorne* Gyll.

Ifølge Bangsholt (1968, side 541) ingen jyske fund af denne art siden 1930.

Cymindis vaporariorum L. (p. 46): 2 eks. Karup 8/6 og 13/7-1968 på tør hedebund mellem lyng og mos.

Ifølge Bangsholt (1968, side 542) er arten siden 1930 kun fundet i 2 eks. i Jylland henholdsvis ved Horslund Krat vest for Ribe og ved Vejrs.

Catops dorni Rtt. (p. 74): 1 eks. ♂ Grejs ved Vejle 18/7-1968 på græsstrå ved oversvømmelse i en muldet-leret eng med mange muldvarpegange, sammen med bl. a. *Choleva oblonga* Latr. og *Choleva glauca* Britten samt *Trechus micros* Hbst., sidstnævnte i enormt antal.

Yderst sjælden. Hidtil kun kendt i et enkelt eks. fundet ved Favrdal ved Haderslev 3/6-1931.

Catops neglectus Kr. (p. 75): 1 eks. ♀ Assendrup ved Vejle 4/2-1967 på en bøgestub under fjer- og skeletdele.

Yderst sjælden. Kun fundet ved Ålborg 2 eks. juni 1892 og Sundby Storskov 2 eks. ketset 8/6-1958.

Stenus solutus Er. (p. 114): 1 eks. Bredballe ved Vejle 30/11-1963 på en fugtig eng mellem plantedele.

Ny for Jylland. Sjælden og hidtil kun kendt fra øerne bl. a. en del steder i Nordsjælland.

Barypithes mollicomus Ahr. (p. 397): 2 eks. Grejs ved Vejle 7/8-1966 krybende fremme.

Ny for Jylland. Hidtil kun kendt fra øerne, og her sjælden, men udbredt.

For venlig hjælp ved kontrolbestemmelsen og for genitalpræparation af *Catops dorni* Rtt. takker jeg højesteretsdommer, dr. phil. Victor Hansen.

Summary

New findings in Jutland of ten Danish species of Coleoptera are recorded. They are all very rare in Denmark. *Agonum ericeti* Panz. and *Catops dorni* Rtt. are only known from Jutland, and *Stenus solutus* Er. and *Barypithes mollicomus* Ahr. have never been found before in Jutland.

A redescription of Pegohylemyia retusa Ringdahl, including the 3rd instar larva (Dipt., Anthomyiidae).

By
D. M. Ackland
Hope Dept. of Entomology, Oxford.

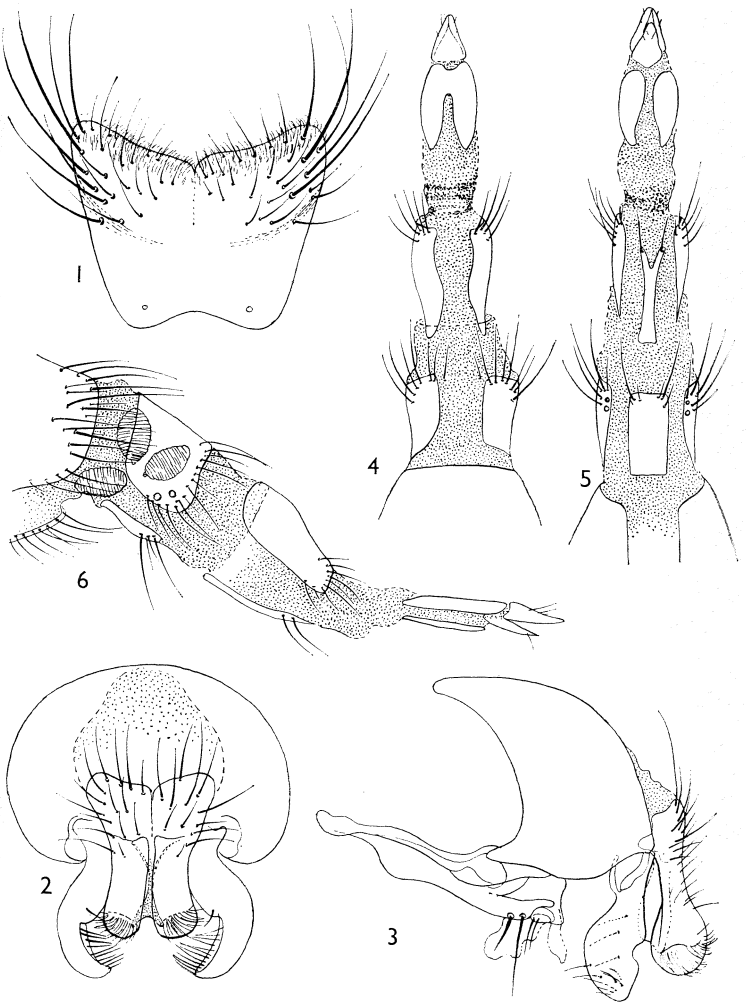
In the autumn of 1967 Dr L. Lyneborg, Zoological Museum, Copenhagen, sent me some larvae, and adults of both sexes, of a species of Anthomyiidae which breeds in the flowers of *Delphinium*. This material was originally submitted (as larvae) to the "Statens Plantepatologiske Forsøg" in Lyngby by Mrs Nordfjeld of Dragør in June 1965, and was collected in her garden; the adults were reared in May 1966 and prove to be *Pegohylemyia retusa* Ringdahl. This species was described by Ringdahl (1952: 231, 233) from the arctic region of Lapland (Kvikkjokk and Saxnäs); two other species of *Pegohylemyia* were described at the same time, and associated (with other species) in a group in which the main or only distinguishing characters are in the male hypopygium. Ringdahl therefore characterized his new species by genitalic characters in the key, and figures of the male hypopygium. The rather surprising occurrence of one of these northern species in Denmark, and the availability of associated males and females, and larvae, makes it possible to redescribe the species in more detail.

In addition to the adults reared from larvae collected by Mrs Nordfjeld mentioned above, larvae have also been found in *Delphinium* flowers in another garden at Lyngby, and at Holte and Molskroen by Prof. Jørgen Jørgensen. The larvae described in this paper were collected at Holte.

The male of *P. retusa* has a fifth sternite (fig. 1) of similar shape to *rectangularis* Ringdahl, described in the same paper, and the name of the latter species refers no doubt to the shape of this sternite; Ringdahl does not figure or mention the fifth sternite of *retusa*. As far as I am aware these are the only European species of this genus with undeveloped lobes to this sternite. Huckett

(1965:79) describes a related species, *aborta,* from northern Canada in which the hypopygium and fifth sternite are very similar to those of *retusa,* and the female of *aborta* (op. cit. 338, fig. 8) has the same type of terminal sclerite to the ovipositor as the female of *retusa,* the cerci being fused to the suranal plate.

The following species of *Pegohylemyia* were described and grouped together by Ringdahl on the basis of the presence of a



Figs. 1—6. *Pegohylemyia retusa* Ringdahl. (1) ♂ 5th sternite. (2) ♂ hypopygium, caudal view. (3) do. profile. (4) ♀ ovipositor, dorsal. (5) do. ventral. (6) do. profile.

median lobe-like process between the two halves of the cercal plate: *nuoljensis, rotundivalva, subfuscisquama, rubrifrons, bidens, setiforceps, rectangularis, retusa,* and probably *coronata. P. nuoljensis* (1926) (as pointed out by Ringdahl) may be synonymous with *rubrigena* (Schnabl, 1915) and *sobrina* Collin, 1931. This latter species was described from three males captured near Godthaab Fjord, Kugssuk, Greenland; these syntypes are in the Hope Dept. of Entomology, Oxford. I have seen specimens of the same species from Iceland (Arnarholt, 7.vii.1922, leg. G. Magnusson) and Sweden (Lake Tarraure, near Kvikkjokk, 20.vii.1962, leg. A. C. Pont) and therefore the synonymy of *nuoljensis* and *sobrina* is probably correct. *P. rubrigena* (described from Siberia) differs from *nuoljensis*, according to the description, in the head colour; *P. incursa* Malloch, 1920 (described from Alaska) has very similar genitalia, and may also be a synonym. These four names may be synonyms for a circumpolar species with some variation in colour.

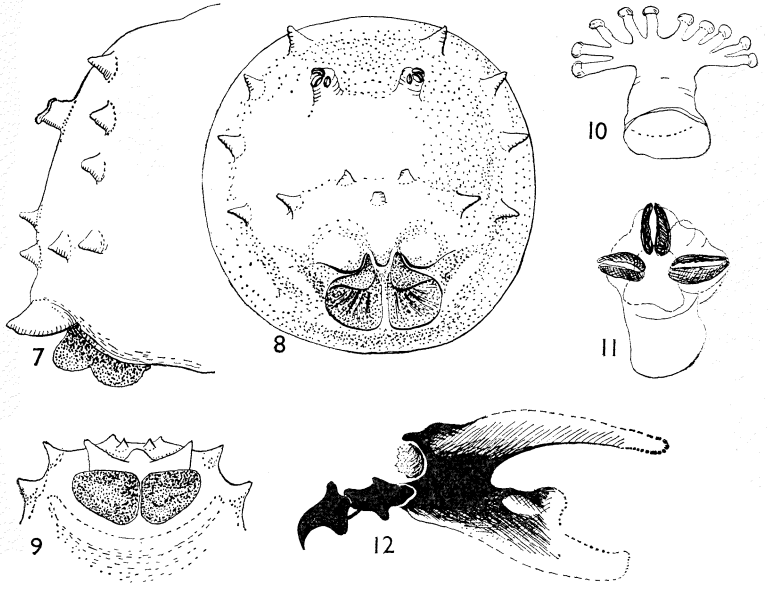
Redescription ♂♀: **Pegohylemyia retusa** Ringdahl, 1952

♂ Head: eye-margins on frons at narrowest part almost touching, separated by diameter of *a* ocellus; interfrontalia linear at this point. Interfrontalia orange, also sometimes upper part of parafacial. Parafacials and jowls below eyes more or less equal to width of third antennal segment. Epistome projecting to same level as profrons. Proboscis not as long as height of eye, mentum about half length of fore tibia. Thorax: greyish brown, with a darker median vitta, and fainter narrower paramedian vittae. *acr* setae rather fine and short, 1—2 pairs of presutural *acr* slightly stronger, the rows as wide apart as distance between *acr* and *dc* rows, with some fine hairs between rows, *pra* seta as long as or slightly shorter than posterior notopleural seta, placed much closer to suture than to *sa* seta. No developed upper anterior mesopleural setula. Two propleural setae, two prostigmatal with 5—6 associated hairs. 1 + 2 sternopleural setae, lower posterior two thirds to three quarters length of upper. Lower squama small, not projecting beyond upper, whitish yellow with pale fringe. Wings: membrane faintly tinged with pale brownish yellow; veins pale. Costal spine very small, hardly differentiated from anterior costal setulae. Legs: fore tibia without median setae, or sometimes a minute *ad* at apical two thirds. Mid tibia with one

ad, two *pd,* all rather short, and 1—2 very short *p* setae. Hind femur with 6—8 *av* on whole length, but only 1—2 long *pv* near base. Hind tibia with 1—2 *av,* 4 short *ad,* 3 longer *pd,* and 1—2 short *p* or *pv* setulae towards base. A b d o m e n : greyish brown pollinose with greenish grey reflections from some points of view; viewed from behind with a faint darker narrow median vitta, but no darker lateral markings. Fifth sternite (fig. 1) almost rectangular, hind margin very little incised. G e n i t a l i a : cercal plate produced into two almost parallel sided lobes with their apices rounded and finely setulose; in profile (fig. 3) these lobes are also expanded. Surstyli with the apical half of inner margin setulose; hypandrium large and robust, praegonites fused to hypandrium, with one long and one shorter slightly flattened seta; postgonite small, distiphallus membranous.

Length 4.5—5 mm.

♀: Agrees with the male except for the following: H e a d : eyes separated on frons by about one third head width, the orange yellow interfrontalia about twice as wide as a parafacial, and with



Figs. 7—12. *Pegohylemyia retusa* Ringdahl, details of 3rd instar larva. (7) posterior segment profile. (8) do. caudal view. (9) do. caudoventral view. (10) anterior spiracle. (11) posterior spiracle. (12) buccopharyngeal armature.

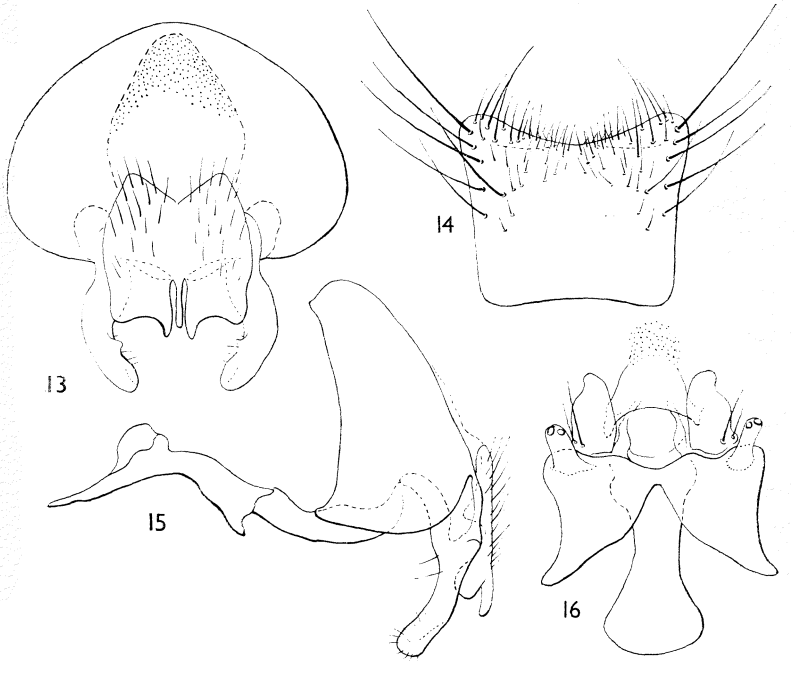
a pair of strong cruciate setae. T h o r a x : mesonotum almost non-vittate, the median vitta only visible in certain lights. Lower posterior sternopleural seta shorter and finer, hardly half length of upper. W i n g s : costal spine more distinct. L e g s : fore tibia with one submedian *ad* seta, and a shorter *pv* setula. Mid tibia with *ad* seta stronger. Hind tibia without *p* setulae. A b d o m e n : almost entirely greyish pollinose, only faint traces of a darker median vitta when viewed from behind. Hind marginal setae of tergites rather weak and decumbent, those on T4 and 5 stronger. In dried specimens the apical segments of ovipositor and the fused cerci are shining brownish, the latter with only short fine hairs. ♀ ovipositor (figs. 4—6): spiracles associated with segment 6 (6+7 of Huckett) close together on lateroventral margins of tergite. Tergites 6 and 7 not sclerotized dorsally along median line, the lateral parts of T8 only fused apically. Sternite 7 forked apically, with two setae; sternite 8 split into two; both tergite and sternite 8 without setae. Cerci apparently fused with suranal plate. Apical part of ovipositor narrower in dorsal and profile view than basal segments.

D e s c r i p t i o n o f t h i r d i n s t a r l a r v a :

About 7—8 mm. long, yellowish white, with a very distinct heavily sclerotized anal plate (fig. 9). Anterior spiracles (fig. 10) with 10 lobes, arranged in two slightly separated groups; posterior spiracles (fig. 11) on distinct protuberences, separated by 2—3 times their diameter; slits more or less at right angles to each other. On the posterior segment, surrounding the spiracles and on disc, are 15 papillae; 2 larger ones above anal plate, 3 on centre of segment, 2 paramedian, and 8 on outer upper part. (fig. 8). Buccopharyngeal armature (fig. 12) with lateral hooks simple.

Pegohylemyia rectangularis Ringdahl, 1952

This species was only separated from *retusa* by hypopygial characters. I possess one male of *rectangularis* (Lake Tarraure, near Kvikkjokk, Northern Sweden, 24.vii.1962, leg. A. C. Pont) which differs from the male of *retusa* in having the proboscis much longer, about as long as head height, the mentum very slender and parallel sided, and about three quarters the length of fore tibia; consequently the lower margin of the head is longer and the epistome more produced forwards. The genitalia of this specimen are drawn in figs. 13—16.



Figs. 13—16. *Pegohylemyia rectangularis* Ringdahl. (13) ♂ hypopygium, caudal view. (14) ♂ 5th sternite. (15) ♂ hypopygium, profile. (16) aedeagus, ventral view.

Acknowledgments.

I am very grateful to Dr L. Lyneborg of the University Zoological Museum, Copenhagen, for allowing me to study the material of *P. retusa,* and my thanks also to Mr A. C. Pont, of the British Museum, who very kindly gave me all the Anthomyiidae which he collected in Sweden in 1962.

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Drei neue Ichneumoniden aus Nordeuropa (Hym., Ichneumonidae).

Von
Rolf Hinz
Einbeck, Fritz-Reuter-Str. 34, BRD.

Campodorus longicaudatus n. sp. ♀

Unter den im Sommer 1964 von mir in Lappland erbeuteten Ichneumoniden befanden sich 5 ♀♀, von denen ich vermutete, daß sie einer noch nicht beschriebenen Gattung angehörten. Henry Townes, Ann Arbor, USA, teilte mir jedoch nach Untersuchung der Type mit, daß es eine *Campodorus*-Art mit ungewöhnlich langem Bohrer sei.

Die Art ist sofort an dem langen, dicken Bohrer zu erkennen. Bei der Determination der Gattung bei Townes (1965) gelangt man ohne Schwierigkeiten zu *Campodorus,* es stören nur die ± deutlichen Quereindrücke auf den vorderen Abdominaltergiten.

K o p f : fein gerunzelt, schwach glänzend, Schläfen und Wangen mit stärkerem Glanz. Wangen 0.5 der Breite der Mandibelbasis. Scheitel nicht verschmälert. Clypeus am Endrande angeschwollen, stumpf, die Seitenecken lappenartig vorgezogen. Fühler fadenförmig, Geißel 21—22-gliedrig.

B r u s t : Mesonotum schwach glänzend, Notauli bis zum Vorderrand deutlich. Mesopleuren stärker glänzend, nur unten kaum erkennbar punktiert, etwas unregelmäßig runzlig mit großem, stark glänzendem Speculum. Propodäum matt, runzlig, Area superomedia und postica mit deutlichen, aber nicht hohen Leisten. Mesosternum stark glänzend.

A b d o m e n : kurz, gegen das Ende deutlich von der Seite zusammengedrückt. 1. Segment etwa so lang wie breit, Basalgrube deutlich, Kiele in der Regel kurz und undeutlich, Glymmen deutlich. 2. Segment deutlich breiter als lang, auch die übrigen Tergite ± deutlich breiter als lang. Bohrer lang und dick: 1.5 der Länge und an der Basis 2.0 der Breite des Metatarsus III. Letztes

Bauchsternit groß, stark gefaltet, die Hinterleibsspitze erreichend. Die vorderen Tergite mit ± deutlichen Quereindrücken hinter der Mitte.

F l ü g e l : Areola fehlt. Nervellus deutlich antefurcal, im hinteren Drittel oder Viertel gebrochen.

F ä r b u n g : Schwarz, Clypeus und Mandibeln schmutzig gelb, Taster dunkel. Fühlergeißel größtenteils bräunlich. Tegulae gelb. Stigma gelbbraun. Abdominaltergite etwa vom 3. an mit ± deutlichen, weißlichen Endrändern. Bauchsternite, auch das letzte, schwarz mit breiten, hellen Endrändern. Beine rot, Hüften schwarz, manchmal zum Teil rot. Trochanteren größtenteils schwarz. Schienen III bräunlich, undeutlich verdunkelt.

G r ö ß e: 4—5 mm.

H o l o t y p u s : ♀, 14.VII.64 Kiruna/S (Zoologisk Museum København, Danmark). P a r a t y p e n : ♀, 20.VII.64 Kiruna/S (Coll. Aubert, Paris); ♀, 25.VII.64 Kilpisjärvi/F (Deutsches Entomologisches Institut, Eberswalde, DDR); 2 ♀♀, 22.VII.64 Kiruna/S (Coll. Hinz). Beide Fundorte liegen in Lappland und zwar im Bereich der Betula tortuosa-Region.

Cubocephalus crassivalvus n. sp. ♀

Die Art ist an dem dicken, stark nach oben gebogenen Bohrer leicht zu erkennen.

K o p f : Clypeus breit, etwa 2.5 so breit wie lang, der obere Teil chagriniert mit einzelnen, groben Punkten, der breite Vorderrand stumpf umgebogen, glatt, Clypeusecken vorgezogen, scharfkantig. Gesicht so lang wie der Clypeus, chagriniert, schwach glänzend, mit feinen Punkten. Stirn gewölbt, mit breit eingedrückten Fühlergruben, chagriniert, glänzend, mit zerstreuten Punkten. Scheitel nicht verschmälert, von oben gesehen breiter als die Augen, chagriniert, glänzend, zerstreut punktiert. Schläfen breit, mitten 1.4 so breit wie die Augen, chagriniert, glänzend, zerstreut punktiert. Wangen 0.5 der Mandibelbasis. Mandibelzähne etwa gleich lang. Fühler sehr kurz und gedrungen, fadenförmig, zur Basis verdünnt, Geißel 19-gliedrig, Glieder höchstens so lang wie breit.

B r u s t : niedergedrückt, Vorder- und Mittelbrust chagriniert, glänzend, ± stark punktiert. Notauli bis fast zur Mitte des Mesonotums deutlich. Sternauli etwa bis zur Hälfte der Mesopleuren erkennbar. Speculum chagriniert. Propodäum runzlig, matt. Lei-

sten, auch die Pleuralleiste, kaum erkennbar. Luftlöcher rund.

A b d o m e n : Basis runzlig, matt, Endsegmente chagriniert, glänzend. 1. Tergit ganz ohne Kiele. Bohrer 2.0 so breit wie der Metatarsus III, Klappen stark nach oben gebogen.

F l ü g e l : Areola mit stark konvergierenden Seiten, Nervellus antefurcal, im hinteren Drittel gebrochen, Nerv deutlich.

B e i n e : gedrungen, Schenkel III 2.9 so lang wie breit.

F ä r b u n g : Schwarz. Rot sind: Mundteile, Basis der Fühlergeißel, alle Beine und die breiten Hinterränder der vorderen Abdominaltergite. Der Rest der Fühlergeißel braun. 7. Tergit mit weißem Hinterrand. Tegulae und Stigma schwarzbraun.

G r ö ß e : 6 mm.

H o l o t y p u s : ♀, 1.VIII.1968 Kiruna/S (Zologisk Museum, København, Danmark). P a r a t y p u s : ♀, 23.VIII.1964 Kiruna/S (Coll. Hinz). Der Fundort liegt in Schwedisch-Lappland, gefangen wurden die Tiere in der Betula tortuosa-Region.

Die Art lag Henry Townes, Ann Arbor, USA vor, nach dessen Auskunft sie bei *Cubocephalus* zur *brevicornis*-Gruppe gehört. Nach seiner Angabe (in litt.) gehört das bei Townes & Gupta (1962, p. 66) erwähnte in Ottawa befindliche ♀ aus Schweden entweder zu dieser oder zu einer nahe verwandten Art.

Meloboris islandicus n. sp. ♂♀

♀. K o p f : Gesicht, Stirn und Wangen chagriniert, kaum glänzend, Scheitel und Schläfen etwas stärker glänzend. Stirn über den Fühlern schwach eingedrückt. Augen schwach behaart. Wangen etwas länger als die Breite der Mandibelbasis. Fühlergeißel 29—30-gliedrig, 1. Glied 1.5 so lang wie das 2.

B r u s t : Propleuren unregelmäßig gerunzelt, schwach glänzend. Mesopleuren chagriniert, unten mehr gerunzelt, schwach glänzend, unten matt. Eindruck mit undeutlichen, etwas unregelmäßigen Streifen. Speculum stark glänzend, meist glatt. Mesonotum chagriniert, fast matt. Hintere Mesosternumleiste nicht unterbrochen. Propodäum nicht eingedrückt, unregelmäßig runzlig, mit undeutlicher Area superomedia.

A b d o m e n : schwach zusammengedrückt. Postpetiolus etwas mehr als 2.0 so breit wie der Petiolus. Glymmen fehlen. Seitengrübchen ± deutlich. Postpetiolus chagriniert, fast matt. 2. Abdominaltergit 1.4 so lang wie breit. Thyridien deutlich. Bauchsternite

mit chitinösen Seitenplatten. Bohrer dünn, länger als das 2. Glied der Tarsen III.

F l ü g e l : Areola regelmäßig, höchstens ganz kurz gestielt, Außennerv undeutlich. Nervellus ganz hinten gebrochen, der ausgehende Nerv kaum sichtbar.

F ä r b u n g : Schwarz, Mundteile gelblich, Mandibeln mit dunklen Spitzen. Tegulae gelb, Stigma gelbbraun. Hinterränder der Abdominaltergite, an den Seiten breiter, ± deutlich rot. Hüften I—III schwarz. Trochanteren I—III schwarz mit hellen Spitzen. Trochantellen I—III gelbbraun. Schenkel I und II an der Basis, Schenkel III ganz schwarz. Schienen III braun, hinter der Basis und am Ende verdunkelt, ebenso die Tarsen III.

Das ♂ entspricht morphologisch dem ♀. Die Färbung stimmt auch gut überein, die hellen Teile der Beine und dem Abdomens sind nur wenig ausgedehnter und intensiver.

G r ö ß e : 6 mm.

H o l o t y p u s : ♀, Skaftafell, S.Ø. Island, Lok. ZB II ke, 21.7. 1961, Jens Böcher. P a r a t y p e n : 3 ♀♀: vom gleichen Fundort und Fangdatum; ♂: Arnarfell hiðmikla. Die Typen befinden sich im Zoologisk Museum, København, Danmark, 1 Paratypus (♀) in Coll. Hinz.

Die morphologischen Unterschiede zu *Meloboris collector* Thbg. sind nicht bedeutend, jedoch fallen bei Vergleich beider Arten die breiteren Schläfen, längeren Wangen und die stärkere Runzelung der Hinterhälfte des Propodäums der neuen Art auf. Außerdem sind bei *collecto*r die Augen nicht behaart. In der Färbung unterscheiden sich beide Arten beträchtlich, da *islandicus* ganz schwarze Schenkel III, ganz schwarze Hüften I—III und nur undeutlich rot gezeichnete Hinterränder der Abdominaltergite besitzt.

Petersen (1956, p. 88) führt der ♂ irrtümlich unter dem Namen *Angitia fenestralis* Holmgren auf. Es ist wahrscheinlich, daß auch die beiden anderen unter diesem Namen angegebenen Exemplare zu *Meloboris islandicus* n.sp. gehören. *Angitia fenestralis* Hlgr. wäre dann aus der Liste der isländischen Arten zu streichen.

Für die Hilfe bei der Beurteilung aller drei Arten danke ich Herrn Henry Townes, Ann Arbor, USA, für die Beurteilung der letzten Art auch Herrn Dr. J.-F. Aubert, Paris. Den Herren Dr. Tuxen und Dr. B. Petersen, København, danke ich für die Überlassung der Paratype sowie für das Übersenden des Materials.

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(Noona Dan Papers No. 87).

Ticks (Metastigmata: Ixodidae) collected by the Noona Dan Expedition to the Philippine and Bismarck Archipelagos.

By
Nixon Wilson
Department of Biology, University of Northern Iowa,
Cedar Falls, Iowa 50613 USA

The Danish natural history expedition to the southern Philippines and Bismarck and Solomon Islands in 1961—1962 (Petersen, 1966), collected 52 ticks representing 4 genera and 7 species. This material, though small in quantity, is important from the standpoint of extending the known distribution of several species to little collected island groups.

A few specimens deposited in the collection of the Bernice P. Bishop Museum, Honolulu are indicated by the letters BBM; all others are in the Zoological Museum, Copenhagen. Acknowledgement is extended to Dr. B. Petersen for allowing me to study the material and to Dr. H. Hoogstraal for comments relative to some of the *Haemaphysalis* and for reviewing the manuscript.

Amblyomma cyprium cyprium Neumann, 1899

Philippines, TAWI TAWI: Lapid Lapid, 3 ♂, 2 ♀, 21 Nov. 1961 (1 ♂, 1 ♀, BBM).

Bismarck Is., NEW IRELAND: Lemkamin, 900 m, 1 ♀, 15 April 1962.

The material from Tawi Tawi was compared with specimens of *A. cyprium aeratipes* Schulze from Mindanao and with specimens of *A. c. cyprium* from Micronesia and New Guinea. It clearly belongs to the latter subspecies. This is the first record of the nominate subspecies from any of the Philippine Islands.

The closest recorded occurrence of *A. cyprium aeratipes* to *A. c. cyprium* of Tawi Tawi is the specimen listed by Schulze (1933)

from Point Banga (between Kawit Kawit and Anungan), Zamboanga del Norte Province, Mindanao. These two localities are about 370 kilometers apart. It would be desirable to have additional specimens of *Amblyomma cyprium* from the southern Zamboanga Peninsula of Mindanao and the Sulu Archipelago, to determine the exact limits of the two subspecies in this area. The species has not been recorded from nearby Borneo, Java, Sumatra and Malaya, or the numerous small islands surrounding them. The only records for southeast Asia are from China (Chang, 1958) and Thailand (Audy et al. 1960).

Amblyomma helvolum Koch, 1844

Philippines, TAWI TAWI: Tarawakan; 4 ♂, 3 ♀, 6 and 13 Nov. 1961 (1 ♂, 1 ♀, BBM).

This species is widely distributed throughout southeast Asia and the south Pacific from Thailand to Australia with reptiles the preferred hosts. These are the first records from the Sulu Archipelago.

Aponomma fimbriatum (Koch, 1844)

Bismarck Is., MUSSAU: Talumalaus, 20 ♂, 6 ♀, 6 N, ex *Varanus* sp., 6 Feb. 1962 (4 ♂, 2 ♀, 2 N, BBM).

This widespread species in the south Pacific occurs almost exclusively on reptiles.

I have called the above specimens *A. fimbriatum* on the basis of scutal measurements and presence of a ventral terminal spur on tarsus I of the males, as defined by Roberts (1964). The extreme scutal measurements for 20 males are 2.45 × 2.41 mm — 1.84 × 1.94 mm with an average of 2.17 × 2.19 mm. All have a small ventral terminal spur. There is considerable variation in the number of punctations and degree of scutal ornamentation, and several specimens would be identified as *A. trimaculatum* (Lucas) on the basis of this character alone.

Dermacentor auratus group

Philippines, TAWI TAWI: Lapid Lapid, 2 ♂, 21 Nov. 1961.

This species complex is widespread throughout southeast Asia, Borneo, Indonesia, New Guinea and Palawan Province of the Philippines. This is the first record from the Sulu Archipelago.

Haemaphysalis (Rhipistoma) centropi Kohls, 1949

Philippines, PALAWAN: Makagwa, 2 ♂, 1 ♀, ex *Centropus bengalensis,* 27 Sept. 1961.

This species is recorded from this host on Palawan (Kohls, 1949). Hoogstraal et al. (1965) list it as occurring also in Borneo, Burma, Malaya, Taiwan and Thailand.

Haemaphysalis (Kaiseriana) nadchatrami Hoogstraal, Trapido and Kohls, 1965

Philippines, PALAWAN: Pinigisan, 600 m, 1 ♂, 21 Sept. 1961.

Hoogstraal et al. (1965) recorded *nadchatrami* as a subspecies, from central and southern Thailand, Malaya, Singapore, Sumatra, Java, Nanukan and Borneo. They now consider it a valid species. The above record from Palawan is not surprising, inasmuch as this island shares close faunal affinities with Borneo.

Haemaphysalis sp.

Philippines, TAWI TAWI: Lapid Lapid, 1 ♀, 16 Nov. 1961.

According to Hoogstraal, this specimen appears to represent an undescribed species in the *formosensis* group. More material of this species is especially desirable.

Summary

Seven species of ticks are recorded: 4 from Tawi Tawi, 2 from Palawan and 2 from the Bismarck Islands. All collections, except one, are new records for the islands on which they were collected.

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The Heteroptera fauna of Korshage, Zealand, II. A comparison July-August of the fauna of the herb stratum.

By
Jens Böcher

I. Introduction.

My previous paper described the late summer aspect of the Heteropterous fauna of Korshage (Böcher 1967). In the Addendum of that paper I briefly mentioned the present investigation, which is attempting a comparison, confined to the herb stratum, between the bug faunas of July and August 1966.

Concerning situation, physiography and plant communities of the study area, see Böcher 1967. There is, however, a single correction. In the present paper the term "Carex dune grassland" is restricted to the very uniform, strongly *Carex arenaria*-dominated vegetation in the north-western part of the area (cf. Böcher 1967, pp. 43, 55, 56). The remainder of what was formerly denoted "Carex dune grassland" is now refered to as "Grey dune grassland", as it is always situated at the margins of the typical grey dune. A survey of the division into plant communities is presented in Table 1; the numbering differs a little from that used in 1967.

II. Methods etc.

The method of collection was sweeping. The unit sample was 50 strokes, but this is not strictly comparable to the samples from 1963 and 1965 because a somewhat smaller net (28 cm diameter) was used in 1966. Just as in the previous investigation (where this was not pointed out) the main guide for sampling was that every plant community should be equally well represented, relative both to the area it is covering and to its diversity. Accordingly, e.g. the "dune pasture and swamp" (3) is clearly overrepresented in rela-

tion to area, whereas the "Carex dune grassland" (4 d) is underrepresented — due to the heterogeneity of the former and the homogeneity of the latter. For further information about the sampling procedure and for a short discussion on the value of sweeping, see Böcher 1967 p. 29 ff.

The samples were taken during two periods, viz. 10.—29. VII and 17.—28. VIII. Contrary to the summers 1963 and 1965 the summer of 1966 was relatively sunny, dry and warm. Sampling was performed during the interval 9^{30} A.M. to 4^{30} P.M. and during fairly uniform weather conditions, i.e. temperatures about 20° C, light to moderate breeze, more or less bright sunshine. Conditions were particularly constant during the August-period. Detailed information on weather conditions etc., and the yield of each sample is available on request.

III. Results.

Tables 2 and 3 give, for July and August respectively, the total caught, the average-catch per sample, the percentage of total, and the percentage of samples in which the species occurred, for each species of Heteroptera. The few samples from the beach (1) and the heath (5) are not included, because sweeping in both places is

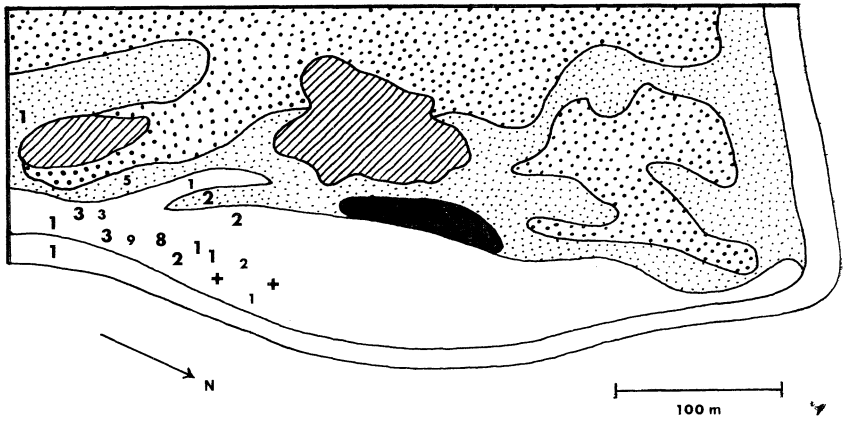


Fig. 1. Map sketch of the study-area at Korshage showing the finds of *Nabis brevis* Sz.. Small figures: 1963, large figures: 1966; crosses stand for finds from 1966 outside the quantitative samples. — The major plant communities are roughly indicated: without signature = beach and green dune, black = dune pasture and swamp, small dots = dune grassland, larger dots = dune heath, hatched = dune scrub (cf. Böcher 1967, Fig. 1).

rather difficult and not quite comparable to when practised in the other plant communities; the heath is devoid of a real herb stratum. Moreover, the bug faunas of these two communities are so distinctive from the fauna of the remainder that they must be treated separately.

Evidently the Heteropterous fauna had changed considerably from July to August. Perhaps the most conspicuous difference is the mean number per sample, namely in July 69.0 (± 79.3*), median: 40/sample, range: 9—364/sample) contrasted with 23 (± 14.5, median: 20/sample, range: 1—87/sample) in August**).

In July *Cymus glandicolor* Hahn and *Plagiognathus chrysanthemi* (Wff.) were the strongly dominant and constant species, whereas in August they were replaced by *Phytocoris varipes* Boh. and *Notostira elongata* (Geoffr.) (cf. Böcher 1967). The fauna was richer in July (52 spp.) than in August (38 spp.) but only 28 species were caught both months. For an explanation of the terms "dominancy" and "constancy" see Böcher 1967, pp. 35, 36.

In order to look at the differences in detail the Tables 4—13 were prepared, comprising a July—August comparison for each of the plant communities.

In the green dune communities (2) the mean number per sample was virtually unchanged from July to August and so was the number of species in each community, even though the composition and relative frequency of the species had been much altered. Only about one third of the species was in common to both months.

In the "dune pasture and swamp" (3) the yield per sample in August only amounted to 25 % of that in July, and there were more species in the latter month. The large numbers in July were chiefly due to two species, namely *Plagiognathus chrysanthemi* and *Cymus glandicolor*.

Even greater differences were found in the "dune grassland" communities (4). The catchings in August only constituted 28 % (4 a), 26 % (4 b), 23 % (4 c) and 7 % (4 d), respectively, of those in July. Again, the dissimilarity is first and foremost caused by the early abundance of *Plagiognathus* (especially 4 a

*) Standard deviation.

**) That there were taken six additional samples from the green dune communities during August introduces a bias into this comparison. Otherwise the number of samples is corresponding July—August within each community.

and 4 b) and *Cymus*, the latter to a remarkable degree in 4 d. *Nysius thymi* (Wff.), too, contributed to the high figures from July in 4, especially in 4 b. — In the "grey dune grassland" (4 c) the number of species in August was less than half the number in July; changes were slight in the other grassland communities. The grey dune grassland has a somewhat ephemeral character, flourishing in early summer, largely withered already in the beginning of August. This accounts for the serious decline in the Heteropterous population of this community during the summer.

The figures from the *Atriplex*-vegetation of the b e a c h (1) are quite another order of magnitude than those coming from the other plant communities. They are, however, merely based on half a sample each month, so not too much reliance should be placed in the values. The composition of the fauna also greatly deviates from the other communities, strongly dominated as it is by *Piesma quadratum* (Fieb.), *Orthotylus flavosparsus* (Shlbg.) (practically all the unindentified "Miridae spp. juv." no doubt belong to this species) and *Lygus maritimus* Wagn.

Species composition was also entirely differing in the d u n e h e a t h (5) where *Orthotylus ericetorum* (Fall.), *Nysius helveticus* (H.S.), *Scolopostethus decoratus* (Hahn) and *Nabis ericetorum* Sz. were the prominent species (cf. Böcher 1967, p. 45). In the heath the number of individuals per sample i n c r e a s e d from July to August.

It is possible to divide the species into the following groupings, comparing their occurrence and frequency in July and August.

A. *Species, the immature stages of which are living and feeding on the Atriplex-vegetation of the beach, from which they migrate as adults to the other plant communities during August.*

This applies to *Piesma quadratum* (Fieb.), *Orthotylus flavosparsus* (Shlbg.), and *Lygus maritimus* Wagn.

Elsewhere in Europe the three species complete two generations a year (Krczal and Völk 1956, Southwood and Leston 1959, Boness 1963). From the present figures it is, however, not possible to decide whether this is the case at Korshage. The proportion of adults rose (from 6 % to 72 %, 6 % to 79 %, and 17 % to 75 %, respectively) and the total of individuals fell on the host-plants from July to August. This seems to indicate that a second generation had not yet started by August the 28th.

Migration was most marked in *Lygus maritimus* which was found throughout the Korshage-area in August; less so in *Piesma quadratum,* and even less in *Orthotylus flavosparsus.* But *Piesma* and *Orthotylus* commenced migration already in July.

B. *Species decreasing in number during July—August.*

Most of the species decreased in number (or eventually completely disappeared — see C) during the space of time elapsed between the periods studied. The decrease is undoubtedly due to natural mortality as the season proceeds, many species having completed their reproductive cycle before the second sampling period. The numbers of the following species fell more or less markedly:

Eurygaster testudinaria (Geoffr.), *Dolycoris baccarum* (L.), *Myrmus miriformis* (Fall.), *Nysius thymi* (Wff.), *Cymus glandicolor* Hahn, *Nabis flavomarginatus* Sz., *Megalocoleus molliculus* (Fall.) and *Plagiognathus chrysanthemi* (Wff.)

During July *Eurygaster testudinaria* was exclusively found as nymphal instars; the two specimens from August were adults. As to *Dolycoris baccarum,* 8 % of the catching in July were adults, against 75 % in August.

The decline was most pronounced in *Cymus, Megalocoleus* and *Plagiognathus* which were on an average reduced by more than ninety percent per sample (22.9—1.4/sample, 1.9—0.1/sample, 17.5—0.6/sample respectively).

Cymus glandicolor shows an interesting bi-centric disposition in the area: astonishing high numbers were caught in the "Carex dune grassland" (4 d) but a second centre is constituted by the "dune pasture and swamp" (3). The species feeds exclusively on sedges (Southwood and Leston 1959) and this facts offers the explanation. In most of the area the food-plant must be *Carex arenaria* which is especially abundant and luxuriant in 4 d. However, other species of sedges are met with in 3 — namely *Carex nigra,* a dominant of that community, and *Carex panicea* (cf. Table 1). In July merely 8 % of the catch were adults, which made up 75 % in August.

Although nearly 80 % of the *Megalocoleus molliculus* caught during July were nymphs, reproduction evidently was absolutely completed by the middle of August and the adults were dying off, as only 4 adult specimens were taken during the latter period.

Regarding *Plagiognathus chrysanthemi* the large numbers were

found in the fairly damp communities, viz. 3, 4a and 4b; nymphs were only taken during July and exclusively in 3 and 4a (10 % and 4 %, respectively) so these communities may represent centres of dispersal.

Myrmus miriformis only decreased from average 2.9/sample in July to 1.2/sample in August. It was full-grown in the latter month, whereas 11 % were immature in July. *Myrmus* showed a bicentric distribution, similar to that of *Cymus* but less pronounced, with one centre in the humid part of the area (3) and another in the "Carex dune grassland" (4d), in which a relatively large number was taken in July (cf. Böcher 1967 p. 55).

In *Nysius thymi* the mean number per sample dropped by about 80 % (from 4.9 to 1.0 per sample) and the percentage of nymphs decreased from 17 to zero. Just as in the late summers of 1963 and 1965 (Böcher 1967, p. 43), *Nysius thymi* had its maximum density in the "dune slack grassland" (4b) during both July and August 1966, but it was frequent also in the other grassland communities.

Nabis flavomarginatus was fully matured already in the middle of July; none of the characteristic later nymphal instars (Southwood and Fewkes 1961) were taken. Contrary to the other species of *Nabis* s. str. in the area which hibernate as adults, *N. flavomarginatus* overwinters in the egg-stage (Southwood and Leston 1959). This allows it to become adult one month earlier than these, and it persists rather frequently in August (decreasing average about 50 % per sample).

C. *Species disappearing completely during July—August.*

This group merely carries the tendency met with in B a step further; the life-stories of the species were entirely terminated before the second sampling period in mid-August, and no immature stages were caught. This is true for *Derephysia foliacea* (Fall.), *Orthocephalus coriaceus* (F.), *Orthocephalus saltator* (Hahn), *Globiceps fulvicollis cruciatus* Reut., *Calocoris norvegicus* (Gmel.), *Leptopterna dolabrata* (L), and presumably also for *Lopus decolor* (Fall.) and *Capsus ater* (L.) of which only a few specimens were taken. *Calocoris norvegicus* was taken once in August, but not in a sample.

Regarding the two species of *Orthocephalus,* they act as "vicariant" species in the area, *O. coriaceus* practically confined to the

"dune pasture and swamp" (3) and *O. saltator* prefering the drier habitats, especially the "grey dune grassland" (4 c); the two species overlap in 4 a.

That no *Stenodema* was caught in the August-samples may be accidental as the *Stenodema* spp. on the whole are remarkably sparse in the Korshage area (cf. Böcher 1967).

D. *Species relatively unchanged in number July—August.*

This applies to *Aelia acuminata* (L.), *Chorosoma schillingi* (Schum.), *Ischnodemus sabuleti* (Fall.), *Nabis pseudoferus* Rem., *Nabis brevis* Sz., *Nabis ericetorum* Sz., and *Adelphocoris lineolatus* (Gz.)

Regarding *Aelia acuminata* the adults present in July (14 %; 81 % in August) no doubt have passed the winter in that stage (the same is true for *Dolycoris baccarum*; Jensen-Haarup 1912, Southwood and Leston 1959).

Chorosoma schillingi reached complete maturity in August against 19 % nymphs in July.

In *Ischnodemus sabuleti* the precentage of nymphs of the total catching merely declined from 31 % in July to 16 % in August; this might be related to the overlapping generations (Tischler 1960). The figures, however, are not reliable because sweeping is not fit for this species: only a small and inconsistent portion is caught of the sometimes huge assemblages of individuals on the lower parts, preferably in the leaf sheaths, of the host plants, *Elymus arenarius* and *Ammophila arenaria* (cf. Böcher 1967, pp. 39, 40).

During July the three species of *Nabis, N. pseudoferus, N. brevis* and *N. ericetorum* were present practically exclusively as immature stages. Due to their red tinge it is possible to distinguish nymphs of *N. ericetorum,* but immature *N. pseudoferus* and *N. brevis* (and possibly a few *N. ferus* which is exceedingly rare in the area) have to be pooled under the heading "*Nabis* spp. juv.". During August most of the individuals reached maturity (59 % of *N. ericetorum,* 75 % of *N. pseudoferus* + *N. brevis*).

Nabis brevis deserves special mentioning. In 1963 this species showed a peculiar distribution, being confined to the south-eastern part of the study area, and it was attempted to explain this by a recent immigration from the south in connexion with the limited dispersal powers of the species (Böcher 1967, p. 54). Fig. 1 shows

the disposition in the area of all the finds from 1963 (small figures) and 1966 (large figures, the single specimen from 1965 included). It is seen that the species had advanced (if the interpretation is correct) no further during the three years.

Adelphocoris lineolatus had on the whole grown up from July (87 % juv.) to August (10 % juv.). In the latter month it appeared more widespread than in July, where it seemed confined to the "grey dune grassland" (4 c). Here *Trifolium* spp. and possibly *Lotus corniculatus* must be the food-plants.

E. *Species increasing in number during July—August.*

This is true for only five species, namely *Scolopostethus decoratus* (Hahn), *Lygus pratensis* (L.), *Orthops kalmi* (L.), *Phytocoris varipes* Boh., and *Notostira elongata* (Geoffr.)

Scolopostethus decoratus overwinters as an adult and it is unknown whether there are one or two generations a year (Southwood and Leston 1959). The present evidence seems to indicate two generations at Korshage, as nymphs were found both in July (45 %) and, more frequently (92 %), at the end of August. In 1965 a large number of nymphs were swept even later in the season (on 10. IX. — cf. Böcher 1967).

Lygus pratensis. In July only a single nymph most likely belonging to this species was taken. During August, however, adults were fairly frequent and found in as good as all the plant communities, possibly migrating into the area from outside.

In *Orthops kalmi* a number of nymphs together with a few adults were caught in some of the grassland communities (4 c, 4 d) during August. Only a single adult, presumably of the overwintered generation, was found in July.

Phytocoris varipes increased in number from average 1.1/sample in July to 3.8/sample in August, where it was the dominating species in most of the plant communities. The proportion of immature stages at the same time fell from 19 % to zero. It is difficult to explain the increase in the catching of this species during the season; perhaps the nymphs preferably stay near the base of the grasses where they would largely escape the sweep-net.

Notostira elongata is bivoltine (Woodward 1950) and of the 29 females caught in July only one belonged to the ochreous autumn generation, which made up 8 of the 9 females from August. The nymphs taken in July (47 %) may originate from both genera-

tions, whereas those caught in August (81 %) must belong to the autumn generation. The rise in number (from average 1.9/sample in July to 3.5/sample in August) may be due to a difference in frequency between the generations.

It might seem as if *Stygnocoris pedestris* (Fall.), of which merely five adult specimens were caught, should be placed in a group of its own — including species exclusively present in August. The species is, however, predominantly a ground dweller only occasionally ascending the vegetation, and this is especially true for the immature stages reigning supreme during July.

Concerning species not mentioned above, the apportionment of nymphs and adults was as follows.

	JULY		AUGUST	
	Nymphs	Adults	Nymphs	Adults
Legnotus picipes (Fall.)	1	4	—	2
Sciocoris cursitans (F.)	—	3	—	2
Rhacognathus punctatus (L.)	4	—	—	—
Alydus calcaratus (L.)	2	2	—	3
Nysius helveticus (H.S.)	6	19	—	13
Anthocoris nemoralis (F.)	2	1	6	7
Orthotylus ericetorum	47	1	1	9
Polymerus brevicornis (Reut.)	—	4	—	1
Stenodema calcaratum (Fall.)	5	—	—	+
Stenodema laevigatum (L.)	—	4	—	—

IV. Conclusions.

The fauna of Heteroptera changed considerably during summer, both in species composition and in the relative frequency of the species. It is accordingly possible to distinguish a "mid-summer aspect" and a "late-summer aspect" of the bug fauna inhabiting the herb stratum of Korshage, taking into account that the establishment of the former is based on the investigations of only one summer.

Leaving out the beach and the dune heath with their very distinct faunas, the mid-summer aspect is characterized by 1) the abundance of a few species, especially *Cymus glandicolor* and *Plagiognathus chrysanthemi,* which causes the number of individuals per sample to be on an average three times that in August; 2) the presence of some species (e.g. *Derephysia foliacea, Megalocoleus molliculus, Orthocephalus coriaceus, O. saltator, Calocoris*

norvegicus, Leptopterna dolabrata) which are entirely (or nearly so) absent in late summer. The fauna of the late summer is poorer in both species and individuals, being dominated by *Phytocoris varipes* and *Notostira elongata.*

When the Heteropterous fauna found in August 1966 is compared with the late summer fauna of 1963 (and 1965) (Böcher 1967) it will be noted that most of the conclusions arrived at in the previous paper are confirmed. But naturally there are differences, most of which may be due to the different weather conditions of the humid summers 1963, 1965 and the dry summer of 1966. Besides a number of smaller dissimilarities not worth mentioning, the following are more conspicuous. Three species, viz. *Stygnocoris pedestris, Polymerus brevicornis* and *Adelphocoris lineolatus,* were considerably more frequent during 1963 (+ 1965). *Adelphocoris* was dominating in some plant communities (3, 4 a, 4 b) where it was absent or playing an insignificant part in 1966. *Stygnocoris* was widespread in the area and a dominant in the heath, whereas a total of only five specimens were taken during 1966. On the other hand some species were more numerous in 1966 as compared with the previous years, namely *Aelia acuminata, Cymus glandicolor, Orthotylus flavosparsus, Lygus pratensis* and *Phytocoris varipes.* No absolute figures were obtained from the *Atriplex*-vegetation in 1963, but the numbers of *Piesma* and *Orthotylus* were clearly much lower than in 1966.

Concerning the "Heteroptera communities" proposed by Böcher (1967, p. 56) the distribution of the species in the area during July seems in some measure to justify their maintenance. The fauna of the "Carex dune grassland", however, must be included as a distinct "bug community" (cf. p. 289), characterized by the huge numbers of *Cymus glandicolor* and the frequency of *Myrmus miriformis,* especially during July (cf. Böcher 1967, p. 56). The "green dune bug community" should only comprise 2 a, 2 b and 2 c, as the fauna of the "grey dune grassland" has a peculiar character (see p. 292). During July many species were mainly or exclusively found here (*Dolycoris baccarum, Lopus decolor, Plagiognathus* sp., *Orthotylus saltator, Stenodema calcaratum, S. laevigatum, Trigonotylus ruficornis*), whereas in August the bug population was exceedingly sparse, dominated by *Chorosoma schillingi, Adelphocoris lineolatus* and *Nysius thymi.* Ground dwelling

species play an important part in this "bug community" (cf. Böcher 1967, pp. 44, 56).

Summary.

In the dune and heath area of Korshage, northern Zealand, the Heteropterous fauna of the herb stratum in July was compared with that in August on the basis of sweep-net collections. During July there were more species and the average density of bugs was three times higher than in August. The mid-summer fauna was characterized by the abundance of *Cymus glandicolor* Hahn and *Plagiognathus chrysanthemi* (Wff.) and by the presence of a number of forms (e.g. *Derephysia foliacea* (Fall.), *Orthocephalus saltator* (Hahn), *Calocoris norvegicus* (Gmel.), *Leptopterna dolabrata* (L.)) which, after having completed their life-cycles, disappeared entirely before the second sampling period in mid-August. The late-summer fauna, previously treated in detail (Böcher 1967), was dominated by *Phytocoris varipes* Boh. and *Notostira elongata* (Geoffr.).

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Table 1. — Plant communities of Korshage. Herb stratum.

Community.	Vegetation. !! and ! indicate more or less dominating species. (Mosses and lichens are not included).
1. Beach.	Atriplex litoralis!!
2. Green dune.	
a. Outer green dune.	Ammophila arenaria!! Festuca rubra!! Hieracium umbellatum! Lathyrus maritimus! Achillea millefolium, Agropyrum repens, Armeria maritima, Artemisia campestris, Campanula rotundifolia, Carex arenaria, Crambe maritima, Elymus arenarius, Galium verum, Jasione montana, Pimpinella saxifraga, Rumex thyrsiflorus, Thalictrum minus.
b. Mixed green dune.	Festuca rubra!! Thalictrum minus!! Achillea millefolium! Ammophila arenaria! Carex arenaria! Lathyrus maritimus! Agropyrum repens, Artemisia campestris, Campanula rotundifolia, Deschampsia flexuosa, Elymus arenarius, Galium verum, Hieracium umbellatum, Jasione montana, Pimpinella saxifraga, Plantago maritima, Rhinanthus minor, Rumex thyrsiflorus.
c. Inner green dune.	Ammophila arenaria!! Deschampsia flexuosa!! Achillea millefolium! Anthoxanthum odoratum! Campanula rotundifolia! Carex arenaria! Galium verum! Hieracium umbellatum! Pimpinella saxifraga! Polypodium vulgare! Artemisia campestris, Cerastium semidecandrum, Chamaenerium angustifolium, Festuca rubra, Gnaphalium arenarium, Jasione montana, Lathyrus maritimus, Rhinanthus minor, Rumex thyrsiflorus, Solidago virga-aurea, Thalictrum minus.
3. Dune pasture and swamp.	Potentilla anserina!! Vicia cracca!! Agrostis tenuis! Carex nigra! Festuca rubra! Holcus lanatus! Lythrum salicaria! Achillea millefolium, Anthoxanthum odoratum, Deschampsia flexuosa, Carex panicea, Cirsium palustre, Epilobium palustre, Galium uliginosum, Geranium sanguineum, Heleocharis palustris, Juncus articulatus, J. compressus, J. conglomeratus, Lathyrus montanus, Lycopus europaeus, Pimpinella saxifraga, Poa pratensis, Potentilla erecta, P. reptans, Ranunculus acer, Scirpus tabernaemontani, Stellaria graminea, Thalictrum minus, Trifolium repens, Veronica chamaedrys.
4. Dune grassland.	
a. Thalictrum dune grassland.	Pimpinella saxifraga!! Thalictrum minus!! Achillea millefolium! Anthoxanthum odoratum! Festuca rubra! Geranium sanguineum! Potentilla reptans! Agrostis tenuis, Ammophila arenaria, Artemisia campestris, Campanula rotundifolia, Carex arenaria, Hieracium umbellatum, Hypochoeris maculata, Lotus corniculatus, Plantago lanceolata, Pulsatilla pratensis, Veronica chamaedrys.
b. Dune slack grassland.	Agrostis tenuis! Armeria maritima! Festuca rubra! Pimpinella saxifraga! Trifolium repens! Achillea millefolium, Anthoxanthum odoratum, Carex arenaria, C. nigra, Lotus corniculatus, Plantago lanceolata, P. maritima, Potentilla reptans, Thalictrum minus.
c. Grey dune grassland.	Anthoxanthum odoratum! Carex arenaria! Corynephorus canescens! Festuca ovina! F. rubra! Galium verum! Heracium umbellatum! Pimpinella saxi-

Table 1 continued.

fraga! Pulsatilla pratensis! Achillea millefolium, Agrostis tenuis, Armeria maritima, Artemisia campestris, Avena pratensis, Campanula rotundifolia, Geranium sanguineum, Gnaphalium arenarium, Hieracium pilosella, Hypochoeris maculata, Jasione montana, Lotus corniculatus, Plantago maritima, Polypodium vulgare, Thalictrum minus, Thymus serpyllum, Trifolium arvense, T. repens.

d. Carex dune grassland..

Carex arenaria!! Agrostis tenuis, Anthoxanthum odoratum, Armeria maritima, Avena pratensis, Campanula rotundifolia, Deschampsia flexuosa, Hieracium umbellatum, Pulsatilla pratensis, Thalictrum minus, Thymus serpyllum.

5. Dune heath.

Calluna vulgaris!! Empetrum nigrum! Deschampsia flexiuosa, Salix repens, Vaccinium uliginosum.

Explanation to the Tables 2—13.

A cross (+) means that the species was taken by supplementary sweeping in the locality concerned, but not in a quantitative sample.

D = dominant, I = influent (the species is constituting more than 10 %, and 4—10 %, respectively, of the total of individuals caught from the plant community, or the plant communities, in question).

C = constant, Acs = accessory (the species is present in more than 50 %, and 25—50 %, respectively, of the samples in question).

The limits given for the mean number per sample are standard deviations.

Table 2. — Whole area. July. 40 samples.

	Individuals caught	Per sample	% of total	In % of samples
Cymus glandicolor Hahn	916	22.9	33.2 D	65 C
Plagiognathus chrysanthemi (Wff.)	700	17.5	25.4 D	70 C
Nysius thymi (Wff.)	196	4.9	7.1 I	45 Acs
Myrmus miriformis (Fall.)	116	2.9	4.2 I	55 C
Nabis spp. (juv.)	104	2.6	3.8	80 C
Chorosoma schillingi (Schum.)	94	2.4	3.4	70 C
Ischnodemus sabuleti (Fall.)	91	2.3	3.3	28 Acs
Notostira elongata (Geoffr.)	77	1.9	2.8	68 C
Megalocoleus molliculus (Fall.)	76	1.9	2.8	30 Acs
Calocoris norvegicus (Gmel.)	53	1.3	1.9	40 Acs
Nabis flavomarginatus Sz.	48	1.2	1.7	48 Acs
Phytocoris varipes Boh.	43	1.1	1.6	50 Acs
Aelia acuminata (L.)	37	.9	1.3	45 Acs
Dolycoris baccarum (L.)	24	.6	.9	38 Acs
Adelphocoris lineolatus (Gz.)	23	.6	.8	15
Leptopterna dolabrata (L.)	22	.6	.8	43 Acs
Orthocephalus saltator (Hahn)	19	.5	.7	15
Eurygaster testudinaria (Geoffr.)	15	.4	.5	10
Derephysia foliacea (Fall.)	13	.3	.5	20
Globiceps fulvicollis cruc. Reut.	13	.3	.5	18
Miridae spp. (juv.)	11	.3	.4	15
Orthocephalus coriaceus (F.)	8	.2	.3	18
Nabis pseudoferus Rem.	7	.2	.3	13
Legnotus picipes (Fall.)	5	.1	.2	8
Lopus decolor (Fall.)	5	.1	.2	5
Stenodema calcaratum (Fall.)	5	.1	.2	5
Alydus calcaratus (L.)	4	.1	.1	10
Stenodema laevigatum (L.)	4	.1	.1	5
Sciocoris cursitans (F.)	3	.1	.1	8
Capsus ater (L.)	3	.1	.1	8
Geocoris grylloides (L.)	2	.1	.1	5
Charagochilus gyllenhali (Fall.)	2	.1	.1	5
Other species*)	20	—	.7	—
Total	2759	69.0	100.1	

*) Only one specimen was taken of each of the following species: *Eurydema oleracea* (L.), *Picromerus bidens* (L.), *Peritrechus nubilus* (Fall.), *Rhyparochromus pini* (L.), *Stygnocoris fuligineus* (Geoffr.), Lygaeidae sp. (juv.), *Piesma quadratum* (Fieb.), *Nabis ferus* (L), *Nabis brevis* Sz., *Nabis ericetorum* Sz., *Anthocoris nemorum* (L.), *Tytthus pygmaeus* (Zett.), *Plagiognathus* sp. (*albipennis* group), *Strongylocoris leucocephalus* (L.), *Orthotylus flavosparsus* (Shlbg.), *Lygus pratensis* (L.), *Orthops kalmi* (L.), *Polymerus unifasciatus* (F.), *Polymerus brevicornis* (Reut.), *Trigonotylus ruficornis* (Geoffr. in Fourcr.). *Monosynamma bohemani* (Fall.) and *Pithanus maerkeli* (H.S.) were found but not in a sample.

Table 3. — Whole area. August. 46 samples.

	Individuals caught	Per sample	% of total	In % of samples
Phytocoris varipes Boh.	176	3.8	16.6 D	74 C
Notostira elongata (Geoffr.)	161	3.5	15.2 D	67 C
Ischnodemus sabuleti (Fall.)	89	1.9	8.4 I	28 Acs
Chorosoma schillingi (Schum.)	89	1.9	8.4 I	67 C
Nabis pseudoferus Rem.	66	1.4	6.2 I	46 Acs
Cymus glandicolor Hahn	64	1.4	6.1 I	15
Myrmus miriformis (Fall.)	60	1.2	5.7 I	48 Acs
Nysius thymi (Wff.)	44	1.0	4.2 I	26 Acs
Nabis spp. (juv.)	30	.7	2.8	37 Acs
Plagiognathus chrysanthemi (Wff.)	29	.6	2.7	22
Lygus maritimus Wagn.	29	.6	2.7	33 Acs
Aelia acuminata (L.)	26	.6	2.5	28 Acs
Nabis flavomarginatus Sz.	25	.5	2.4	43 Acs
Lygus pratensis (L.)	25	.5	2.4	30 Acs
Nabis brevis Sz.	23	.5	2.2	20
Orthops kalmi (L.)	20	.4	1.9	4
Adelphocoris lineolatus (Gz.)	20	.4	1.9	20
Piesma quadratum (Fieb.)	15	.3	1.4	15
Miridae spp. (juv.)	14	.3	1.3	22
Nabis ericetorum Sz.	12	.3	1.1	13
Dolycoris baccarum (L.)	8	.2	.8	13
Stygnocoris pedestris (Fall.)	5	.1	.5	9
Megalocoleus molliculus (Fall.)	4	.1	.4	7
Orthotylus flavosparsus (Shlbg.)	4	.1	.4	7
Polymerus brevicornis (Reut.)	4	.1	.4	7
Alydus calcaratus (L.)	3	.1	.3	7
Eurygaster testudinaria (Geoffr.)	2	.0	.2	4
Sciocoris cursitans (F.)	2	.0	.2	4
Anthocoris spp. (juv.)	2	.0	.2	2
Other species*)	7	—	.7	—
Total	1058	23	100.2	

*) Only one specimen was taken of each of the following species: *Legnotus picipes* (Fall.), *Picromerus bidens* (L.), *Stygnocoris rusticus* (Fall.), *Berytinus crassipes* (H.S.), *Piesma capitatum* (Wff.), *Stalia major* (Costa), *Adelphocoris seticornis* (F.). *Calocoris norvegicus* (Gmel.) and *Stenodema calcaratum* (Fall.) were found, but not in a sample.

Table 4. — 1. Beach. ½ + ½ sample.

	JULY		AUGUST	
	Per sample	% of total	Per sample	% of total
Eurydema oleracea (L.)	+	—	—	—
Piesma quadratum (Fieb.)	1114	46.6 D	188	29.2 D
Anthocoris nemoralis (F.)	6	.03	26	4.1
Orthotylus flavosparsus (Shlbg.)	64	2.8 (D)	310	48.6 D
Lygus maritimus Wagn	132	5.9	32	5.0
Lygus pratensis (L.)	—	—	2	.3
Miridae spp. (juv.)*)	932	41.5	80	12.5
Total	2248	99.8	638	99.7

*) Practically all no doubt *Orthotylus flavosparsus* (Shlbg.).

Table 5. — 2 a. Outer green dune. 6 + 9 samples.

	JULY		AUGUST	
	Per sample	% of total	Per sample	% of total
Aelia acuminata (L.)	.3	1.2	.2	.8
Eurydema oleracea (L.)	.1	.6	—	—
Dolycoris baccarum (L.)	—	—	.1	.4
Picromerus bidens (L.)	—	—	.1	.4
Myrmus miriformis (Fall.)	1.8	6.5 C	.8	2.9
Chorosoma schillingi (Schum.)	2.3	8.3 C	2.2	8.2 C
Ischnodemus sabuleti (Fall.)	12.3	44.0 D C	8.4	31.1 D C
Nysius thymi (Wff.)	2	7.1	1.1	4.1
Cymus glandicolor Hahn	.3	1.2	—	—
Berytinus crassipes (H.S.)	—	—	.1	.4
Piesma quadratum (Fieb.)	—	—	.4	1.6
Nabis flavomarginatus Sz.	.3	1.2	.6	2.0 C
Nabis pseudoferus Rem.	—	—	2.2	8.2 C
Nabis brevis Sz.	—	—	.7	2.5
Nabis spp. (juv.)	1	3.6	.3	1.2
Stalia major (Costa)	—	—	.1	.4
Megalocoleus molliculus (Fall.)	.5	1.8	—	—
Tytthus pygmaeus (Zett.)	.1	.6	—	—
Plagiognathus chrysanthemi (Wff.)	.7	2.4	—	—
Orthotylus flavosparsus (Shlbg.)	—	—	.2	.8
Lygus maritimus Wagn.	—	—	1.8	6.6 C
Lygus pratensis (L.)	—	—	.3	1.2
Calocoris norvegicus (Gmel.)	1.8	6.5 C	—	—
Adelphocoris lineolatus (Gz.)	—	—	.1	.4
Phytocoris varipes Boh.	.5	1.8	4.3	16.0 D C
Capsus ater (L.)	.1	.6	—	—
Notostira elongata (Geoffr.)	3.1	11.3 D C	2.9	10.6 D C
Leptopterna dolabrata (L.)	.3	1.2	—	—
Total	28 (± 22.4)	99.9	27.1 (± 23.5)	99.8

Table 6. — 2 b. **Mixed green dune. 5 + 6 samples.**

Legnotus picipes (Fall.)	.6	2.1	+	—
Eurygaster testudinaria (Geoffr.)	—	—	.2	.7
Aelia acuminata (L.)	.6	2.1	.2	.7
Dolycoris baccarum (L.)	.4	1.4	—	—
Myrmus miriformis (Fall.)	.8	2.8	1	3.9 C
Chorosoma schillingi (Schum.)	2.6	9.0 C	1.3	5.3
Ischnodemus sabuleti (Fall.)	.4	1.4	.2	.7
Nysius thymi (Wff.)	1	3.5 C	—	—
Stygnocoris pedestris (Fall.)	—	—	.2	.7
Cymus glandicolor Hahn	3.8	13.2 D	—	—
Piesma quadratum (Fieb.)	—	—	.8	3.3
Derephysia foliacea (Fall.)	.6	2.1	—	—
Nabis flavomarginatus Sz.	1.4	4.9 C	.8	3.3 C
Nabis pseudoferus Rem.	.2	.7	3.2	12.5 D C
Nabis brevis Sz.	—	—	.3	1.3
Nabis ericetorum	—	—	.2	.7
Nabis spp. (juv.)	2.8	9.7 (C)	1.5	5.9 (C)
Megalocoleus molliculus (Fall.)	1.8	6.2	.2	.7
Plagiognathus chrysanthemi (Wff.)	2.6	9.0	—	—
Orthocephalus saltator (Hahn)	.4	1.4	—	—
Lygus maritimus Wagn.	—	—	.5	2.0
Lygus pratensis (L.)	.2	.7	1.2	4.6
Calocoris norvegicus (Gmel.)	5.4	18.7 D C	—	—
Phytocoris varipes Boh.	.4	1.4	8.3	32.9 D C
Capsus ater	.2	.7	—	—
Notostira elongata (Geoffr.)	2.4	8.3 C	4.2	16.4 D C
Leptopterna dolabrata (L.)	.2	.7	—	—
Miridae spp. (juv.)	—	—	.5	2.0
Total	28.8 (± 14.2)	100.0	25.2 (± 8.9)	100.2

Table 7. — 2 c. Inner green dune. 6 + 8 samples.

	JULY		AUGUST	
	Per sample	% of total	Per sample	% of total
Legnotus picipes (Fall.)	—	—	.1	.5
Aelia acuminata (L.)	1.2	4.3 C	.3	.9
Picromerus bidens (L.)	.2	.6	—	—
Alydus calcaratus (L.)	.3	1.2	—	—
Myrmus miriformis (Fall.)	1.8	6.8	.8	2.8
Chorosoma schillingi (Schum.)	4.8	17.9 D C	3.6	13.3 D C
Ischnodemus sabuleti (Fall.)	2.5	9.3 C	1.5	5.5 C
Nysius thymi (Wff.)	—	—	.3	.9
Stygnocoris pedestris (Fall.)	—	—	.4	1.4
Cymus glandicolor Hahn	3.8	14.2 D C	—	—
Piesma quadratum (Fieb.)	—	—	.6	2.3
Derephysia foliacea (Fall.)	.7	2.5 C	—	—
Nabis flavomarginatus Sz.	1.7	6.2	.5	1.8
Nabis pseudoferus Rem.	.3	1.2	1.1	4.1
Nabis brevis Sz.	—	—	1.6	6.0
Nabis ericetorum Sz.	—	—	.1	.5
Nabis spp. (juv.)	3.3	12.3 (D) (C)	1	3.7 (C)
Plagiognathus chrysanthemi (Wff.)	.3	1.2	—	—
Strongylocoris leucocephalus (L.)	.2	.6	—	—
Orthocephalus saltator (Hahn)	.3	1.2	—	—
Globiceps fulvicollis cruc. Reut.	.2	.6	—	—
Orthotylus flavosparsus (Shlbg.)	—	—	.3	.9
Lygus maritimus Wagn.	—	—	.1	.5
Lygus pratensis (L.)	—	—	.1	.5
Polymerus brevicornis (Reut.)	—	—	.3	.9
Charagochilus gyllenhali (Fall.)	.2	.6	—	—
Adelphocoris lineolatus (Gz.)	—	—	.8	.2
Phytocoris varipes Boh.	2.3	8.6 C	5	18.3 D C
Notostira elongata (Geoffr.)	2	7.4 C	8.5	31.2 D C
Leptopterna dolabrata (L.)	.3	1.2	—	—
Miridae spp. (juv.)	.5	1.9	.4	1.4
Total	27 (± 8.3)	99.8	27.3 (± 9.3)	100.2

Table 8. — 3. **Dune pasture and swamp.** 7 + 7 samples.

	JULY			AUGUST		
	Per sample	% of total		Per sample	% of total	
Eurygaster testudinaria (Geoffr.) ..	2.1	1.7	C	.1	.5	
Sciocoris cursitans (F.)	.1	.1		—	—	
Aelia acuminata (L.)	1.6	1.2	C	1.7	5.6	C
Dolycoris baccarum (L.)	.3	.2		.1	5	
Myrmus miriformis (Fall.)	5.9	4.6	C	3.7	12.0	D C
Chorosoma schillingi (Schum.) ...	1.1	.9		.7	2.3	
Rhyparochromus pini (L.)	.1	.1		—	—	
Stygnocoris pedestris (Fall.)	—	—		.1	.5	
Cymus glandicolor Hahn	32.4	25.7	D C	6.1	19.9	D C
Derephysia foliacea (Fall.)	.1	.1		—	—	
Nabis flavomarginatus Sz.	2	1.6		1	3.2	C
Nabis pseudoferus Rem.	.6	.5		1.9	6.0	
Nabis ericetorum Sz.	—	—		.4	1.4	
Nabis spp. (juv.)	3.7	3.4	(C)	1.1	3.7	(C)
Anthocoris spp. (juv.)	—	—		.3	.9	
Megalocoleus molliculus (Fall.) ...	4.9	3.9	C	.3	.9	
Plagiognathus chrysanthemi (Wff.)	64.1	50.8	D C	3.4	11.1	D C
Monosynamma bohemani (Fall.) ..	+	—		—	—	
Orthocephalus coriaceus (F.)	.9	.7	C	—	—	
Globiceps fulvicollis cruc. Reut. ...	1.3	1.0		—	—	
Lygus pratensis (L.)	—	—		.4	1.4	
Polymerus unifasciatus (F.)	.1	.1		—	—	
Charagochilus gyllenhali (Fall.) ..	.1	.1		—	—	
Calocoris norvegicus (Gmel.)	.1	.1		—	—	
Adelphocoris seticornis (F.)	—	—		.1	.5	
Phytocoris varipes Boh.	.7	.6		4.1	13.4	D C
Capsus ater (L.)	.1	.1		—	—	
Stenodema calcaratum (Fall.)	.1	.1		+	—	
Notostira elongata (Geoffr.)	2.1	1.7	C	4.7	15.3	D C
Miridae spp. (juv.)	.3	.2		.3	.9	
Total	126.1 (± 50.3)	100.3		30.9 (± 10.6)	100.0	

Table 9. — 4 a. **Thalictrum** dune grassland. 4 + 4 samples.

	JULY			AUGUST		
	Per sample	% of total		Per sample	% of total	
Sciocoris cursitans (F.)	.3	.4		.5	3.0	
Aelia acuminata (L.)	—	—		.5	3.0	
Dolycoris baccarum (L.)	.8	1.2		.8	4.5	
Alydus calcaratus (L.)	—	—		.3	1.5	
Myrmus miriformis (Fall.)	.8	1.2		2	11.9	D C
Chorosoma schillingi (Schum.)	1.3	2.1		2.3	13.4	D C
Nysius thymi (Wff.)	2.8	4.5		2	11.9	D
Peritrechus nubilus (Fall.)	.3	.4		—	—	
Stygnocoris rusticus (Fall.)	—	—		.3	1.5	
Cymus glandicolor Hahn	1	1.6		—	—	
Piesma capitatum (Wff.)	—	—		.3	1.5	
Piesma quadratum (Fieb.)	—	—		.3	1.5	
Nabis flavomarginatus Sz.	2	3.0	C	.8	4.5	C
Nabis pseudoferus Rem.	—	—		1.3	7.5	C
Nabis ericetorum Sz.	.3	.4		—	—	
Nabis spp. (juv.)	2.5	4.1	(C)	—	—	
Megalocoleus molliculus (Fall.)	6	9.9	C	.3	1.5	
Plagiognathus chrysanthemi (Wff.)	38	59.3	D C	.5	3.0	
Orthocephalus coriaceus (F.)	.5	.8		—	—	
Orthocephalus saltator (Hahn)	.3	.4		—	—	
Lygus maritimus Wagn.	—	—		.3	1.5	
Lygus pratensis (L.)	—	—		.5	3.0	
Orthops kalmi (L.)	—	—		+	—	
Calocoris norvegicus (Gmel.)	2	3.0		—	—	
Phytocoris varipes Boh.	2.8	4.5	C	2.3	13.4	D C
Notostira elongata (Geoffr.)	.8	1.2		1.3	7.5	
Leptopterna dolabrata (L.)	.5	.8		—	—	
Miridae spp. (juv.)	.3	.4		.8	4.5	
Total	60.8 (± 35.7)	99.2		16.8 (± 5.5)	100.1	

Table 10. — 4 b. Dune slack grassland. 2 + 2 samples.

	JULY			AUGUST		
	Per sample	% of total		Per sample	% of total	
Legnotus picipes (Fall.)	.5	.6		—	—	
Aelia acuminata (L.)	1	1.3		—	—	
Dolycoris baccarum (L.)	.5	.6		1	4.5	
Alydus calcaratus (L.)	—	—		.5	2.2	
Myrmus miriformis (Fall.)	1	1.3		1	4.5	
Chorosoma schillingi (Schum.)	2	2.4	C	2.5	11.4	D C
Geocoris grylloides (L.)	.5	.6		—	—	
Nysius thymi (Wff.)	31.5	37.3	D C	7	31.8	D C
Cymus glandicolor Hahn	7	8.3	C	—	—	
Derephysia foliacea (Fall.)	1	1.3		—	—	
Nabis flavomarginatus Sz.	1.5	1.8	C	.5	2.2	
Nabis ericetorum Sz.	—	—		1.5	6.8	
Nabis spp. (juv.)	1	1.3	(C)	.5	2.2	
Anthocoris nemorum (L.)	.5	.6		—	—	
Megalocoleus molliculus (Fall.)	3	3.6		—	—	
Plagiognathus chrysanthemi (Wff.)	31.5	37.3	D C	1	4.5	
Globiceps fulvicollis cruc. Reut.	.5	.6		—	—	
Orthotylus flavosparsus (Shlbg.)	.5	.6		—	—	
Lygus maritimus Wagn.	—	—		1.5	6.8	C
Lygus pratensis (L.)	—	—		3.5	15.9	D C
Orthops kalmi (L.)	—	—		+	—	
Calocoris norvegicus (Gmel.)	—	—		+	—	
Adelphocoris lineolatus (Gz.)	—	—		.5	2.2	
Phytocoris varipes Boh.	1	1.3		—	—	
Notostira elongata (Geoffr.)						
Total	84.5 (± 10.5)	100.8		22 (± 5)	99.5	

Table 11. — 4 c. Grey dune grassland. 8 + 8 samples.

	JULY			AUGUST	
	Per sample	% of total		Per sample	% of total
Legnotus picipes (Fall.)	.1	.3		—	—
Sciocoris cursitans (F.)	.1	.3		—	—
Aelia acuminata (L.)	1.1	2.9	C	—	—
Dolycoris baccarum (L.)	1.9	4.8	C	.1	1.4
Alydus calcaratus (L.)	.3	.6		.1	1.4
Myrmus miriformis (Fall.)	1	2.5		.1	1.4
Chorosoma schillingi (Schum.)	2	5.7	C	1.5	16.9 D C
Geocoris grylloides (L.)	.1	.3		—	—
Ischnodemus sabuleti (Fall.)	+	—		—	—
Nysius thymi (Wff.)	10.8	27.3	D C	1.3	14.1 D C
Stygnocoris fuligineus (Geoffr.)	.1	.3		—	—
Lygaeidae spp. (juv.)	.1	.3		—	—
Cymus glandicolor Hahn	5.4	13.7	D C	.1	1.4
Piesma quadratum (Fieb.)	.1	.3		—	—
Derephysia foliacea (Fall.)	+	—		—	—
Nabis flavomarginatus Sz.	.3	.6		—	—
Nabis ferus (L.)	.1	.3		—	—
Nabis brevis Sz.	.1	.3		.3	2.8
Nabis spp. (juv.)	2.3	5.7	(C)	.1	1.4
Lopus decolor (Fall.)	.6	1.6		—	—
Plagiognathus sp.	.1	.3		—	—
Plagiognathus chrysanthemi (Wff.)	1.5	3.8	C	—	—
Orthocephalus saltator (Hahn)	1.8	4.4		—	—
Globiceps fulvicollis cruc. Reut.	.3	.6		—	—
Pithanus maerkeli (H.S.)	+	—		—	—
Lygus maritimus Wagn.	—	—		.6	7.0
Lygus pratensis (L.)	—	—		.3	2.8
Orthops kalmi (L.)	.1	.3		1	11.3 D
Polymerus brevicornis (Reut.)	.1	.3		.3	2.8
Calocoris norvegicus (Gmel.)	.8	1.9		—	—
Adelphocoris lineolatus (Gz.)	2.9	7.3	C	1.4	15.5 D
Phytocoris varipes Boh.	1	2.5		.9	9.9
Stenodema calcaratum (Fall.)	.5	1.3		—	—
Stenodema laevigatum (L.)	.5	1.3		—	—
Notostira elongata (Geoffr.)	1.6	4.1		.5	5.6
Trigonotylus ruficornis (Geoffr.)	.1	.3		—	—
Leptopterna dolabrata (L.)	.8	1.9		—	—
Miridae spp. (juv.)	.6	1.6		.4	4.2
Total	39.4 (± 13.1)	99.7		8.9 (± 3.3)	99.9

Table 12. — 4. d. Carex dune grassland. 2 + 2 samples.

	JULY			AUGUST		
	Per sample	% of total		Per sample	% of total	
Aelia acuminata (L.)	1.5	.4		1.5	6.5	C
Dolycoris baccarum (L.)	.5	.1		—	—	
Myrmus miriformis (Fall.)	18	5.3	C	2	8.7	
Chorosoma schillingi (Schum.)	1.5	.4		.5	2.2	
Nysius thymi (Wff.)	9.5	2.8	C	+	—	
Cymus glandicolor Hahn	292	86.5	D C	10	43.5	D C
Derephysia foliacea (Fall.)	1.5	.4		—	—	
Nabis flavomarginatus Sz.	1	.3		—	—	
Nabis ericetorum Sz.	—	—		2	8.7	
Nabis spp. (juv.)	4	1.2		—	—	
Plagiognathus chrysanthemi (Wff.)	6.5	1.9		.5	2.2	
Orthops kalmi (L.)	—	—		6	26.1	D
Phytocoris varipes Boh.	—	—		.5	2.2	
Notostira elongata (Geoffr.)	.5	.1		—	—	
Leptopterna dolabrata (L.)	1	.3		—	—	
Total	337.5 (± 26.5)	99.7		23 (± 0)	100.1	

Table 13. — 5. Dune heath. 4 + 2 samples.

	JULY		AUGUST	
	Per sample	% of total	Per sample	% of total
Rhacognathus punctatus (L.)	1	3.7 C	—	—
Pentatomidae spp. (juv.)	.3	.9	—	—
Nysius thymi (Wff.)	.3	.9	1.5	3.2
Nysius helveticus (H.S.)	6.3	23.4 D C	6.5	13.7 D C
Macrodema micropterum (Curt.)	—	—	1	2.1
Stygnocoris pedestris (Fall.)	—	—	.5	1.1
Scolopostethus decoratus (Hahn)	2.8	10.3 D	24.5	51.5 D C
Eremocoris abietis (L.)	.5	1.9	—	—
Empicoris vagabundus (L.)	.3	.9	—	—
Nabis pseudoferus Rem.	—	—	.5	1.1
Nabis ericetorum Sz.	2.5	9.3 C	5	10.5 D C
Nabis spp. (juv.)	.3	.9	—	—
Monosynamma nigritula (Zett.)	.3	.9	—	—
Orthotylus ericetorum (Fall.)	14	44.9 D C	—	—
Orthotylus flavosparsus (Shlbg.)	.3	.9	—	—
Lygus maritimus Wagn.	—	—	+	—
Lygus rugulipennis Popp.	—	—	1	2.1
Lygus pratensis (L.)	—	—	.5	1.1
Adelphocoris lineolatus (Gz.)	.3	.9	.5	1.1
Phytocoris varipes Boh.	—	—	1	2.1
Total	26.8 (± 15.8)	99.8	47.5 (± 4.5)	100.1

On the subspecies of Apatania muliebris McL. (Trichoptera).

By
Anker Nielsen
Zoological Museum, Copenhagen

Many years ago I found, much to my surprise, this species as a relict in some large springs in Himmerland, northern Jutland. In 1950 I gave a detailed description of specimens from Rold Kilde, assuming that the population in this spring represented the typical form af *A. muliebris*. This assumption was based chiefly on the fact that its annual cycle seemed perfectly suited for Arctic conditions. In the same paper I described two new species, *cimbrica* and *intermedia,* from the spring Lille Blåkilde. (They were described under the generic name *Apatidea.* I now agree with Schmid, 1954a pp. 145—46, that the distinction between the genera *Apatania* Kol. and *Apatidea* McL. cannot be upheld).

As far as female Trichoptera of the same genus go, the difference between *cimbrica* and the population in Rold Kilde is quite great, so it was justified to consider them as separate species. Hence I believed *cimbrica* and *intermedia* to be endemic species, evolved from *muliebris* during the postglacial period, and no doubt *intermedia* also is endemic. As to *cimbrica,* however, Schmid (1954b, p. 38) reported it from Lappland, and later (1961) I found it myself in a large spring, Svinebæk, in the middle of Jutland. Moreover, having examined several specimens, i.a. the type, of Schmid's *helvetica* (1954b, pp. 37—38) I am convinced that this name is a synonym of *cimbrica;* syn. nov.

In his monograph (1954b, pp. 39—40) Schmid pointed out that the population in Rold Kilde is different from that (now unfortunately extinct) in Arundel Park, McLachlan's type locality, and named it *nielseni.*

I now have had the opportunity to examine specimens from three more relict localities: Arundel Park, South Downs, England; Storlien, Jämtland, Sweden; the island Kolter in the Faroes. They are all different from each other, but together with *intermedia* they form a complete series of links between *cimbrica* and *nielseni*. If specimens from more localities had been examined, a still 'smoother' series probably would have been found. Hence I think that the proper measure will be to consider them, including *cimbrica* and *nielseni*, as subspecies of *A. muliebris*, though of course it is difficult to define subspecies of a species the reproduction of which is exclusively parthenogenetic. *A. m. cimbrica* is the typical and widely distributed form of *muliebris*, but according to the rules of nomenclature the name *A. m. muliebris* must be attributed to the population in Arundel Park. Brief diagnoses of six subspecies are given below.

A. m. cimbrica Niels. (1950, fig. 2; *helvetica* Schmid 1954b, pp. 37—38). The dorsal side of segment X is steeply descendent, almost vertical. It has a pair of low and very indistinct bulgings, but no trace of a longitudinal ridge. The posterior corners of segment X is narrow, rather pointed and clearly visible from above. Length of the anterior wing in Lille Blåkilde 6.7 — 9.4 mm, in Svinebæk 7.8 — 9.7 mm.

A. m. muliebris McL., 1866. My description (fig. 1) is rather much at variance with that by Schmid (1954b, p. 36). In a lateral view the dorsal side of segment X is ca. 45° descendent. It has no bulgings, but a faint indication of a dorsal ridge, which in a posterior direction tapers gradually. The posterior corners of segment X are broadly rounded and clearly visible from above. Length of the anterior wing in two specimens 8.45 and 9.35 mm. Arundel Park, South Downs, England. Unfortunately this locality has been destroyed long ago.

A. m. jemtlandica n. subsp. (fig. 2). The dorsal side of segment X without bulgings but with a longitudinal ridge, which in a posterior direction tapers abruptly into a thin lamella. This lamella is lower than in *nielseni*, and in a lateral view the dorsal side of segment X is ca. 45° descendent in a slightly S-like curve. Its posterior corners are rather narrow, but rounded, and clearly visible from above. Length of the anterior wing in one specimen 8.1 mm. Holotype (Storlien, Jämtland, Sweden, 7.8.1932) in the Zoological Museum, Copenhagen.

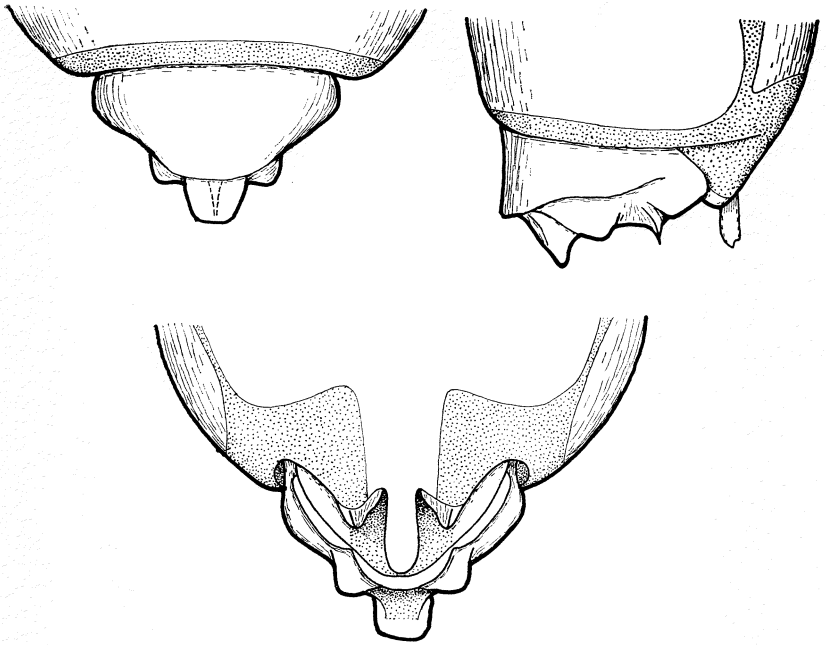


Fig. 1. *A. muliebris muliebris* McL.

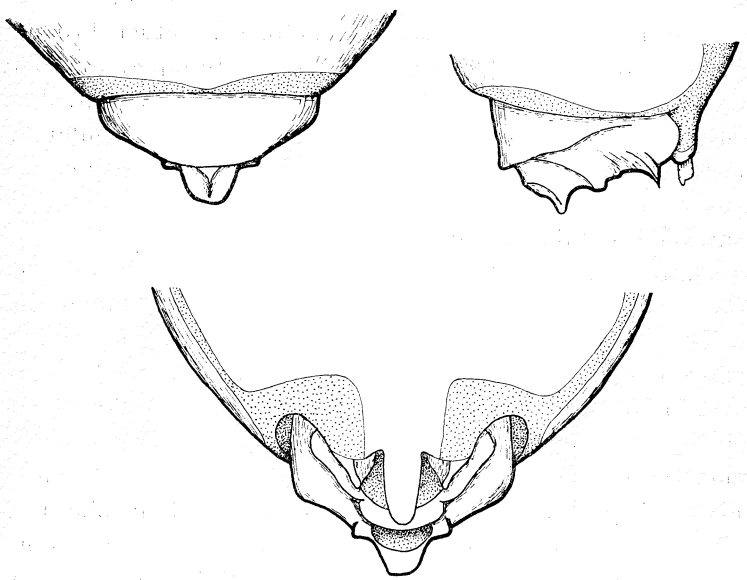


Fig. 2. *A. muliebris jemtlandica* n. subsp.

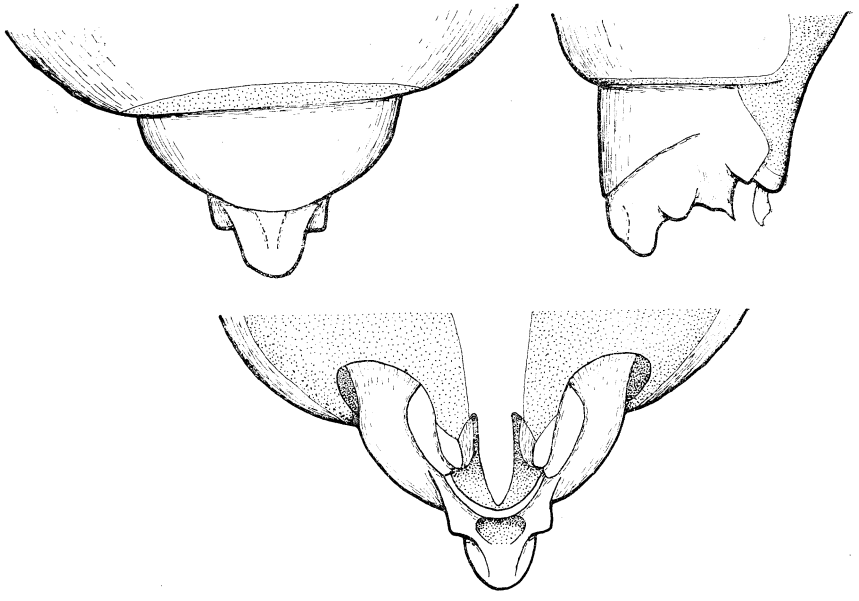


Fig. 3. *A. muliebris kolteriana* n. subsp.

A. m. intermedia Niels. (1950, fig. 7). Segment X with a pair of dorsal bulgings, which are much larger than in *cimbrica* and laterally projecting. The segment therefore is rather broad. It has a dorsal longitudinal ridge, which gradually tapers to a vertical, thin, but rather low lamella. In a lateral view the dorsal side of segment X is ca. 45° descendent in a somewhat irregular line. Its posterior corners are broad and rounded, just visible from above. Length of the anterior wing of one specimen (paratype) 8.9 mm. Lille Blåkilde, Himmerland, northern Jutland.

A. m. kolteriana n. subsp. (fig. 3). Segment X has no dorsal bulgings, but a distinct, though low and rounded longitudinal ridge. The posterior end of the ridge, which does not reach the posterior margin of the segment, is rather broad. In a lateral view the anterior part of the dorsal side of segment X is almost horizontal, the posterior part ca. 45° descendent. Its posterior corners are rounded and clearly visible from above. Unlike conditions in the other subspecies the posterior end of the median lobe of the 'vulvar scale' is rather pointed. Length of the anterior wing in one specimen 7.95 mm. Holotype (the island Kolter in the Faroes, 1.8.1926) in the Zoological Museum, Copenhagen.

A. m. nielseni Schmid, 1954 (Anker Nielsen 1950, fig. 1). Segment X is finger-like. It has no dorsal bulgings, but a very distinct longitudinal ridge, which in a posterior direction tapers rather gradually to a thin vertical lamella. In a lateral view most of the dorsal side of segment X is almost horizontal; quite posteriorly it is steeply descendent. The posterior corners of the segment are broadly rounded and not visible from above. Unlike conditions in the other subspecies the posterior corners of segment IX are rather pointed. It is the largest of the subspecies; length of the anterior wing 9.1 — 10.1 mm. Rold Kilde, Himmerland, northern Jutland.

According to the shape of segment X when seen from the side, the series will be: *cimbrica—muliebris—jemtlandica—intermedia —kolteriana—nielseni.* According to presence and shape of a longitudinal ridge on the dorsal side of segment X, it rather will be: *cimbrica—muliebris—kolteriana—intermedia—jemtlandica—nielseni.*

Where great and continuous populations of *A. muliebris* exist, as in the Alps and in the Norwegian high mountains, they are represented, or at least dominated, by the subspecies *cimbrica.* In small relict populations, however, local subspecies are apt to arise. It must be borne in mind that these populations are at the verge of extinction, and especially must have been so in the warm Atlantic and Subboreal Periods. Due to the parthonogenesis one single surviving female will be able to secure the population at a critical time, and such a female may happen to be a mutant.

The frequency of mutations is shown also by the fact that anomalies in the wing venation are of common occurrence. In both fore wings of the type specimen of *A. m. jemtlandica,* e.g., r_4 and r_5 anostomize near the base. Fork 2 thus has a very long stalk, at the root of which a small trapezoidal cell is seen.

The possibility of course also exists that a mutation may have selective value in altered climatic conditions. Thus, the population of *cimbrica* in Lille Blåkilde cannot be distinguished morphologically from that in Svinebæk, but it has quite another annual cycle. That in Lille Blåkilde, in which the flying season extends over at least most of the year, certainly must have selective value in a stenothermous spring in a temperate climate, in which the winters usually are very mild. (The population in Lille Blåkilde thus may

be said to represent a biological subspecies, but from a systematical point of view a subspecies can be defined only morphologically).

The parthenogenesis also makes it possible that two subspecies may exist in the same locality, which actually is the case in Lille Blåkilde.

A. m. kolteriana has been recorded erroneously as *A. arctica* Boh. (=*zonella* Zett.) by Henriksen (1929, p. 8). In the Norwegian high mountains *A. zonella,* to my experience, is found only in melt-water lakes at or above the snow-line, and there is no eternal snow on the Faroes. (*A. zonella* has a similar distribution as *Ranunculus glacialis,* which probably is dependent on this caddisfly for pollination). It has been recorded, together with *A. muliebris,* from the island Gotland in the Baltic (Gislén & Brinck 1950, p. 21), but perhaps we here are concerned with two subspecies of *A. muliebris.*

For providing material I wish to express my sincere thanks to Professor J. de Beaumont, Lausanne, Dr. D. E. Kimmins, London, and Professor Carl H. Lindroth, Lund.

Summary

A. muliebris McL. is exceedingly variable. In great and continuous populations it is represented by the subspecies *cimbrica,* whereas local subspecies have evolved in small relict populations. Two new subspecies are described.

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Nye sommerfugle (Lepidoptera) i Danmark 1968.

Af
Wilhelm van Deurs
Frugtparken 7, Gentofte.

På Entomologisk Forenings møde den 16. april 1969 blev der af tilstedeværende medlemmer givet meddelelser om 10 arter nye for den danske fauna. Hertil kommer en art publiceret i »Lepidoptera« samt en korrektion. Når intet andet er angivet, er fundene gjort i 1968.

Nye arter:

Actebia fennica Tausch. 1 ♂ 25/8 Stige (Fyn) (Otto Buhl) og fra flere lokaliteter på Bornholm: 1 ♀ 29/7 Svenskehavn (Eivind Palm), 1 ♀ 29/7 Snogebæk (Gregers Jørgensen, 1 ♀ 3/8 Slusegård (Tage Krake) og 1 ♀ 8/8 Boderne (H. K. Jensen). Se Eivind Palm, 1968, »Lepidoptera«, ny ser., bd. 1, nr. 7, pag. 142.

Nycteola degenerana Hb. 1 eks. 24/8 Ulfshale (Møn) (Robert Torp: såfremt der ses bort fra tidligere opgivelser). Bestemmelsen verificeret af Stig Torstenius, Stockholm.

Aegeria melanocephala Dalm. Klækket fra larver fundet flere steder i Jylland marts—maj (Michael Fibiger). Se »Lepidoptera«, ny ser., bd. 1, nr. 6, pag. 119.

Vitula edmansae Pack. (**bombylicolella** Amsel). 2 ♂♂ 9/8 og 17/9 Harboør (Jyll.) (Preben L. Holst).

Euergestis limbata L. 1 eks. 19/7 1967 Saltuna (Bornh.) (E. Vilsund).

Acleris nigrilineana Kaw., som af Opheim (Opusc. Ent., bd. 33, 1968, p. 371—74) er anført som ny for Norge og Sverige, forekommer iflg. N. L. Wolff talrigt i Nordjylland og Nordsjælland, medens de på Fyn, Sydsjælland, Falster og Bornholm forekommende populationer stemmer med den hidtil som *abietana* Hb. publicerede art. Wolff er af den opfattelse, at nærmere under-

søgelser af *abietana*'s forskellige populationer i Europa er nødvendige for at afgøre, om *nigrilineana* er en selvstændig art eller en underart af *abietana*.

Pammene ignorata Kuzn. (beskrevet 1968). Ca. 1860—1870 Falster (Benzon leg., N. L. Wolff det.). 1 ♀ coll. Zoologisk Museum.

Phthorimaea operculella Zell. 1 ♂ 9/6 Gentofte (C. Aastrup). Se »Flora og Fauna« 1969, 2. hefte, pag. 63.

Elachista consortella Stt. (**exiguella** Frey). 1 ♀ 10/6 1961 Kregme (Sjæll.), 1 ♂ 16/6 1967 Høvblege (Møn) (N. L. Wolff), samt 30/7 og 2/8 1961 Høvblege (Møn) (E. Traugott-Olsen).

Scrobipalpa sp. nær **S. klimeschi** Pov. ikke forevist, men meddelt som fundet på Læsø 4/8 af Jan Jonasson. Formentlig n. sp. Taget i Rumex-stængler i Sverige og Finland (N. L. Wolff medd.)

Fra »Lepidoptera«:

Perizoma taeniata Stph. Flere eks. 18/7 til 6/8 Louenkærskovene ved Mariager Fjord (Jyll.) (Knud Nielsen). Se »Lepidoptera« ny ser., 6 bd. 1, nr. 8, pag. 157.

Korrektion:

Ingen danske fund af *Oegoconia quadripuncta* Haw. vedrører denne, men O. *deauratella* H. S. (N. L. Wolff medd.)

Summary.

Eleven species of Lepidoptera new to the Danish fauna are listed, viz. *Actebia fennica* Tausch., *Nycteola degenerana* Hb., *Aegeria melanocephala* Dalm., *Vitula edmandsae* Pack. (*bombylicolella* Amsel), *Euergestis limbata* L., *Acleris nigrilineana* Kaw., *Pammene ignorata* Kuzn., *Phthorimaea operculella* Zell., *Elachista consortella* Stt. (*exiguella* Frey), *Scrobipalpa* sp. near *S. klimeschi* Pov., and *Perizoma taeniata* Stph. *Acleris nigrilineana* Kaw. occurs in North Jutland and North Zealand, whereas *A. abietana* Hb. seemingly is restricted to the south-eastern parts of Denmark (Funen, South-Zealand, Falster and Bornholm). Further investigations may show if *nigrilineana* is a distinct species or a subspecies of *abietana*. All previous Danish records of *Oegoconia quadripuncta* Haw. concern *O. deauratella* H.S.

(Noona Dan Papers No. 90.)

A new Philippine species and taxonomic notes on Bocchus Ashmead (Hym., Dryinidae).

By
Carol G. Nagy
Marine Research Station, Agigea, Rumania

In the Bethyloid material collected by the Noona Dan Expedition (Petersen, 1966) and deposited in the Zoological Museum of Copenhagen, Denmark, I have recognized a considerable number of new species. The two species described below, one as a new species, belong to the genus *Bocchus* Ashmead, 1893, of the subfamily *Bocchinae* C. Nagy, 1967.

This small distinct subfamily of the Dryinidae contains some genera (*Bocchus* Ashmead, *Mystrophorus* Foerster, *Bocchoides* Benoit, and others; see also Richards, 1939, p. 189), the species of which are predators of Homoptera, especially *Bruchomorpha* spp. The Bocchinae are predominantly Nearctic and European, with only one species known from the Indo-Australian area and one from Madagascar. The second record of the subfamily from the Indo-Australian region is presented below.

Bocchus Ashmead

Bocchus Ashmead, 1893. Bul. U.S. Natl. Mus., vol. 45, p. 91.
Type-species: ***Bocchus flavicollis*** **Ashmead, 1893, by monotypy and original designation.**

Phorbas Ashmead, 1893. Bul. U.S. Natl. Mus., vol. 45, p. 90, preocc.
Type-species: ***Phorbas laticeps*** **Ashmead, 1893, by monotypy.**

Eukoebeleia Perkins, 1905. Hawaii. Sugar. Plant. Assoc. Bul., vol. 1, p.59.
Type-species: ***Eukoebeleia mirabilis*** Perkins, 1905, by monotypy.

Phorbasia Kieffer, 1914. Das Tierreich, Lief. 41, p. 58.
Proposed as a new name for ***Phorbas*** Ashmead.
Type-species: ***Phorbas laticeps*** Ashmead, 1893, automatically.

Neoanteon Fouts, 1922. Philipp. Journ. Sci., vol. 20, p. 633. **New syn.**
Type-species: ***Neoanteon rubrica*** Fouts, 1922, by monotypy and original designation.

The main characters of the genus are as follows: Eyes long haired, or only with a microscopical pubescence; inner margins carinate, or separated from front with an impression. Front with a longitudinal carina in the middle. Maxillary palpi 6-, labial palpi 3-segmented. Flagellum long and filiform; scapus dentate, or not. Occipital margin complete. Mandibles tridentate, or quadridentate with one of the teeth very small. Abdomen more or less petiolated. Fore tarsi in the female chelate, with only a few spines on the mobile part and without a row of lamellae. Females winged or brachypterous; males always macropterous. Particularly in the pronotum, legs and antennae the coloration is very different in females and males of the known species.

Richards (1939) mentions that these wasps have only three apical teeth in the mandibles. *Neoanteon rubrica* Fouts, 1922, and the new species mentioned below represent an unusual state of this character as they have quadridentate mandibles. However, I do not consider these species generically different.

Provisional key to the species of Bocchus Ashmead

1. Front tarsi chelate, females 2
—. Front tarsi simple, males 7
2. Brachypterous species, abdomen very short petiolate (North America, Ohio) ..... *mirabilis* Perkins, 1905
—. Winged species, abdomen relatively long petiolate 3
3. Body black, eyes with distinct pubescence 4
—. Body partially yellow, testaceous or castaneous; eyes with very short, microscopical pubescence 5
4. Scutellum shining, very moderately alutaceous (North America, Arizona) ..... *arizonica* Perkins, 1907
—. Scutellum not shining, very weakly alutaceous (Europe, Czechoslovakia) ..... *slovacus* Strejček, 1964
—. Scutellum with long, pale pubescence (Central America, Panama) ..... ? *melanocephalus* Cameron, 1888
5. Scapus dentate (Europe, France) .... *europaeus* Bernard, 1939
—. Scapus simple 6
6. Body rufo-castaneous all over (Asia, Philippines) .... *rubricus* Fouts, 1922
—. Black, pronotum testaceous (Europe, Rumania) .... *scobiolae* C. Nagy, 1968
—. Black, pronotum yellow (North America, Michigan) .... *flavicollis* Ashmead, 1893
7. Abdomen very long petiolate (Asia, Philippines) .... *pedunculatus* sp. n.
—. Abdomen short petiolate 8

8. Pterostigma of forewing white (North America, Florida) .... *laticeps* Ashmead, 1893
—. Pterostigma of forewing dark brown (Europe, Rumania) .... *scobiolae* C. Nagy, 1968

The generic position of *melanocephalus* Cameron is not definitively established at present (see also Kieffer, 1914, p. 46).

Bocchus pedunculatus sp. n.

Holotype. ♂. The Philippines, PALAWAN: Mantalingajan, Pinigisan, 600 m, 4 Sept. 1961, caught in a Malaise insect trap (Noona Dan Exped.). In the Zoological Museum, Copenhagen, Denmark.

Description. Male. Length about 2,8 mm. Body (Fig. 1) black; clypeus, antennae, tegulae, legs and veins yellow; abdomen basally dark castaneous, at apex black. Body covered with long, pale pubescence, especially on the flagellum. Head as long as wide, its sides strongly arched, much wider near the middle than at vertex or behind. Vertex straight in anterior view; occipital carina not very strong, visible in lateral view at slope of vertex. Eyes relatively large, broadly elliptical, with moderately long pubescen-

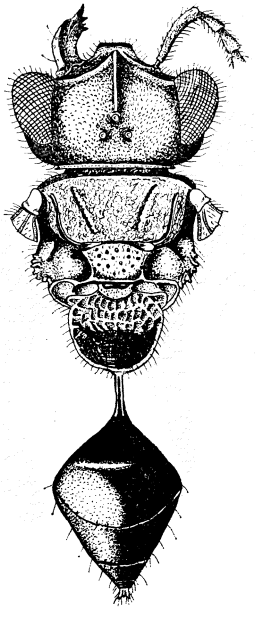


Fig. 1 — *Bocchus pedunculatus* n. sp., male holotype, body dorsal view.

ce; larger diameter of an eye as long as the distance between eyes across front. Mandibles with four apical teeth. Clypeus broad, with prominent, broadly rounded apical margin; median area finely shagreened. Posterior orbital carina of eyes reaches the base of mandibles. Front strongly polished, with irregular reticulate punctures; median carina prominent and shining. Ocellar triangle equilateral; posterior ocelli removed from crest of vertex by a distance slightly longer than width of ocellar triangle. Vertex broadly, weakly rounded off at only a short distance above eye tops. Antennae with a ratio of about 1,5:1:1:1,2 between the first four segments. Flagellar pubescence erect, bristle-like, setae about half as long as width of flagellum.

Pronotum short; propleuron with only a few punctures and four longitudinal carinae. Mesoscutum alutaceous, parapsidal furrows obscurely marked; basal groove of scutellum strongly constricted in the middle. Scutellum shining, with a few moderately large punctures. Propodeum rounded, strongly margined laterally and behind, covered with coarse reticulations. Mesopleuron reticulated; sides of proprodeum shining. Wings hyaline; pterostigma lanceolate, very long; basal vein is distinctly curved. (Distal half of forewing, parts of the veins and hind wing wanting). Claws simple. Petiolus as long as the hind coxae, laterally with two shining, longitudinal carinae forming a longitudinal concavity. Abdomen shining, broad and short, without punctures, only the posterior margins of the tergites with relatively long, erect hairs. Genitalia not studied.

Female unknown.

R e m a r k s. The very long abdominal petiolus does not occur in other known male specimens. The species is of great interest because its mandibles have four apical teeth, exactly as in the following species. It is not likely that it is the male of *rubricus* because the later has the clypeus trilobed, the posterior orbital carina absent, and some other characters clearly different.

Bocchus rubricus (Fouts), comb.n.

Neoanteon rubrica Fouts, 1922. Philipp. Journ. Sci., vol. 20, pp. 634—635, ♀.

Philippines, PALAWAN: Tagembung, 1150 m, 1 ♀, 17 Sept. 1961.

R e d e s c r i p t i o n. Female. Length about 4 mm. Body red-



Fig. 2 — *Bocchus rubricus* (Fouts) female, chela of left fore tarsi.

castaneous, yellow are mandibles, antennal segments 1, 2, 7, 8, and legs. Wing venation brown. Mandibles with four strong apical teeth; clypeus trilobed, the median lobe broadly rounded, with prominent apical margin, the clypeal disc finely alutaceous. Ratio between first four antennal segments is about 2,5:1:1,2:1,3; flagellum with short, semi-erect pubescence. Eyes covered with short hairs. Front shining although uniformly alutaceous, punctures small and rather widely spaced; median carina prominent; inner orbits of eyes impressed; antennal scrobes margined. Head with its sides strongly converging and much wider near the front than behind. Ocelli in a long triangle; posterior ocelli as far from occipital carina as a distance two times as long as width of ocellar triangle. Occipital carina complete.

Pronotum short, posteriorly of the constriction shining, anteriorly weakly striate. Mesoscutum polished and densely finely wrinkled in anterior half, alutaceous and covered with small punctures in posterior half. Parapsidal furrows ill-defined, anteriorly represented by two minute grooves. Scutellum and postscutellum shining, finely punctate. Propodeum trapezoidal, distinctly margined behind, disc otherwise covered with rather strong reticulations. The notum sutures marked by a line of punctures. Wings hyaline, with three transversal dark bands; pterostigma elongate, but shorter than the radial vein; basalis curved, subcostalis very long and complete. Fore coxae twice as long as broad; fore trochanters a little thickened distally; fore femora as long as the fore tibia; fore tarsi with segments 1—3 together as long as tibiae, segments 1 and 4 very long, segment 1 one and half times as long as 4; chelae as in Fig. 2, enlarged claw with a subapical tooth and a median seta. Middle and hind tibiae with a line of setae on the sides; claws simple. Petiolus as long as the hind coxae, circular in section; abdomen shining, only near apex with a few hairs.

Male unknown.

Remarks. Only two specimens of this species are known. The development of the clypeus is unique and immediately separates *rubricus* from other known species. The modifications of the chelae are also unusual. They are partly similar to those of some Anteoninae, but not of generic value. The mandibles are very similar to those of *pedunculatus,* in most other features, however, the two species are very different.

Summary

Bocchus pedunculatus n. sp. is described, and *Neoanteon rubricus* Fouts redescribed. *Neoanteon* Fouts is shown to be the same as *Bocchus* Ashmead, a new synonymy. The genus *Bocchus* is redefined and a key to the species included is presented.

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(Noona Dan Papers No. 91)

The Ameniinae (Diptera: Calliphoridae) of the Noona Dan Expedition, with other new records from the Bismarck Archipelago, New Guinea and Moluccas.

By
R. W. Crosskey
Commonwealth Institute of Entomology, London.

The Danish "Nona Dan" Expedition (see Petersen, 1966) obtained a small collection of flies of the little known subfamily Ameniinae, a group recently revised and assigned to the Calliphoridae in an earlier paper (Crosskey, 1965). Altogether 46 specimens were collected by the Expedition, of which only one was from the Philippine Islands and all the remainder from the Bismarck Archipelago. The main purpose of the present paper is to record this material, but I am taking this opportunity of recording also some other material from the New Guinea area that has become available since my earlier revision (*op. cit.*) was published; most of this extra material was obtained from my own collecting in New Guinea and New Britain during June and July, 1965, but some is from the collections of the Bishop Museum, Honolulu, made over the past few years, and a few specimens are in other museum collections. The museum depositories of all specimens are recorded in the paper and the following abbreviations are used:

AMNH	American Museum of Natural History, New York.
ANIC	Australian National Insect Collection, Canberra.
Bish. Mus.	Bernice P. Bishop Museum, Honolulu.
BMNH	British Museum (Natural History), London.
DEI	Deutsches Entomologisches Institut, Eberswalde.
MNHN	Muséum National d'Histoire Naturelle, Paris.
USNM	United States National Museum, Washington D.C.
UZM	Universitetets Zoologiske Museum, Copenhagen.

It should be noted that a few specimens at present in the British Museum (Natural History) or in the Bishop Museum may later be

deposited in the collection of Washington State University, Pullman, USA, as a result of exchange arrangements.

It is remarkable that so few specimens of Ameniinae from the Bismarck Archipelago existed in museum collections before the recent expeditions, as the brilliant metallic green flies of the genera *Platytropesa* and *Stilbomyella* are evidently common at certain times and alight and rest conspicuously on low level vegetation, often on the leaves of wild ginger, where they are easily seen and collected. During one week of my own visit to Keravat in New Britain a total of 213 specimens of *Stilbomyella nitens,* until then a species recorded only from the unique holotype, was obtained without special effort; flies of this species, together with *Platytropesa dubia,* were found to be attracted to the shells of the introduced giant snails of the genus *Achatina* Lamarck (Mollusca), up to four or five flies sometimes being observed on the shell of one living or dead snail. This clear interest in the snails supports the suggestion made previously (Crosskey, 1965) that the Ameniinae are biologically associated with land molluscs, though whether as true parasites remains unconfirmed. Some of the female flies of both the genera *Stilbomyella* and *Platytropesa* seen from the Bismarck Archipelago and New Guinea show a single moderately well developed larva protruding from the postabdomen, and specimens of the genus *Silbomyia* from Indonesia have now been seen with similar partially extruded larvae, thus confirming the statement deduced from female abdominal morphology and made in the earlier work (*op. cit.*) that the Ameniinae are undoubtedly larviparous; it is now certain that they retain the larvae in utero to an advanced stage of development, as in the South American subfamily Mesembrinellinae, and probably until almost ready for pupation (flies showing moderately developed protruding larvae had probably not been caught at larviposition but had partially ejected immature larvae in response to the killing agent). An interesting field of research awaits anyone able to work on the field biology of Ameniine flies in the Bismarck islands and New Guinea, and on their suspected ecological relationships with Mollusca.

Tribe **AMENIINI**

Silbomyia palawana Crosskey, 1965

Philippines. — BALABAC: 1 ♀, Dalawan Bay, 8.x.1961 (Noona Dan Exp.) (UZM).

The specimen is smaller and more violet-blue than other known material.

Genus **Stilbomyella** Malloch

In my revision of the Ameniinae (*op. cit.*) two species of this genus were tentatively recognised, the type-species *S. nitens* Malloch (at that time known only from the unique holotype) occurring in New Britain, and *S. nigrocostalis* (Doleschall) occurring in the Moluccas and New Guinea, but it was emphasised that *nitens* was only very doubtfully distinct from *nigrocostalis* and that the latter species showed some rather baffling variability over different parts of its range. The additional material of the genus now available (approximately 265 specimens) still leaves much doubt as to how many species ought to be recognised, or which characters can be relied upon to provide good specific (or subspecific) characters. The most striking feature that is now clear from the extra material is that specimens from New Britain are consistently much smaller than those from the New Guinea mainland, that their colour tends to be more brassy or coppery green, and that some or all of the genal and all the postbuccal hair is dark brownish to black; specimens from New Guinea are on average much larger than New Britain specimens, their colour is usually more emerald green or even bluish to violet, and all or almost all of the genal and postbuccal hair is golden-orange (the genae are also slightly wider and have the pollinosity a rich golden-orange colour).

The above-mentioned distinctions between New Guinea and New Britain specimens are clear, but it becomes more difficult to decide what taxonomic value should be placed on the observed differences when material from the Molucca islands is also taken into account, for most specimens from Amboyna resemble those from New Britain (dark genal and postbuccal hair), specimens from Buru most resemble those from New Guinea, and specimens from Batjan are rather intermediate (an admixture of pale and dark hair on genae and postbuccae); a specimen seen from Ceram has all dark head hair. Furthermore specimens from Amboyna (the type-locality of *nigrocostalis* and its synonym *costalis* Walker) are sometimes no larger than average specimens from New Britain.

Male specimens from New Guinea having golden genal and postbuccal hair and the gena slightly wider than usual have the mesolobes of the genitalia rather more straight in profile and more pointed at the extreme apices than specimens from elsewhere, and

it is possible that a distinct species exists in the New Guinea uplands; there is insufficient evidence at present to justify treating specimens from the New Guinea uplands as specifically or subspecifically distinct from the true *nigrocostalis,* and it would be unwise to do so until more material of *Stilbomyella* has been collected in the Aru Islands. It is curious that the few female specimens so far known from these low-lying islands (including the holotype of *gloriosa* Walker, a name currently in synonymy with *nigrocostalis*) have the gena rather wide and all the genal and postbuccal hair, plus the hair of the gular region, deep yellow to golden-orange in colour, and are thus almost identical with material from the interior highlands of New Guinea. If the species from the latter area proves to be distinct from true *nigrocostalis* it is therefore possible that Walker's name *gloriosa* will apply to it. Unfortunately no male specimens are yet available from the Aru Islands (the type-locality of *gloriosa)* to determine whether the hypopygium has the mesolobes of the rather straight shape found in New Guinea mainland specimens.

In the Bismarck Archipelago the genus *Stilbomyella* is now known from the island of Lavongai as well as New Britain, but there is no evidence yet that it occurs in New Ireland (as appears probable) or in the Admiralty Islands.

As it is still very uncertain, in spite of the new material here recorded, what status should be accorded to the variant forms within *Stilbomyella,* it is considered best to follow my earlier revision and recognise *nitens* and *nigrocostalis* as separate species; the new material is listed accordingly below.

The two species tentatively recognised differ as follows:

Size small, mean length 9.3 mm. (range 7.4—11.3 mm.: 200 specimens measured). At least some and often all of genal hair dark brown, all hair of postbuccae and gular region dark brown to blackish. Mesopleura shining metallic, almost no trace of whitish pollinosity in any light. Genal pollinosity not nearly reaching to gular suture, postbuccal region adjacent to gular suture semi-metallic and hardly at all pollinose. Colour usually brassy-green, sometimes cupreous, less often emerald green or bluish-green (never violet-blue in material seen). [Bismarck Archipelago only] ..... *S. nitens* Malloch

Size larger, mean length 12.6 mm. (range 9.7—14.9 mm.: 38 specimens measured). Genal hair usually pale yellow to golden-orange, sometimes dark brown, hair of postbuccae and gular

region partly or all pale yellow to golden-orange (sometimes all dark in Molucca specimens). Mesopleura (especially when viewed from above) showing extensive covering of whitish pollinosity, at least when seen in some lights, often with large conspicuous densely white-pollinose spot. Genal pollinosity usually nearly reaching back to gular suture, postbuccal region adjacent to suture usually therefore not broadly semi-metallic. Colour usually emerald green or bluish-green, sometimes blue or violet, only occasionally brassy-green or cupreous. [New Guinea and Moluccas] ..... *S. nigrocostalis* (Doleschall)

Stilbomyella nitens Malloch, 1935

Bismarck Archipelago. — NEW BRITAIN: 2 ♂, 6 ♀, Yalom, 1000 m., 8—23.v.1962 (Noona Dan Exp.) (UZM); 2 ♀, Komgi, 1000 m., 14.v.1962 (Noona Dan Exp.) (UZM); 35 ♂, 10 ♀, Keravat, 2.vii.1965 (R. W. Crosskey) (BMNH); 63 ♂, 19 ♀, Keravat, 29.vi.1965 (R. W. Crosskey) (BMNH); 51 ♂, 35 ♀, Keravat, 24—28.vi.1965 (R. W. Crosskey) (44 ♂ & 30 ♀ in BMNH, 4 ♂ and 2 ♀ in ANIC, 1 ♂ & 1 ♀ in DEI, 1 ♂ & 1 ♀ in MNHN, 1 ♂ & 1 ♀ in USNM); 2 ♂ [one in celluloid capsule], Keravat, 20—25.xi.1959 (T. C. Maa) (Bish. Mus.). — LAVONGAI: 1 ♂, Banatam, 23.iii.1962 (Noona Dan Exp.) (UZM).

Stilbomyella nigrocostalis (Doleschall, 1858)

New Guinea and Moluccas. — AUSTRALIAN NEW GUINEA: 3 ♂, 5 ♀, Western Highlands, Olgolboly, 13 km. E. of Mt. Hagen, 4.vi.1965 (R. W. Crosskey) (BMNH); 3 ♀, Western Highlands, Olgolboly, 13 km. E. of Mt. Hagen, 6.vi.1965 (R. W. Crosskey) (BMNH); 2 ♂, Wau, 1200 m., 10 & 14.xi.1965 (P. Shanahan) (Bish. Mus. & BMNH); 1 ♀, Wau, 1250 m., 6.v.1965 (J. & M. Sedlacek) (Bish. Mus); 3 ♀, Wau, Mt. Missim, 1100 m., 16.ii.1963 (J. Sedlacek) (Bish. Mus. & BMNH); 1 ♀, Wau, Mt. Missim, 1150 m., 11.iv.1964 (J. Sedlacek) (Bish. Mus.); 2 ♀, Missim, 1100 m., 16.ii. [no year date] (J. & M. Sedlacek) (Bish. Mus.) — WEST IRIAN (Indonesian New Guinea): 1 ♀, Star Mts., Sibil Val., 1245 m., 18.x.—8.xi.1961 (S. Quate) (Bish. Mus.); 1 ♀, Genjam, 40 km. W. of Hollandia, 100—200 m., 1—10.iii.1960 (T. C. Maa) (Bish. Mus.) — CERAM: 1 ♀, Paroe, ii.1909 (F. Muir) (Bish. Mus.) — AMBOYNA: 4 ♂, Amboina (F. Muir) (Bish. Mus. & BMNH).

It is of interest to note the exceptional colour of the Bishop Museum specimen from Genjam (West Irian) listed above: this has the abdomen entirely deep metallic violet, the scutellum violet-blue and the scutum and prescutum blue-green.

Genus **Platytropesa** Macquart

Since the revision of Ameniinae (Crosskey, 1965) was prepared another 175 specimens of the genus *Platytropesa* have become available for study, and it is now possible to form some more

positive conclusions about the distribution, status, and variability of the three species recognised; these are given below, following the data of the new material of each species.

Platytropesa simulans Crosskey, 1965

New Guinea. — AUSTRALIAN NEW GUINEA: 15 ♂, 2 ♀, Western Highlands, Olgolboly, 13 km. E. of Mt. Hagen, 4.vi.1965 (R. W. Crosskey) (BMNH); 6 ♂, 2 ♀, Western Highlands, Olgolboly, 13 km. E. of Mt. Hagen, 6.vi.1965 (R. W. Crosskey) (BMNH); 1 ♂, 1 ♀, Morobe District, Wau, 3500—4000 ft., 16 & 17.v.1965 (R. W. Crosskey) (BMNH); 1 ♀, Morobe District, Wau, 1200 m., 13—19.ix.1962 (J. Sedlacek) (Bish. Mus.); 1 ♂, Morobe District, Wau, 1200 m., 12.iv.1963 (J. Sedlacek) (Bish. Mus.); 1 ♂, 1 ♀, Swart Valley, Karubaka, 1400 & 1450 m., 6 & 12. xi.1958 (J. L. Gressitt) (Bish. Mus.); 1 ♂, 1 ♀, Eliptamin Valley, 1200—1350 m., 1—15.viii.1959 (W. W. Brandt) (BMNH & Bish. Mus.); 1 ♀, Wampit Valley, nr. Gurakor village, 950 m., 7.vii.1957 (D. Elmo Hardy) (Bish. Mus.); 1 ♀, Finisterre Range, Saidor, Gubumi village, 24—30.vi. 1958 (W. W. Brandt) (Bish. Mus.); 2 ♂ [in celluloid capsule], 1 ♀, Kassam, 1350 m., 48 km. E. of Kainantu, 30.x.1959 (T. C. Maa) (Bish. Mus.); 1 ♀, 6 m. N.W. of Lae, 15 m., 9.vii.1957 (D. Elmo Hardy) (Bish. Mus.); 1 ♀, Bubia Agricultural Station, Lae, 15 m., 6.vii.1957 (D. Elmo Hardy) (Bish. Mus.); 1 ♀, Papua, Owen Stanley Range, Goilala, Loloipa, 1—15. ii.1958 (W. W. Brandt) (Bish. Mus.); 1 ♂, Papua, Normanby Is., Wakaiuma, Sawa Bay, 1—10.xii.1956 (W. W. Brandt) (Bish. Mus.); 1 ♀, Papua, Normanby Is., Wakaiuma, Sawa Bay, 11.xi.1956 (W. W. Brandt) (Bish. Mus.). — WEST IRIAN (Indonesian New Guinea): 1 ♂, 2 ♀, Central Mts., Archbold Lake, 760 m., 26.xi.—3.xii.1961 (S. Quate) (BMNH & Bish. Mus.); 1 ♀, Central Mts., Archbold Lake, 760 m., 26.xi.—3.xii. 1961 (L. W. Quate) (Bish. Mus.).

This species appears to be confined to New Guinea (including Papua) and its immediately offshore islands, and is apparently absent from the Bismarck Archipelago and the Moluccas; it is also unknown from Queensland, where *P. auriceps* occurs. It is the most distinctive species in the male because of the very straight mesolobes of the genitalia (when seen in profile: Fig. 2), which have a trace of a small blunt anterior hook-like projection apically. *P. simulans* appears to be the only species of *Platytropesa* occurring in the interior highlands of New Guinea, and males examined from a variety of upland localities in both West Irian and Australian New Guinea show great constancy in the exact shape of the hypopygial mesolobes and paralobes (Fig. 2); furthermore males of *simulans* are always without proclinate orbital setae, to judge from material so far known, and both sexes always show a well developed large white pollinose spot on the mesopleuron. The latter feature distinguishes the females of *simulans*

from those of *P. dubia,* which are otherwise difficult to distinguish, and it is largely because of the presence of the white mesopleural spot that the female specimens recorded above from the lowland area of Lae have been identified as *simulans* (no males from this area are yet available for confirmation). Two specimens of *Platytropesa* have been seen (and are listed above) from Normanby Island, one of the D'Entrecasteaux Islands off the eastern end of Papua, and these are tentatively identified as *simulans,* although the shape of the hypopygial paralobes of the male specimen resemble those of *dubia* as much as those of *simulans;* however the Normanby Island specimens have almost no angulation of the inner eye margins, the male is without proclinate orbital setae, and the mesopleura have the white pollinose spot, and identification as *simulans* appears justified.

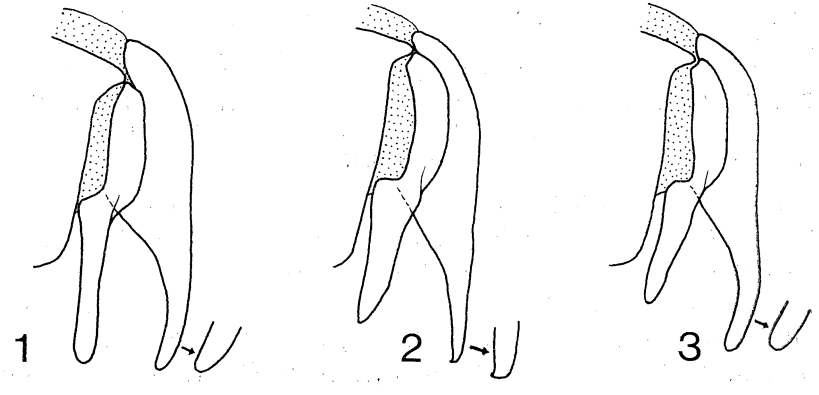
Platytropesa dubia (Malloch, 1935)

Bismarck Archipelago. — NEW BRITAIN: 7 ♂, 7 ♀, Yalom, 1000 m., various dates from 9—22.v.1962 (Noona Dan Exp.) (6 ♂, 6 ♀ in UZM, 1 ♂, 1 ♀ in BMNH); 1 ♂, 2 ♀, Valoka, 5 & 7.vii.1962 (Noona Dan. Exp.) (UZM); 1 ♀, Bita Paka, 15 km. SE of Kokopo, 10.vii.1962 (Noona Dan Exp.) (UZM); 1 ♂, Warangai, 30.vi.1965 (R. W. Crosskey) (BMNH); 6 ♂, 32 ♀, Keravat, 27.vi.1965 (R. W. Crosskey) (5 ♂, 29 ♀ in BMNH, 1 ♂, 3 ♀ in UZM); 3 ♂, 23 ♀, Keravat, 1.vii.1965 (R. W. Crosskey) (3 ♂, 21 ♀ in BMNH, 2 ♀ in UZM); 1 ♂, 1 ♀, Gazelle Peninsula, Bainings, St. Paul's, 350 m., 8.ix.1955 (J. L. Gressitt) (Bish. Mus.); 1 ♂, Linga Linga Plantation, W. of Willaumez Pen., 1 m., 13.iv.1956 (J. L. Gressitt) (Bish. Mus.) — NEW IRELAND: 1 ♂, 5 ♀, Lemkamin, various dates from 11—21.iv.1962 (Noona Dan Exp.) (1 ♂, 4 ♀ in UZM, 1 ♀ in BMNH)); 2 ♀, Danu, Kalili Bay, 30.iv.1962 (Noona Dan Exp.) (UZM & BMNH); 8 ♀, Kandan, 1.i.1960 (W. W. Brandt) (6 ♀ Bish. Mus., 2 ♀ in BMNH); 3 ♂, 3 ♀, Schleinitz Mts., Lelet Plateau, x.1959 (W. W. Brandt) (2 ♂, 2 ♀ in Bish. Mus., 1 ♂, 1 ♀ in BMNH). — LAVONGAI: 4 ♂, 4 ♀, Banatam, various dates from 21.—24.iii.1962 (Noona Dan Exp.) (3 ♂, 3 ♀ in UZM, 1 ♂, 1 ♀ in BMNH).

It appears justified on the basis of the new material listed above to treat *Platytropesa* dubia as a distinct species, although as pointed out in my earlier paper (Crosskey, 1965) it is very close to *P. auriceps* and could perhaps be regarded as a subspecies of the latter; for the two forms are evidently allopatric, *dubia* occurring only in the Bismarck Archipelago (New Britain, New Ireland and Lavongai so far recorded) and *auriceps* being absent from these islands. However, there are constant differences between the two forms, and I prefer to accept *dubia* as a valid species.

Both sexes of *dubia* constantly lack any well developed white pollinose pleural spot and the mesopleura are shining metallic, whereas in both of the other species (*auriceps* and *simulans*) there is a very distinct large white pollinose area on each mesopleuron, and the male genitalia of *dubia* specimens (which are very constant in form among specimens from New Britain, New Ireland and Lavongai) differ slightly but apparently constantly from those of the other species: in *dubia* the paralobes of the male hypopygium are much shorter than the mesolobes (as in *simulans*) but the mesolobes are curved in profile with rounded tips (much as in *auriceps*), so that together when seen in profile they have a different form from those of the other two species (see Fig. 3).

In *P. simulans* the male is always without proclinate orbital setae and in *P. auriceps* it always has two pairs of such setae, but *dubia* from Bismarck Archipelago shows complete variability in these setae in the male over the whole range, although the setae tend to be either present or absent in different islands. In male specimens of *P. dubia* from New Britain, proclinate orbital setae are almost always absent (out of 23 specimens seen none has two pairs of proclinate orbitals, only one — namely the lectotype of *ralumensis* Enderlein, synonym of *dubia* — has one pair, and one specimen has such a seta on one side of the head but not on the other); but in specimens from New Ireland and Lavongai proclinate orbital setae seem always to be present in the males, either one or two pair (of four males seen from Lavongai two have one



Figs. 1—3. Left lateral view of paralobe and mesolobe of ♂ hypopygium, showing shape of these structures in: (1) *Platytropesa auriceps;* (2) *P. simulans;* (3) *P. dubia.* Hair vestiture omitted.

pair and two have two pairs of such setae, and of four males seen from New Ireland three have two pairs of proclinate orbital setae and the remaining specimen has two such setae on one side of the head and one on the other). In the earlier paper (*op. cit.*) it was suggested, from the very few specimens then available, that *dubia* males did not have two pairs of proclinate orbital setae, but the material now known from New Ireland and Lavongai shows that they often do. Variation in number of these setae is not associated with any differences in the male genitalia, and the males that differ in this character are certainly all conspecific.

As only very few specimens were seen previously, no description of *dubia* was then given, and it may now be useful to give the following notes from the much more extensive material now to hand. The colour in *P. dubia* usually ranges from brilliant metallic brassy-green to emerald-green and blue-green, but a few specimens are deep metallic blue or slightly violaceus; many specimens have the abdomen distinctly more blue that the thorax. The extent and intensity of the brown colouring of the wings is extremely constant, and the golden-yellow head colouring shows very little variability in intensity. Almost all specimens of both sexes, but most noticeably in the males, have the inner margins of the eyes slightly but distinctly angulate near the level of the lunula when seen in facial view (as described and figured for *P. auriceps* by Crosskey, 1965). Almost all specimens have the lower calypter dark brown on about the posterior quarter to third, but in a few specimens dark infuscation covers nearly half the calypter. Body size is very variable, as shown by the following body length measurements:— mean length 10.65 mm. (range 8.2—13.0 mm.) [75 specimens measured]. As with other Ameniinae there is no significant difference in size between males and females, and the same overall variability is found in specimens from different islands of the Bismarck Archipelago as shown by the following: — New Britain specimens [48 measured], mean length 10.7 mm. (range 8.4—13.0 mm.); New Ireland specimens [20 measured], mean length 10.6 mm. (range 8.2—12.4 mm.); Lavongai specimens [7 measured], mean length 10.2 mm. (range 9.2—12.5 mm.); the measurements for the species as a whole, given above, are based on all of these specimens taken together.

Platytropesa auriceps Macquart, 1851

New Guinea. — AUSTRALIAN NEW GUINEA: 1 ♀, Papua, Louisiade

Archipelago, Misima Island, Mt. Sisa, 350 m., 23.vii.1956 (L. J. Brass) (AMNH); 1 ♀, Papua, Louisiade Archipelago, Sudest Island [Tagula I.], 0—100 m., 10.ix.1956 (L. J. Brass) (AMNH); 2 ♀, Papua, Central District, Gaile Forest, 28 miles S.E. of Port Moresby, 8.v.1965 (R. W. Crosskey) (BMNH). — WEST IRIAN (Indonesian New Guinea): 1 ♂, 1 ♀, Vogelkop, Jef Lio I., Sele Straits, 1—5 m., 15.viii.1957 (D. Elmo Hardy) (BMNH & Bish. Mus.); 1 ♀, Vogelkop, Fak Fak, S. coast of Bomberai, 100—700 m., 4.vi.1959 (T. C. Maa) (Bish. Mus.); 2 ♀ [one in celluloid capsule], Genjan, 40 km. W. of Hollandia, 100—200 m., 1—10. iii.1960 (T. C. Maa) (Bish. Mus.); 1 ♀, Hollandia area, W. Sentani, Cyclops Mts., 150—250 m., 18.vi.1959 (J. L. Gressitt) (BMNH).

Aru Islands. — 1 ♀, no other locality data, 1916 (W. W. F[roggatt]) (Bish. Mus.).

The small amount of additional material now seen and listed above tends to confirm that *P. auriceps* in mainly a lowland and coastal species around New Guinea; it is not known from the true interior highlands, and has not yet been found in north-east New Guinea. In the earlier paper (Crosskey, *op. cit.*) it was suggested that *auriceps* must occur in Papua, although no Papuan specimens were then known, and this can now be confirmed from specimens collected by myself near Port Moresby (Gaile Forest) and from the specimens in the collection of the American Museum of Natural History, New York, from the Louisiade Archipelago at the extreme south-eastern tip of Papua: although these are all females they appear to be identifiable without any doubt as *auriceps,* but it would be desirable to have males from Papua for full confirmation of identity. *P. auriceps* is absent from the Bismarck Archipelago, where its place is taken by the very closely related species (or possibly subspecies) *P. dubia* (Malloch).

The Australian National Insect Collection at Canberra contains a male and a female specimen of *Platytropesa* with the data "Queensland, Iron range, 9.iv.1964 (I. F. B. Common & M. S. Upton)" and a female specimen with the data "S. E. Papua, Misima Island, xi.1963 (W. W. Brandt)" which may belong to *P. auriceps* or possibly to *P. simulans;* these specimens have not been to hand while preparing the present paper, and they are not positively identified to species at this time. However, it should be noted that the male specimen from Iron range, Queensland, has no proclinate orbital setae and would therefore be atypical for *auriceps* (but this is the only species yet certainly known from Queensland: see Crosskey, 1965). The paralobes and mesolobes of the male genitalia of *P. auriceps* as seen in profile are shown in Fig. 1, for comparison

with those of *simulans* and *dubia*; it should be noted that the paralobes are long, not tapering, and the apices are rounded, giving a different impression from those of the other two species in which the paralobes are conspicuously shorter than the mesolobes and distinctly taper towards the tips.

Tribe **PARAMENIINI**

Genus **Paramenia** Brauer & Bergenstamm

This little known genus occurs in Misöol, Aru Islands, New Guinea, and eastern Australia, but is absent from Bismarck Archipelago. Only very little material is yet known from the New Guinea area, and only a small number of specimens (recorded below) has become available since the genus was revised earlier (Crosskey, 1965).

Paramenia divitiosa (Walker, 1864)

New Guinea. — AUSTRALIAN NEW GUINEA: 1 ♂, Finisterre Range, Saidor, Gabumi, 1—21.vii.1958 (W. W. Brandt) (Bish. Mus.); 1 ♂, 1 ♀, Finisterre Range, Saidor, Gabumi, 24—30.vi.1958 (W. W. Brandt) (BMNH ♂ Bish. Mus.); 1 ♂, Wum, Upper Jimmi Valley, 840 m., 17.vii. 1955 (J. L. Gressitt) (Bish. Mus.); 1 ♀, Madang District, near Madang, 11.vi.1965 (R. W. Crosskey) (BMNH). — WEST IRIAN (Indonesian New Guinea): 1 ♂, Vogelkop, Manokwari, 75 m., 21.vii.1957 (D. Elmo Hardy) (Bish. Mus.); 1 ♀, Vogelkop, Danowaria, 2.vi.1959 (T. C. Maa) (BMNH); 1 ♀, Ifar, Cyclops Mts., 300—500 m., 23—25.vi.1962 (J. Sedlacek) (Bish. Mus.).

The records, although few, of this species suggest that it is mainly distributed in western and northern New Guinea; it is still unknown from Papua. Some of the specimens now seen have the body colour greenish-blue or deep greenish, much as in *P. macularis*, but all are consistent in both sexes in having all of the parafacials except for a narrow part adjacent to the gena silvery-white pollinose (males of *divitiosa* are at once distinguished by this character from those of *macularis* in which the male head is all yellow). In known material the males are rather consistently smaller than the females, as shown by the following measurements of body length: male mean length 12.1 mm. (range 11.1—12.4 mm. : 4 specimens measured); female mean length 13.6 mm. (range 12.2—15.2 mm. : 12 specimens measured). But this size difference may not hold true when longer series of specimens are available. Not all males show the covering of whitish pollinosity on the dorsum of the third abdominal tergite that was recorded

in the earlier paper (*op. cit.*, p. 130) for the single male then known.

Paramenia macularis (Walker, 1859)

New Guinea. — AUSTRALIAN NEW GUINEA: 2 ♀, Papua, Kiunga, Fly River, 15—24.vii. & 4—5.ix.1957 (W. W. Brandt) (Bish. Mus); 1 ♀, Papua, Kiunga, Fly River, 21—24.x.1957 (W. W. Brandt) (BMNH); 1 ♀, Papua, Central District, Kapogere, 60 m. S.E. of Port Moresby, 2.v. 1965 (R. W. Crosskey) (BMNH); 1 ♂, Karimui, 1080 m., 14—15.vii.1963 (J. Sedlacek) (BMNH); 1 ♀, Morobe District, Markham Valley, Umi River, 480 m., 14.xi.1959 (L. J. Brass) (AMNH).

The last two specimens listed above are from north-east New Guinea, not from Papua, and are identified as *P. macularis*, but it should be noted that in both of them the thorax is more blue and the abdomen more deep blue to violet-purple than is usual in *macularis*. The specimens from Papua, on the other hand, agree very exactly with the male holotype and other material from the type-locality of *macularis* (Aru Islands) and may be positively identified as this species: they are the first specimens known from the New Guinea mainland.

Acknowledgments.

I am most grateful to Dr. Leif Lyneborg of the University Zoological Museum, Copenhagen, for allowing me to study the "Noona Dan" material here recorded, and to Dr. J. L. Gressitt for the loan of material from the Bernice P. Bishop Museum, Honolulu; I also appreciate the generosity of Professor Maurice T. James of Washington State University, U.S.A. in allowing me to see the Ameniine material formerly on loan to him from the Bishop Museum and here recorded.

Summary.

The Calliphoridae of the subfamily Ameniinae collected by the Danish "Noona Dan" Expedition are identified and listed, together with records of other material from the Bismarck Archipelago, New Guinea and the Moluccas not previously published.

References.

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(Noona Dan Papers No. 92)

The Soldier Flies (Diptera, Stratiomyidae) collected in the Philippine Islands by the Noona Dan Expedition.

Part I. *Beridinae, Sarginae, Clitellariinae, Hermetiinae, and Cyphomyiinae.* [1]

By
Maurice T. James
Washington State University, Pullman,
Washington, U.S.A.

This report is based on the collection of soldier flies, in part, made in the Philippine Islands on the Noona Dan Expedition of 1961—62 (Petersen 1966), supplemented by material from the Bishop Museum, Honolulu (BM), the Swedish Museum of Natural History (SMNH), and the United States National Museum (USNM). All holotypes and allotypes, unless otherwise indicated, are in the Zoological Museum, Copenhagen, Denmark.

I am indebted to Dr. Leif Lyneborg and to the Zoological Museum, Copenhagen, for making this fine collection available to me for study.

Subfamily **BERIDINAE**

Allognosta pleuralis, new species

Distinguished from all other Oriental species except *A. fuscipennis* Enderlein and *A. stigmaticalis* Enderlein by the contrasting black mesonotum and ochraceous pleura; the prominently black last palpal segment and the color pattern of the legs will distinguish it from both these species.

Allognosta flavopleuralis Frey and *A. varians* Frey, both from Burma, are described as having yellow, rather than ochraceous, pleura; if *pleuralis* is considered as having yellow pleura it will

[1] Scientific Paper 3079, College of Agriculture, Washington State University. Work was conducted under Project 9043.

trace to *flavopleuralis* in Frey's key except for the coloration of the wing; this and other minor discrepancies, together with the geographic separation, indicate different species. Though Frey's description is very brief, it indicates that the two species are quite closely related.

F e m a l e. Comparative measurements: head length 60 (60=1 mm); head height 70; head width 120; frons at vertex 48, at callus 35. Occipital orbit flaring somewhat upward on upper part, strongly narrowing to posterior corner of eye. Head black; occipital orbit and frons with numerous setigerous punctures, the hairs erect but short on frons, semi-appressed to appressed on orbits; callus shiny, bare; facial orbits and face with appressed to semi-appressed hairs: all vestiture pale yellowish. Scape, pedicel, and first two flagellomeres ochraceous, flagellum thence gradually darkening to black; apices of antennal segments and flagellomeres with black setulae. Proboscis brown; palpi brown, apical segment oval, inflated, black, with black setulae.

Mesonotum mostly and scutellum black, with abundant but not particularly conspicuous, appressed yellowish hairs; humeri, postalar callus and adjacent area from wing base to scutellum, prothoracic collar and all pleural and sternal areas ochraceous with whitish to yellowish inconspicuous hairs. Legs mostly ochraceous; front tibia except basal third and front tarsus, black; middle tibia except basal third, hind tibia except at basal half and middle and hind tarsi except most of their basitarsi, brownish-black. Fore tarsus expanded, the basitarsus almost as broad as its tibia. Wing uniformly clothed with microtrichia except at extreme base, pale brown, a little darker so near costal margin to wing apex, stigma and all veins distinctly brown. Halteres black, stalk mostly ochraceous.

Abdomen dark chestnut brown, darker laterally and at apex, under certain lights with a slight but distinct metallic bluish sheen, especially laterally; venter a little paler, first sternum ochraceous; seventh segment dorsally and ventrally almost black; eigth sternite small, triangular, black; cerci black. Pile abundant but short, appressed, conspicuous and for the most part concolorous with ground color; hairs on median parts of basal four sterna yellowish.

Length, 5—5.5 mm.

M a l e. Unknown.

T y p e s. Holotype, female, PALAWAN: Mantalingajan Range, Pinigisan, 600 m, 3 Sept. 1961. Paratype, female, PALAWAN: Brooke's Point, Uring Uring, 15 Aug. 1961.

A slightly teneral female bears the same data as the paratype except 20 August.

Allognosta platypus, new species

This is the only described species, except *phillippina* Frey, in which the femora are wholly yellow except for a terminal brownish-black to blackish ring on the front femur. It traces to *philippina* in Frey's key but may readily be distinguished from that species by the ochraceous halter (described as "dunkel" by Frey) and the chestnut-brown abdomen (yellowish brown in *philippina*). The two species must be very closely related; however, Frey's description is very brief, omits some important characters, and gives no measurements except that in his key his species traces to the group that is less than 7 mm in length. *A. platypus* is close to *A. crassitarsis* de Meijere which, like it, has an expanded front tarsus in the female, but in that species the apical half of the hind femur is black and the wing is differently patterned.

F e m a l e. Comparative measurements: head length 38 (60=1 mm), head height 62, head width 75; frons at vertex 33, at callus 30. Occipital orbits rounded in profile; frons almost parallel-sided. Head black. Frons narrowing a little toward frontal callus; the latter hardly developed in the usual sense, that is, marked only by a transverse depression, the frons being punctate virtually to that depression; however, the area between the depression and the antennal bases smooth, slightly elevated, and callus-like; the frons widening gradually but sharply below the transverse depression and onto the face. Frons above callus with abundant, short whitish hairs, face white pruinose, with scattered whitish hairs. Proboscis and palpi brown to brownish-black, terminal segment of palpi sometimes yellowish; palpi cylindrical, with two or three black setulae apically; palpi and proboscis black-haired. Scape, pedicel and first and sometimes second flagellomeres bright ochraceous, flagellum otherwise brownish-black; hairs black.

Thorax black; mesonotum shining, clothed with abundant, appressed, whitish pile. Pleura brownish-black to black, lightly cinereous pollinose and with whitish pile. Legs mostly light ochraceous; front tibia except extreme base, entire tarsus, and a

preapical annulus on the femur black; middle and hind tarsi becoming black beyond apex of their basitarsi. Wings uniformly clothed with microtrichia except at extreme base; almost hyaline but a light tinge of brown, developing into a light though distinct cloud at apex; stigma distinctly brown. Halteres ochraceous.

Abdomen chestnut brown, a little paler on sterna; pile fairly abundant but very short and inconspicuous, black on terga, whitish ventrally; cerci bright ochraceous.

Length, 3.5—4.5 mm, of holotype 4 mm.

Male. Unknown.

Types. Holotype, female, PALAWAN: Mantalingajan Range, Pinigisan, 600 m, 3 Sept. 1961. Paratypes, 16 ♀ same data but Sept. 1, 3, 4, and 8.

Subfamily **SARGINAE**

Microchrysa flaviventris (Wiedemann)

Sargus flaviventris Wiedemann, 1824, p. 31.

PALAWAN: Pinigisan, 600 m, 1—13 Sept. 1961, both inside and outside forest, 12 ♀, 5 ♂; Uring Uring, 16 Aug. to 16 Sept. 1961, 3 ♀, 1 ♂. — TAWI TAWI: Tarawakan, 20 Oct. 1961, 1 ♀. — BALABAC: Dalawan Bay, 7—12 Oct. 1961, 2 ♀, 2 ♂. — MINDANAO: Sapamoro, 17 and 22 Dec. 1961, 2 ♀.

Microchrysa fuscistigma de Meijere

Microchrysa fuscistigma de Meijere, 1913, p. 321.

PALAWAN: Tagembung, 16 and 19 Sept. 1961, 3 ♀.

Cephalochrysa chrysidiformis (Lindner)

Microchrysa chrysidiformis Lindner, 1937, p. 373.

TAWI TAWI: Tarawakan, 12 Nov. 1961, 1 ♀.

Sargus metallinus mactans Walker

Sargus mactans Walker, 1860, p. 97.

TAWI TAWI: Tarawakan, 12 Nov. 1961, 1 ♀. — MINDANAO: Sapamoro, 20—21 Dec. 1961, 1 ♂, 2 ♀.

Formosargus variegatus, new species

Structurally closely similar to the type and only previously known species, *F. kerteszi,* differing from that species particularly in the pattern of the thorax and abdomen, notably the U-shaped yellow marking against a black background on the mesonotum of

the male and in the black metanotum and paired abdomen spots of the female.

M a l e. Head and appendages yellow except the following black areas: frons above callus to and including ocellar triangle and occiput except cerebrale. Frons narrowing from vertex to plane of antennal insertion; 0.21 head width across anterior ocellus, 0.17 head width at base of antennae. Pile of head inconspicuous, somewhat thicker and more prominent on vertex and face, light yellow. Prothorax wholly yellow; mesothorax yellow in ground color but conspicuously marked with black; humeri, postalar callus and scutellum wholly yellow; broad sides from humerus to postalar callus and thence across in front of scutellum and occupying most of the postsutural area, also a median area extending from anterior margin to a plane just anterior to suture, black; the mesonotum might be described as chiefly black with a broad U-shaped yellow marking, with slight appendages extending outward along suture. Anterior half of mesopleuron shiny black; most of hypopleuron, metapleuron and metanotum black; scutellum wholly yellow, legs yellow except constricted basal one-third to one-fourth of hind tibia, which is brown; hind tarsi almost white. Pile of scutellum scattered, black; that of thorax and legs otherwise yellow. Halteres yellow, wings hyaline, veins brown; venation as in *kerteszi*. First abdominal segment black, two through five inclusively yellow on basal half, black on apical half; background color approximately same dorsally and ventrally; pile thick, black on black and yellow on yellow areas dorsally, more extensively yellow ventrally except at apex of abdomen. Genitalia yellow, not dissected.

Length, 6 mm.

F e m a l e. Frons parallel-sided, about 0.27 head width. Thorax mostly yellow; mesonotum with a median blackish vitta extending from extreme anterior margin to scutellum and continued by a median, terminally rounded, area extending almost to apex of scutellum; a small, obscure brownish spot on each side of median vitta before suture and a more conspicuous, oval one behind suture. Polished propleural area reduced to a small quadrate spot adjacent to notopleural suture; metanotum mostly brownish black. Abdomen yellow; first tergum with an indefinitely outlined transverse band anteriorly; second through fourth terga each with a pair of small, rounded brownish spots. Genitalia yellow, cerci

brown. Legs wholly yellow. Otherwise as described for male.

Length, 6.5 mm.

Types. Holotype, male, PALAWAN: Mantalingajan Range, Pinigisan, 600 m, 24 Sept. 1961. Allotype, female, BALABAC: Dalawan Bay, 13 Oct. 1961.

Subfamily **CLITELLARIINAE**

Brachycara ventralis Thomson

Brachycara ventralis Thomson, 1869, p. 461.

PALAWAN: Uring Uring, 16 Aug. 1961, 1 ♀. — BALABAC: Dalawan Bay, 9—12 Oct. 1961, 8 ♀, 7 ♂.

Negritomyia maculipennis (Macquart)

Ephippium maculipennis Macquart, 1849, p. 54 (358).

PALAWAN: Pinigisan, 600 m, 23 Sept. 1961, 1 ♂, 1 ♀; Uring Uring, 15 Aug. to 24 Sept. 1961, 7 ♀, 2 ♂. — BALABAC: Dalawan Bay, 6—13 Oct. 1961, 8 ♀, 3 ♂. — SAMAR: Osmena, South Coast, 11—20 April, 1945, J. Laffoon, USNM.

Negritomyia consobrina (Bigot)

Ephippium consobrinum Bigot, 1879, p. 208.

This species is represented in the Noona Dan material from the Bismarck Islands, but not from the Philippine Islands. It has been recorded from that archipelago, but such records need to be carefully checked. Until such a time, its occurrence on the Philippine Islands must be considered as hypothetical.

Negritomyia punctifrons, new species

Very similar to *consobrina* and *maculipennis,* but females readily distinguishable from both those species in the structure of the frons. The over-all coloration is black, with pile patterns of the thorax and abdomen essentially as in *consobrina* and *maculipennis.*

Female. Frons bare and shining just above antennae and with the usual pair of densely white, tomentum-like hair patches; just above each of these, adjacent to the eye, a distinct, keel-like ridge arises and runs along the ocular orbit, along side and to the occiput at the posterior margin of the ocellar triangle (Fig. 2); area between these ridges flattened, not bulging toward ocellar triangle. Area above the lower frontal hair patches smooth and shining; above this punctured, the punctures bearing white ap-

pressed hairs which become thinner toward the ocellar triangle, leaving a polished area there which is, however, interrupted by scattered setigerous punctures; an irregular row of these setigerous punctures extends just inside each frontal ridge and between this and the ocellar triangle. Frons at upper margin of eye about one-sixth head width, widening somewhat to just above bases of antennae, then expanding onto face. Pile of the head white, a few scattered white hairs on polished area above antennae; ocellar triangle black-haired; pile of eyes black, becoming white posteriorly. Antenna structurally and in color as in *maculipennis*. Pile of the abdomen whitish. Scutellar spines from lateral view essentially on a level with scutellum, a little shorter than it, black, apices brown, usually obscurely so. Wing light brown, a suggestion of a band from the stigma across apices of basal and anal cells; no distinct clouding, however. Hind and sometimes middle femur and

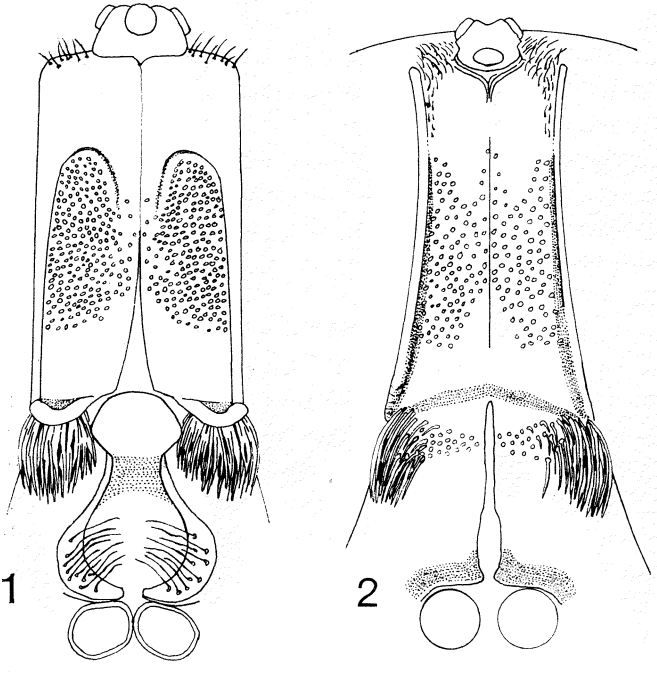


Fig. 1. ***Negritomyia separata,*** **new species, frons of female, from antennal base upward. Pile removed from depressions on middle frons, for sake of simplicity; position of hairs shown by punctures. — Fig. 2.** ***Negritomyia punctifrons,*** **new species, the same. Illustrations by Milton Brewster.**

all tibiae yellow at extreme base; tarsi yellow, apical tarsomeres becoming black.

Length, 7—11 mm, of holotype 10 mm.

Male. Similar to the female, except sexually. Eyes broadly contiguous halfway from anterior ocellus to antennal base; patch of hairs on frontal triangle dense and more shaggy than in *maculipennis,* the glabrous area below it smaller. Face wholly white pilose. Mesonotal pile more yellowish than in female. Leg and wing coloration as in female.

Length, 7—10 mm.

Types. Holotype, female, TAWI TAWI: Tarawakan, 12 Nov. 1961. Allotype, same data but Oct. 24. Paratypes, nine females same data but Oct. 23 to Nov. 14.

The structure of the frons is more reminiscent of the African *N. loewi* Brauer than of the related Oriental species. *N. loewi* is quite different, however; the wings are definitely clouded, the scutellar spines long and semierect, the femora are much more extensively yellow, and the frontal ridges are narrower among other things. Brunetti's statement (1923, p. 96) that *loewi,* (as *maculipennis* [Loew], not Macquart), was probably a synonym of *maculipennis* (Macquart), is puzzling.

Male genitalia seem to be identical in *maculipennis, consobrina,* and the two species described here; consequently, they are of no taxonomic value in this group.

Negritomyia separata, new species

Close to *maculipennis,* but the depression above the antennal bases and the black hairs below and to the side of it distinguish it from other species known from the Philippine Islands. I considered the possibility of this depression and the lack of subapical wing cloud being the result of the separation of the lower frontalia as the result of a teneral condition, but none of the specimens in the type series show any evidence of being teneral; moreover, the black hairs definitely are not consistent with a teneral hypothesis.

Female. Upper frons much as in *maculipennis,* that is; swollen, bare and shining below the ocellar triangle; below this, a depressed area, sharply margined above and laterally, in which are located numerous setigerous punctures; still below this, in the area of the callus, polished and shining. Lower frons (Fig. 1)

markedly different from that of any other species known to me; medially with a dumbbell or key-hole-shaped depression, oriented lengthwise of the frons, its margin roughened below, just above the antennal base; a transverse depression, on a shallower level, extending to the eye margin below the callus; a median impression extending from ocellar triangle to lower frons and widening above the mid-frontal depression. Frons a little less than half the head width (0.23 in holotype), almost parallel-sided; a dense tuft of appressed, yellowish hairs, touching each eye, just below the transverse depression, and below each of these a shining bare area; median depression lined with erect black hairs which become dense below. Face yellow-haired with a few scattered black hairs medially. Eyes largely white-pilose, pile becoming black anteriorly. Scutellar spines almost on a plane with scutellum, slightly elevated, black, distinctly though usually narrowly reddish at apex. Wings light brown, a little darker near the veins, but with no clouding. Legs black, femora, especially hind ones, usually, and all tibiae, yellowish on base, extent of yellow in femora variable, sometimes extensively so, sometimes femora almost wholly black; middle and hind basitarsi usually yellow but this color also variable. Body coloration and pile otherwise much as in *maculipennis* and *consobrina*.

M a l e. Similar to female except sexually. Eyes contiguous for about half distance from ocellar triangle to antennae. Frontal depression greatly reduced as compared with female but very distinct; no transverse depression; frontal triangle with parted tufts of yellow hairs above, otherwise shiny and bare, but with prominent abundant, erect black hairs along frontal depression and above antennae as in female.

T y p e s. Holotype, female, presumably MINDANAO: Carl Semper Collection No. 429; Swedish Museum of Natural History; allotype, same data, No. 431; paratypes, 7 ♂, 7 ♀, Semper Nos. 429 and 431, SMNH; 1 ♀, Tugbungan sa Iibon, Semper No. 440, SMNH; 2 ♀, 1 ♂, Agusan, 10 km southeast of San Francisco, 4 to 17 Nov. 1959, C. M. Yoshimoto and L. W. Quate, BM.; 2 ♂, 1 ♀, Zamboanga del Norte, 6, 9 and 11 km east of Sindangan, 20 July 1958, Milliron, BM.; 2 ♂, Zamboanga del Sur, 45 m, steam pools, 8 Sept. 1958, Milliron, BM.; 1 ♀, Domingug, 22 Sept. 1959, Quate, BM. — JOLO: 1 ♀, Talipao, 15 to 30 m, grass foothills and jungle clearing, H. E. Milliron, BM. — TAWI TAWI: 1 ♂, Sapamoro, Curuan District, 17 Dec. 1961, Noona Dan Exp.

The Carl Semper collection was made in 1863—64, the specimens bearing numbers 429 and 431 being presumably from the Agusan Valley, according to information furnished to me by Dr. Per Inge Persson and taken from what were presumably Semper's notes.

Negritomyia

Key to the Philippine Species

1. Wing with a strong, clearly differentiated cloud beyond the discal cell 2
   Wing pale brownish, grayish or subhyaline 3
2. Femora broadly yellow at base; female with polished upper part of frons, anterior to ocelli, strongly convex, the area of setigerous punctures in a slight concavity that is definitely margined above (cf. fig. 1) ..... *maculipennis*
   Femora wholly black; female with polished upper part of front flat, the area of setigerous punctures not in a concavity *consobrina*
3. A tuft of thick, black pile on lower frons, above base of antenna; this area in female with a dumbbell shaped concavity, extending lengthwise of frons, and with the black hairs extending somewhat along its lower margin, which is rugulose; upper frons of female as in *maculipennis* ..... *separata*
   Only a few scattered pale hairs on lower front; female with at most a narrow, linear concavity on frons; upper frons of female flattened anterior to ocellar triangle, without any extensive bare, shining area, and with an irregular row of setigerous punctures extending to the vertex ..... *punctifrons*

Two species with unclouded or feebly clouded (though pale brownish or greyish) wings are described here. Two other species with similarly described wings, *N. albitarsis* (Bigot) (1879, p. 207) and *N. responsalis* (Walker) (1865, p. 106, redescribed by Brunetti, 1923, p. 97) are known, but neither of these can be the Philippine Islands species treated here. *N. albitarsis* can readily be separated from both of them by its predominately whitish tibiae and tarsi. *N. responsalis* seems to agree best with *N. punctifrons,* but the frons is wider and the vertex is bare, according to Brunetti; the leg coloration also is different.

Subfamily HERMETIINAE

Hermetia inflata (Walker)

Massicyta inflata Walker, 1859, p. 78.

PALAWAN: Pinigisan, 600 m, 8 Sept. 1961, outside forest, 1 ♀. — BALABAC: Dalawan Bay, 13 Oct. 1961, 1 ♀.

Hermetia illucens (Linnaeus)

Musca illucens Linnaeus, 1758, p. 589.

PALAWAN: Uring Uring, 25 Aug. and 4 Sept. 1961, 2 ♀. — TAWI TAWI: Tarawakan, 24 Oct. 1961, 1 ♀.

Subfamily **CYPHOMYIINAE**

Cyphomyia flaviceps (Walker)

Clitellaria flaviceps Walker, 1857, p. 7, 108.

A damaged specimen, without antennae, proboscis or palpi and with badly damaged legs, appears to be this species, but I can not be sure of it.

PALAWAN: Uring Uring, 25 Aug. 1961, 1 ♀.

Summary

Fourteen species are recorded, five of which are described as new in the genera *Allognosta, Formosargus,* and *Negritomyia.* A key to *Nigritomyia* is presented.

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(Noona Dan Papers No. 93)

Carabidae (Col.) collected by the Noona Dan Expedition in the Bismarck Islands.

By
C. J. Louwerens,
Hilversum.

This is the third part of the results of the Noona Dan Expedition (Petersen, 1966) dealing with the Carabidae. The first and second parts, dealing with Philippine material, have been published by Straneo and Louwerens in Entomologiske Meddelelser 35, 1967, subentitled Noona Dan Papers No. 45 and No. 47, respectively.

I am glad to say that I have received help and assistance from different sides, but first of all I wish to mention the kind helpfulness of Prof. P. J. Darlington Jr. of Harvard University, who was always willing to give me his valuable advices in difficult cases. He also compared a number of species with his type specimens and other material of New Guinea. Thanks too, to Dr. Arnost Jedlicka (Praha) and Mr R. D. Pope (British Museum), who kindly examined a small number of species.

With regard to the accompanying illustrations, the drawings of the two new species of *Scopodes* have been made by an artist of the Rijksmuseum van Natuurlijke Historie at Leiden, under the supervision of Dr M. A. Lieftinck and Dr J. T. Wiebes. The other drawings are pencil camera lucida-sketches by myself and inked by Mr J. C. Krijnen (Rijswijk). To all of them I express my sincere thank.

The majority of the genera has a world-wide distribution or is Oriental of origin, but such genera as *Dicrochile, Diaphoromerus, Stricklandia* and *Scopodes* are clearly Australian or New Guinean. *Dicrochile* also reaches Eastern Indonesia (Halmaheira Isl., Moluccas) and one species of *Scopodes* has been collected in the mountains of Java.

The species are partly Oriental, partly Australian.

All specimens were collected in 1962, most of them at Mercury light or in Malaise insect traps.

Subfam. **Ozaeninae**

Pseudozaena orientalis Klug 1834,, Jahrb. Ins., p. 81, var. tricostata Montrousier 1855, Ann. Soc. Agr. Lyon (2) 7, p. 8.

MUSSAU: Talumalaus, 2 sp., 5—9 Feb.

Distribution: New Britain, Mussau, the Solomons and the Moluccas (Amboina Isl.), where it is a common insect. I have also seen a specimen from W. Celebes, named by H. E. Andrewes.

Subfam. **Scaritinae**

Clivina fessa Darlington 1962, Bull. Mus. Comp. Zool. 126, No. 3, p. 388.

MUSSAU: Talumalaus, 1 sp., 19 Jan.

Distribution: New Guinea, Bismarck and Solomon Isls.

Clivina ? wallacei Putzeys 1863, Mem. Soc. R. Sci. Liege 18, p. 35, var. *philippinensis* Kult 1951, Acta Soc. Ent. Cechosl., 47, p. 27.

MUSSAU: Taletasi Lake, 1 sp., 4 June.

Distribution: Philippines and Formosa.

I am not absolutely sure of the identification. The specimen belongs to the *helferi*-group: labrum 6-setose; median part of clypeus distinctly separated from wings; pronotum with front transverse impression present and the third interval of elytra 4-punctate. Typical *wallacei* is reddish in color and depressed dorsally. Here the color is black, and the specimen is a little larger and of normal convexity, not depressed.

Subfam. **Bembidiinae**

Tachys fasciatus Motschulski 1851, Bull. Soc. Nat. Moscou 24, part 2, no. 4, p. 506.

MUSSAU: Talumalaus, 1 sp., 20. Jan.

Distribution: from southern Asia to Japan in the North and through the islands South and East to the Bismarck and Solomon Isls., New Caledonia and Australia. Also in parts of Africa.

The size of the black fascia on the elytra is variable. I saw a series from New Britain, Cape Cloucester, collected by Dr P. J. Darlington Jr., with almost black elytra.

Tachys nitens Andrewes 1925, Ann. Mus. Civ. Genova 51, p. 412.

NEW BRITAIN: Yalom, 1000 m, 1 sp., 16 May.

Also in New Guinea.

Tachys umbrosus Motschulski 1851, Bull. Soc. Nat. Moscou 24, part 2, no. 4, p. 507.

MUSSAU: Talumalaus, 1 sp., 9 Feb.

Distribution: from southern Asia including Ceylon through the Malay Archipelago and the Philippines to New Guinea, the Bismarck and Solomon Isls.

Tachys acuticollis Putzeys 1875, Ann. Mus. Civ. Genova 7, p. 740.

LAVONGAI: Banatam, 14 sp., 24 March.

Distribution: Aru Isl., the Moluccas, the Bismarck Isls. and New Guinea.

Tachys singularis Andrews 1925, Ann. Mus. Civ. Genova 11, p. 393.

DYAUL: Sumuna, 6 sp., 4 March.

Also in Celebes and the Philippines.

This species is very close to *Tachys yunnax* Darlington of New Guinea, which is originally described from the Dominican Republic, Sánchez, West Indies.

Subfam. **Pterostichinae**

Morion humeratum Chaudoir 1880, Bull. Soc. Nat. Moscou 55, part 1, No. 2, p. 352.

LAVONGAI: Banatam, 1 sp., 9 March.

Distribution: New Guinea, the Bismarck and Solomon Isls.

All eastern members of *Morion,* which I have seen, are more or less toothed at shoulders, but in *humeratum* the teeth are rather large. The pronotum bears a distinct transverse impression just in front of base.

Morion longipenne Putzeys 1875, Ann. Mus. Civ. Genova 7, p. 727.

NEW BRITAIN: Yalom, 1000 m, 1 sp., 12 May.

Distribution: Aru Isl., New Guinea, the Bismarck Arch. and tropical Australia.

Brachidius crassicornis Chaudoir 1852, Bull. Soc. Nat. Moscou 25, part 1, No. 1, p. 78.

NEW BRITAIN: Valoka, 1 sp., 10 July.

Distribution: from India and Andaman Isls. through the Malay Archipelago and the Philippines to New Guinea, New Britain and the Solomons.

Subfam. **Anchomeninae**

Violagonum (Colpodes) violaceum Chaudoir 1859, Ann. Soc. Ent. France (3) 7, p. 351.

MUSSAU: Talumalaus, 7 sp., 18—22 Jan.; LAVONGAI: Banatam, 1 sp., 18 March; NEW BRITAIN: Bita Paka, 15 km SE of Kokopo, 1 sp., 10 July; DYAUL: Sumuna, 1 sp., 5 March.

Distribution: Amboina, Aru and Kei Isls., New Guinea, Bismarck and and Solomon Isls.

Colpodes habilis Sloane 1907, Deutsche Ent. Zeits., p. 179.

MANUS: Lorengau, 1 sp., 19 June.

Distribution: New Guinea, Bismarck and Solomon Isls. and Santa Cruz Isl. It also occurs in the Moluccas (Buru and Amboina Isl.).

Colpodes caudoimpressum new species. (Fig. 1).

Color piceous or black; elytra dark green; side margins of pronotum and narrowly of elytra, palpi, antennae, legs and underside more or less reddish brown; tarsi brown. Shiny. Hind wings fully developed.

Length 6,5—8 mm; width 2,5—3 mm.

Head convex with large, prominent eyes; width over the eyes about 0.70 times largest width of pronotum; antennae reaching basal third of elytra; hind supra-orbital setae between posterior edges of eyes; genae very short; surface smooth. Pronotum convex, transverse; width/length is about 1.60 and base/apex about 1.40; side margins moderately explanate, widening out behind; from widest point, a little before middle, gently rounded to the little distinct rather strongly rounded anterior angles, in an almost straight line contracted to posterior angles, which are obtuse and a little rounded, not or only weakly subsinuate before the angles; at widest point the margins are round or subangulate; the hind lateral pore on the border and on the angle, the front lateral pore a little before widest point on the explanate part; the median line and transverse lines finely impressed; base and apex nearly straight, the former with somewhat oblique sides; basal foveae moderately large and moderately deep with only a very few scattered punctures, for the rest the surface is smooth. Elytra convex; length/width is about 1.50 and width of elytra/width of pronotum is about 1.62; basal border entire; the sides nearly parallel at middle, rounded or subangu-

late at shoulders, rather strongly contracted behind, moderately sinuate before apex, which is obliquely concave over a distance of 3 inner intervals taken together, the apices blunt or subdenticulate; striae for the greater part very superficially impressed, merely indicated by small punctures at places, moderately deep apically; intervals flat without any punctures; the third interval 3-punctate, the front pore on the third, the two other pores on the second stria; disc in some specimens distinctly depressed behind middle. Microsculpture of sides and front of head very finely, moderately transverse at places; the sides of pronotum here and there with vague transverse meshes; on the elytra the meshes are moderately transverse and much more impressed than on head and especially on pronotum. Underside smooth, not

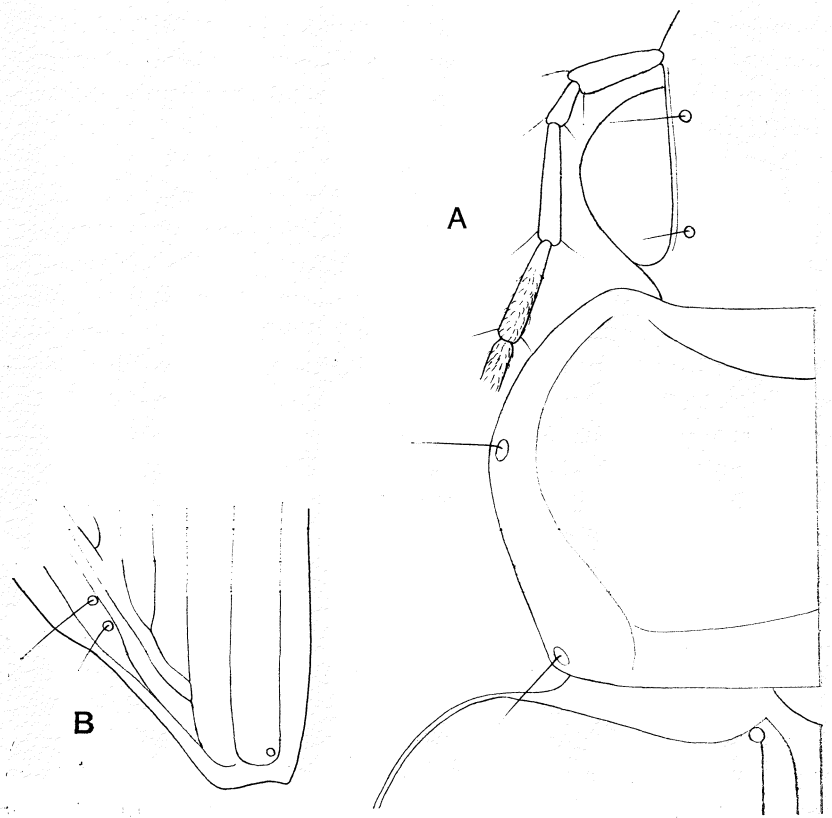


Fig. 1. *Colpodes caudoimpressum*, n. sp., holotype ♂ from Lemkamin; (A) left half of head and pronotum, (B) apex of left elytron.

pubescent; metepisterna twice as long as wide in front; last ventral segment 2- and 4-setose in ♂ and ♀, respectively; segments of middle and hind tarsi sulcate at outer edges, fourth segment emarginate, a little deeper so in the front tarsi, claw segment glabrous beneath.

NEW IRELAND: Lemkamin, 900 m, holotype ♂, 17 April 1962, and 1 paratype 5 April. Additional material: Kandan, allotype ♀, 3 paratypes, 1 Jan. 1960, and from Schleinitz Mts., Lelet Plateau, 7 paratypes, october 1959 (all W. W. Brandt), Bishop Museum, Honolulu.

Readily recognizable by the shiny dark green elytra and the almost obliterated elytral striae.

Altagonum flavicornis new species. (Fig. 2).

Mouth parts and antennae flavous; head almost black; pronotum brown with paler margins; elytra dark brown with sides and sutural intervals lighter; underside brown, reddish at places; legs brown. Shiny, very faintly iridescent, when viewed in strong light. Hind wings fully developed.

Length about 7 mm; width about 2.75 mm.

Head measured over the moderately large and moderately prominent eyes about 0.73 times largest width of pronotum; antennae reaching basal third of elytra; labrum truncate in front; two supra-orbital setae on each side, the hind seta a little behind or at level of hind-eye; frontal impressions large and deep; surface smooth. Pronotum little convex; width/length about 1.42, widest at about middle; sides very finely bordered, gently rounded, more contracted in front than behind, so that base is about 1.36 times apex, which is slightly emarginate; base a little rounded with slightly oblique sides; anterior angles rounded, little advanced; hind angles obtusely rounded; the single lateral pore just before hind angle on the margin, which is moderately broad, widened out behind; median and transverse lines finely impressed; the basal foveae large and deep; surface smooth, only a very few small punctures in the foveae. Elytra convex; length/width about 1.80, and width about 1.60 times largest width of pronotum; basal border entire; sides nearly parallel, obtusely angulate at shoulders, very slightly emarginate before apex, which is nearly truncate; extreme apex indistinctly denticulate; the impunctate striae moderately deep, a little deeper behind, $^3/_4$ and $^5/_6$ unite before apex; intervals little convex,

smooth, the third interval 3-punctate, the front pore on edge of stria 3, the two other ones on edge of stria 2. Microsculpture of head consisting of small meshes, which are a little wider than long, less distinct at sides; on pronotum the narrow meshes are finely impressed, moderately to strongly transverse, only clearly visible at places; elytra with strongly transverse meshes, wider and more distinctly impressed than on head and pronotum. Underside: side pieces of metasternum a little longer than wide in front; last ventral segment bisetose at apex; legs long and slender; first segment of hind tarsi indistinctly grooved along outer edges; fourth tarsal segment a little emarginate; claw segment glabrous at sides.

NEW BRITAIN: Komgi, 1000 m, holotype ♂, 14 May 1962.

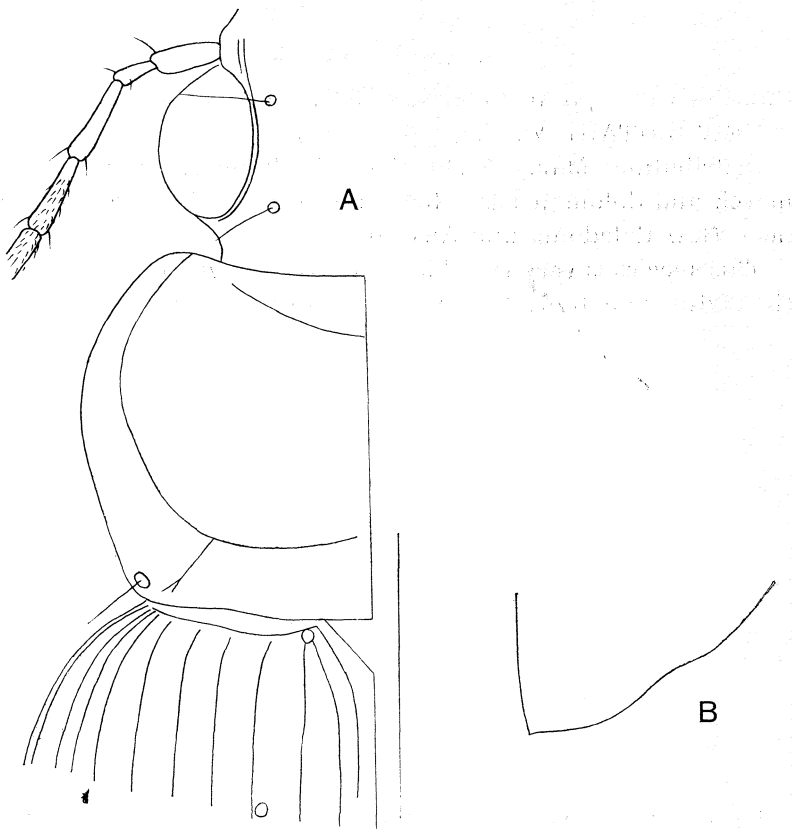


Fig. 2. *Altagonum flavicornis* n. sp. holotype ♂ from Komgi; (A) left half of head and pronotum, (B) apex of right elytron.

In build much like *Dicranoncus* but the tarsal claws are simple. At once recognizable by the yellow antennae.

Subfam. **Licinae**

Dicrochile alternans Darlington, 1968, Bull. Mus. Comp. Zool. 137, no. 1, p. 17.

NEW BRITAIN: Yalom, 1000 m, 1 sp., 16 May.

Also known from New Guinea.

Omestes torta Andrewes 1933, Treubia 14, p. 276.

NEW BRITAIN: Yalom, 1000 m, 1 sp., 16 May. Head and apex of the left elytron are shown i Fig. 3.

Distribution: also Sangi and Talaud Isls., Celebes, the Philippines, the Moluccas and New Guinea.

Subfam. **Chlaeniinae**

Chlaenius flaviguttatus Macleay 1825, Annulosa Javanica, p. 14.

NEW BRITAIN: Valoka, 1 sp. 4. July.

Distribution: Malay Archipelago, Philippines, Moluccas, Bismarck and Solomon Isls., New Guinea, New Hebrides, Fiji, Samoa, New Caledonia and Australia.

This species is very variable as regards the yellow markings on the elytra, sometimes the spots are wanting all together.

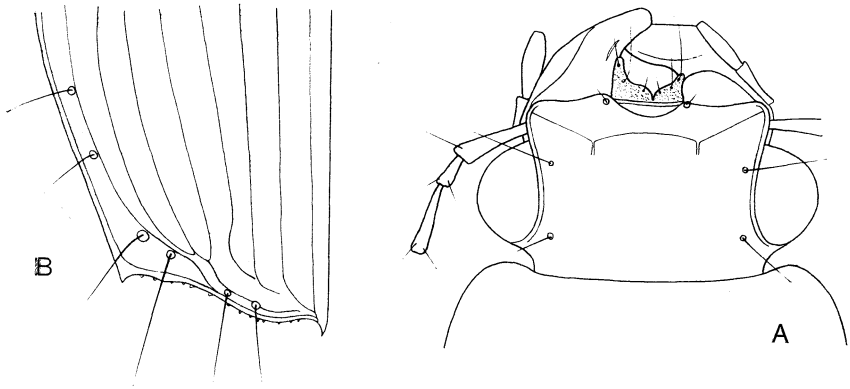


Fig. 3. *Omestes torta* Andrewes from Yalom; head and apex of left elytron.

Chlaenius manus new species. (Fig. 4).

Upper- and underside black; head and pronotum with an extremely faint greenish tinge; palpi, antennae except segments 1 and 3, both darker with lighter tips, and tarsi reddish brown. Moderately shiny. Body winged.

Length about 12,50 mm.

Head over the large, prominent eyes about 0.66 times largest width of pronotum; both clypeus and labrum truncate; antennae not very long, reaching about basal fourth of elytra; antennal segments 3 and 4 of nearly the same length; frontal impressions small and shallow, almost parallel; genae short; neck not constricted behind; surface, with exception of neck, rather densely punctate, the punctures small, of different size and shape, some of them confluent. Pronotum convex; transverse; largest width, at about middle, 1.50 times length along the median line; the sides finely bordered, narrowly explanate, nearly evenly rounded from apex to base, very slightly sinuate just before the hind angles, which are obtusely rounded, anterior angles indistinct, base a little wider than apex, ratio about 1.10; both marginal setae apparently wanting. I can not detect any pores because of the rather rough surface of the margins, the setae, if any, abraded; median line and front transverse impressions very fine, the former a little deeper on apical half; the basal foveae large and

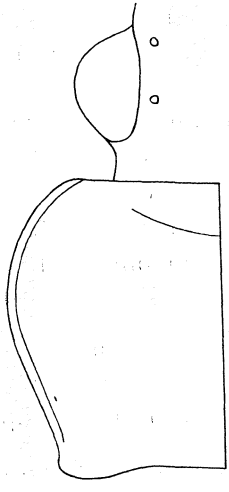


Fig. 4. *Chlaenius manus* n. sp., holotype ♀ from Lorengau; left half of head and pronotum.

deep, somewhat irregular; surface sparsely punctate, the punctures as a whole much larger and deeper than those on head, but there are much smaller punctures amongst the large ones; disc almost smooth with only a few small punctures at places; a few fine hairs at sides. Elytra convex; a little less than twice as long as largest width, which is 1.20 times largest width of pronotum; sides almost parallel, though a little wider behind middle; basal border entire; shoulders rounded; apex faintly sinuate; basal striole long; striae moderately impressed; intervals little convex, with 3 to 4 rows of hair-bearing punctures. Microsculpture: none on head; traces of small, moderately transverse meshes here and there visible at sides of pronotum; elytra with more distinct, small, nearly isodiametric meshes.

Underside: emargination of mentum not toothed; ventral segments without any puncturation; meso- and metasternum sparsely and finely punctate; metepisterna as long as wide in front, punctate; prosternal process with a fine border; claw segment setulose at sides.

MANUS: Lorengau, holotype ♀, 19 June 1962.

Smaller than *Chlaenius drescheri* Louwerens of SE Borneo. *Drescheri* is wholly piceous; less shiny; relatively narrower; the pronotum subcordate; the intervals of the elytra with very minute V-shaped tubercles from the top of which arise moderately long hairs, etc. *Chlaenius wegneri* Louwerens of Flores Isl., also black, is a much bigger species, 19 mm, with pronotum subcordate; tooth in the emargination of mentum bifid, etc.

Subfam. **Harpalinae**

Gnathaphanus licinoides Hope 1842, Ann. Mag. Nat. Hist. 9, p. 427.

MUSSAU: Talumalaus, 2 sp., 5—9 Feb.

Distribution: Moluccas (Amboina Isl.), New Guinea, Bismarck and Solomon Isls., New Hebrides, New Caledonia and Australia.

Gnathaphanus philippensis Chevrolet 1841, Revue Zool., p. 221.

LAVONGAI: Banatam, 1 sp., 26 March.

Distribution: from SE Asia to the Philippines and Australia.

Diaphoromerus papuensis Macleay 1876, Proc. Linnean Soc. New South Wales 1, p. 168.

LAVONGAI: Banatam, 3 sp., 21—23 March.

Distribution: Moluccas (Amboina Isl., described as *Gnathaphanus basilewskyi* Louwerens), New Britain and New Guinea.

Trichotichnus (Carbanus) straneoi Louwerens 1962, Tijdschr. Ent. 105, p. 142.

NEW IRELAND: Lemkamin, 900 m, 1 sp., 12 April.

Distribution: Moluccas (Amboina Isl.), New Guinea, New Britain and New Ireland.

Trichotichnus nigricans Schauberger 1935, Ent. Anzeiger 15, p. 34.

NEW IRELAND: Lemkamin, 900 m, 2 sp., 17—21 April.

Also in New Guinea and Solomon Isls. (Rennell).

Trichotichnus brandti Darlington 1968, Bull. Mus. Comp. Zool. 137, 1, p. 57.

MANUS: Lorengau, 1 sp., 24 June.

Also in New Guinea.

Trichotichnus guttala Darlington 1968, Bull. Mus. Comp. Zool. 137, 1, p. 57.

NEW IRELAND: Lemkamin, 900 m, 3 sp., 12—17 April.

Also in New Guinea and New Britain.

Trichotichnus semirugosus Darlington 1968, Bull. Mus. Comp. Zool. 137, 1, p. 58.

NEW IRELAND: Lemkamin, 900 m, 2 sp. 12—21 April.

Also in New Guinea.

Very close to *Trichotichnus (Lampetes) isabellinus* Louwerens of the Moluccas (Amboina Isl.). It seems, that *isabellinus* is a little smaller and more shiny.

Harpaloxenus mas Darlington 1968, Bull. Mus. Comp. Zool. 137, 1, p. 61.

LAVONGAI: Banatam, 1 sp., 23 March. — NEW IRELAND: Lemkamin, 900 m, 1 sp. 17 April.

Also in New Guinea.

Harpaloxenus celebensis Schauberger 1935, Ent. Anzeiger 13, p. 157.

NEW BRITAIN: Valoka, 2 sp., 9—10 July.

Distribution: Celebes, Java, Suma, Halmaheira and New Guinea.

Egadroma robusta Sloane 1907, Deutsche Ent. Zeits., p. 469.

LAVONGAI: Banatam, 2 sp., 21—23 March. — DYAUL: Sumuna, 2 sp., 8—9 March.

Distribution: New Guinea, Bismarck Arch., the Solomons and Australia. Also in Java.

The four specimens examined bear all a very small posthumeral, yellow marking on the 6th interval.

Egadroma smaragdula Fabricius, 1798. Suppl. Ent. Syst., p. 60.

LAVONGAI: Banatam, 1 sp. 18. March.

Distribution: from SE Asia to Australia.

Subfam. **Anaulacinae**

Anaulacus fasciatus Schmidt-Goebel 1846, Faun. Col. Birmaniae, p. 89.

NEW BRITAIN: Yalom, 1000 m, 1 sp., 18 May.

Distribution: Assam, India, Ceylon, Andaman Isl., Indo China, Sumatra, Java, the Philippines and the Bismarck Arch.

Subfam. **Lebiinae**

Catascopus aruensis Saunders 1863, Trans. Ent. Soc. London (3) 1, p. 331.

NEW BRITAIN: Yalom, 1000 m, 2 sp., 12. May.

Distribution: Aru Isl., New Britain, New Ireland, New Guinea and Australia.

Dr P. J. Darlington Jr. kindly examined the two specimens of New Britain and found them a little different from typical *aruensis*. The New Britain-specimens are larger, a little differently coloured and with longer, apical spines. However for the time being and with only two examples before me it seems better not to introduce a new species or variety.

Pericalus macrostictus new species. (Fig. 5)

Color of upperside: head and pronotum very shiny green; elytra shiny blackish green, but green at places along suture, sides and apical area, each elytron with two large, yellowish spots of irregular shape, the front spot covering intervals 4 to 8 and the hind one 3 to 8; color of underside of head and pronotum green; venter, meso- and metasternum black with a greenish tinge; of the mouth parts the clypeus is green, the rest of the mouth parts, antennae, legs, coxae and trochanters are yellowish. Hind wings developed.

Length about 7 mm.

Head with very large, strongly prominent eyes; over the eyes 1.40 times largest width of pronotum; labrum notched in the

middle of front; genae inconspicous; neck not constricted behind; antennae moderately long, reaching about basal fourth of elytra; surface of head in front and between the eyes with densely placed, almost longitudinal furrows, more or less oblique in front, densely punctate behind the furrows. Pronotum small, subcordiform; width about 1.40 times length, largest width at about one fifth from apex; margins finely bordered, side margins narrowly explanate, gently and evenly rounded from apex to about one third from hind angles, which are sharp and acute; anterior angles rounded and little advanced; apex and base nearly straight and of about the same width; front marginal

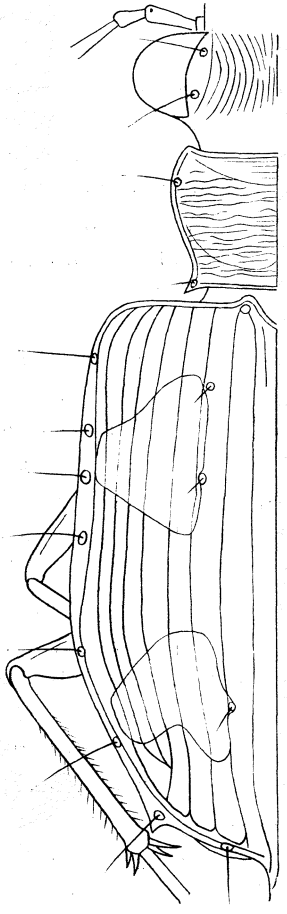


Fig. 5. *Pericalus macrostictus* n. sp., holotype ♂ from Yalom; left half.

seta placed at widest point, the hind seta on the border just in front of the angle; median line finely impressed; of the transverse impressions the front transverse impression is superficially developed, the hind one deep; basal foveae small and deep; disc transversely striate, the sides irregularly and finely wrinkled at places; surface with a few, fine scattered punctures. Elytra convex; length about 1.55 times width; width about 1.90 times width of pronotum; widest a little behind middle; basal border entire; shoulders squarely rounded; sides slightly rounded, somewhat compressed before middle; apex rather strongly oblique, weakly emarginate; outer angles strongly toothed or with a short spine, inner angles clearly spined; striae moderately impressed, punctate at places; the impunctate intervals convex, the third interval 3-punctate, the two front pores before middle on edge of stria 3, the hind pore, at about one fifth from apex, on edge of stria 2. Microsculpture: isodiametric on head; none on pronotum; elytra with moderately transverse meshes. Last ventral segment of ♂ bisetose, that of ♀ quadrisetose at apex; ♂ protarsi a little dilated and with two rows of adhesive scales beneath.

NEW BRITAIN: Yalom, 1000 m, holotype ♂ and allotype ♀, 21 May 1962.

Closely related to *Pericalus klapperichi* Jedlicka also of New Britain. Of the same color and size; the four spots on the elytra are much larger in the new species, the sutural interval terminating in a short spine, the microsculpture of the elytra moderately transverse. However, a number of small species is much alike as to build, color and the shape and size of the elytral spots. Generally the differences are only small. Accordingly the new species is perhaps not more than a modificated form of *klapperichi*.

Coptodera eluta Andrewes 1923, Trans. Ent. Soc. London, p. 30.

NEW BRITAIN: Valoka, 1 sp., 13 July.

Distribution: from SE Asia to the Philippines, New Britain and New Guinea.

The specimen examined has the elytra unspotted.

Stricklandia marginalis new species. (Fig. 7).

Of the same general aspect as *Stricklandia pericalloides* Macleay of Australia and New Guinea but larger and relatively wider than *pericalloides*. Length of the new species 13 mm and width 5 mm. *S. pericalloides* is 10 mm long and 4 mm broad. Width over the eyes is 0.70 times largest width of pronotum; width of pronotum

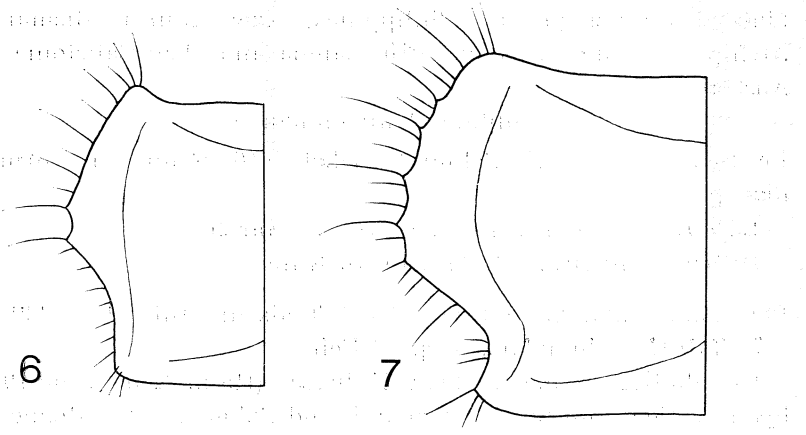


Fig. 6. *Stricklandia pericalloides* Macleay from Dobodura, Papua, New Guinea; left half of pronotum. — Fig. 7. *Stricklandia marginalis* n. sp. holotype ♀ from Yalom; left half of pronotum.

is 1.55 times length; base is 1.10 times apex and width of elytra is 1.40 times width of pronotum. In *pericalloides* width of elytra is 1.56 times width of pronotum. The new species has the sides of pronotum less contracted in front, more behind; from widest point more or less scalloped to anterior angles, which are not so much advanced, though distinct; the emargination is shorter, only 0.3 of the distance between the angles (about 0.5 in *pericalloides*); explanate margins much wider but not so wide as in *Stricklandia lata* Darlington of New Guinea. Elytra with the sides finely serrate and finely setulose; striae very finely impressed behind, merely indicated by rows of small punctures, obliterated at places; intervals a little convex; third interval with two setiferous pores, both behind middle, difficult to detect because the intervals have a row of setae-bearing punctures down the middle of each interval; apex with inner and outer angles strongly spined. No visible microsculpture. The accompanying sketches (Figs. 6, 7) show the differences in the shape of the pronotum of *pericalloides* and the new species.

NEW BRITAIN: Yalom, 1000 m, holotype ♀, 21 May 1962.

Celaenephes parallelus Schmidt-Goebel 1846, Faun. Coleop. Birmaniae, p. 77.

NEW BRITAIN: Valoka, 2 sp., 7—10 July.

Distribution: from Ceylon, NE India and Burma through the

Malay Archipelago, the Philippines, New Guinea, Bismarck Archipelago, the Solomons, Fiji, Samoa and New Caledonia to Australia.

Subfam. **Pentagonicinae**

Pentagonica ruficollis Schmidt-Goebel 1846, Faun. Col. Birmaniae, p. 48.

LAVONGAI: Banatam, 2 sp., 22—24 March.

Distribution: from SE Asia to Australia.

Pentagonica blanda Andrewes 1929, Tijdschr. Ent. 72, p. 339.

MUSSAU: Talumalaus, 1 sp., 9 Feb.

Distribution: Sumatra, Java, Moluccas (Halmaheira), the Philippines, New Guinea, the Bismarck and Solomon Isls. (Rennell). Isls.).

Scopodes peterseni new species. (Fig. 8).

Color of upperside: head and pronotum bright green or bluish green; elytra dark greenish blue or violet, faintly purplish at places when viewed in strong light (only in the holotype); front of head, clypeus and labrum very dark, almost black; antennae dark brown, except segments 1 to 4, which are paler. Underside black; legs brown with tibiae and tarsi lighter. Very shiny.

Length about 4 mm; width about 1.7 mm.

Head over the enormous eyes 1.26 times largest width of pronotum; labrum slightly 6-angulate in front, the 6 setae on the angles, the 2 inner setae much shorter than the outer ones; antennae short, hardly reaching base of pronotum; front of head forming a triangular patch, longitudinally striate or uneven (a little different in the two specimens examined) with two round, small impressions; clypeus longitudinally striate; 7 deep, longitudinal sulci between the eyes, the sulci smaller behind where the surface is more rugose; the surface is too rough to detect any punctures. Pronotum convex, subquadrately cordiform; largest width about 1.14 times length, widest at angulate point at about one third from apex; the bordered sides a little more contracted behind than in front so that base is 0.83 times apex; no emargination between widest point and base; the single lateral pore and seta on the tubercle of the angulation; no distinct anterior and posterior angles; median line moderately impressed; almost the whole surface coarsely rugose and deeply, transversely furrowed. Elytra convex, length/width is about 1.27 and width/width of

pronotum is about 1.90; the sides weakly rounded, widest a little behind middle; shoulders squarely rounded; the narrow, basal border entire; striae finely impressed, but clearly visible (in the holotype) intervals little convex, not punctate; the foveae in the third interval moderately large, not contrasting, 1 near edge of stria 3, the two hind foveae near edge of stria 2. Underside: last ventral segment of ♀ finely haired, not densely, bisetose at apex; also a few scattered, fine hairs down the middle of venter. Microsculpture: none on head and pronotum; elytra with moderately impressed, isodiametric and moderately transverse meshes; microsculpture of venter more distinct, consisting of moderately to strongly transverse meshes.

NEW BRITAIN: Yalom, 1000 m, holotype ♀, 13 May and 1 paratype 12 May 1962.

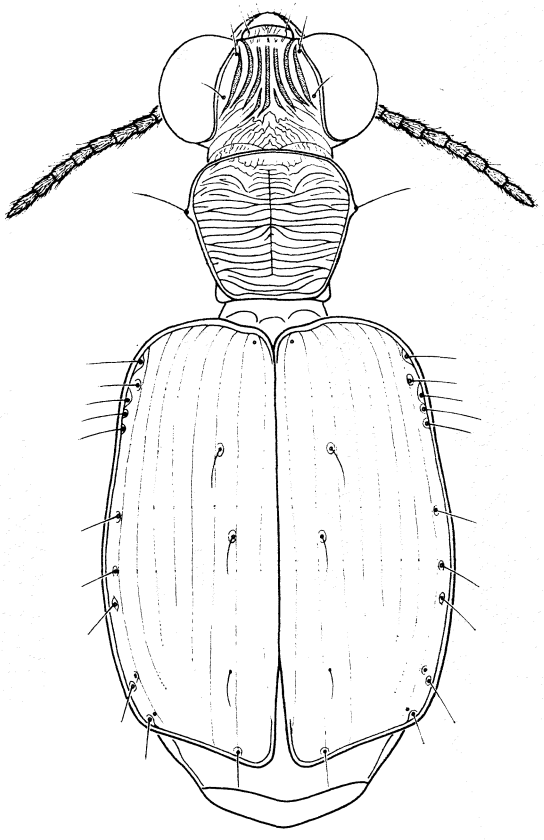


Fig. 8. *Scopodes peterseni* **n. sp., holotype ♀ from Yalom.**

Allied to *Scopodes simplex* Darlington of New Guinea, which is aeneous black with bright aeneous clypeus; the elytra estriate; the microsculpture more distinctly impressed.

The paratype has only striae 1 and 2 faintly impressed, traces of the other striae are here and there visible, at places merely indicated by small punctures.

Scopodes viridis new species. (Fig. 9).

In build almost exactly like *S. peterseni;* a little more convex; color of upperside very shiny dark green; clypeus aeneous; triangular patch in front of head with uneven surface, not distinctly longitudinally striate; pronotum with apical part more irregularly,

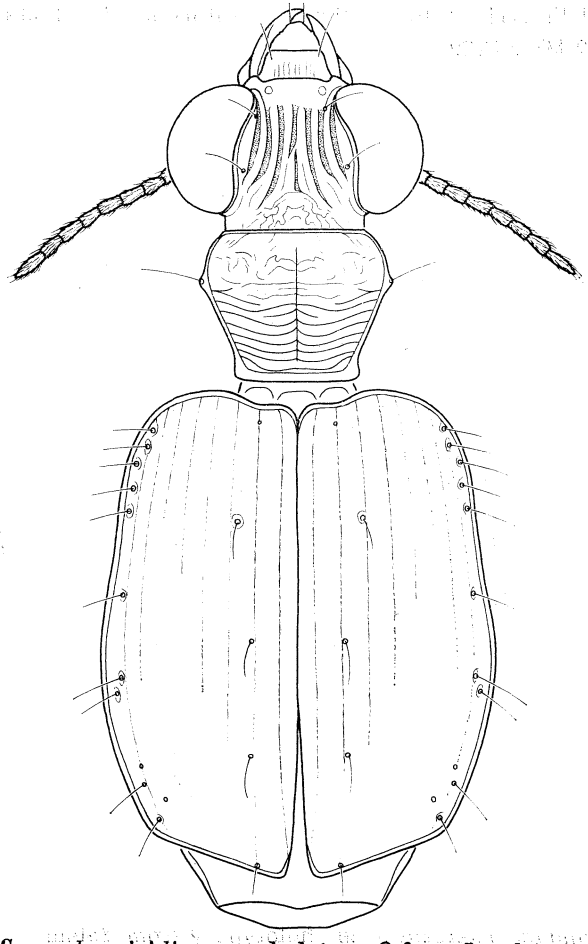


Fig. 9. *Scopodes viridis* n. sp., holotype ♀ from Lemkamin.

rugosely wrinkled; the seta-bearing angulation less acute; elytra with the 2 inner striae faintly impressed, the rest here and there traceable by rows of fine punctures; the foveae in the third interval smaller than in *S. peterseni.* Underside and microsculpture are the same. Measurements: Width over the eyes/with pronotum over the angulation is about 1.22; width pronotum/length is about 1.15; base and apex of pronotum of nearly equal width; length elytra/width is about 1.23 and width elytra/width pronotum is about 2.00.

Length about 4.2 mm; width about 1.8 mm.

NEW IRELAND: Lemkamin, 900 m, holotype ♀, 15 April.

Scopodes is predominantly an Australian genus. The two species described here belong to a group of brilliantly colored forms, which are peculiar to New Guinea and the Bismarck Islands (Darlington 1968). One form of the tessalated group, viz. *irregularis* Andrewes has reached Java.

Subfam. **Odacanthinae**

Dicraspeda (Macrocentra) quadrispinosa Chaudoir 1869, Revue Mag. Zool. (12) 21, p. 206.

DYAUL: Sumuna, 2 sp., 7—8 March. — MANUS: Lorengau, 1 sp., 15. June.

Distribution: Moluccas, New Guinea, Bismarck and Solomon Isls.

Subfam. **Dryptinae**

Drypta fumigata Putzeys 1875, Ann. Mus. Civ. Genova 7, p. 720.

NEW IRELAND: Lemkamin, 900 m, 19 sp., 15—17 April.

Also in New Guinea.

Desera (Dendrocellus) elegans Sloane 1907, Deutsche Ent. Zeits., p. 473.

NEW IRELAND: Lemkamin, 900 m, 1 sp., 15 April.

Also in New Guinea.

Very close to *Desera geniculata* Klug from which it differs only in minor details. Perhaps the two species are one and the same.

Subfam. **Helluodinae**

Pogonoglossus punctulatus new species. (Fig. 10).

Piceous with side margins of pronotum and elytra a little lighter; antennal segments 1 to 4 piceous, each segment with a light brown apex, remainder of antennae and mouth parts light brown; sur-

face of head with an ill-defined reddish spot; prosternum and sides of venter reddish at places; trochanters, tibiae and tarsi light brown; pubescence of body consisting of light brown hairs. Head and pronotum shiny; elytra rather dull. Hind wings fully developed.

Length about 8 mm; width about 3 mm.

Head convex, square, and broad with moderately large and moderately prominent eyes, a little narrower than pronotum at widest point, ratio about 0.90; a small, setulose tubercle just behind the eyes; genae longer than eyes, abruptly curving round to neck, which is deeply constricted; labrum truncate, 6-toothed, each tooth bearing a seta; the frontal foveae large and deep, almost parallel, rounded behind; antennae moderately long, reaching well beyond base of elytra; surface smooth with a very few, fine punctures here and there. Pronotum rather flat, cordiform, at widest point, at about one third from apex, strongly rounded, width 1.3 times length along the median line; the sides from widest point strongly contracted in front, in an oblique straight line contracted to hind angles, which are almost straight, a little emarginate before posterior angles; apex deeply emarginate, 0.75 times base, which is a little convex with slightly oblique sides; anterior angles strongly triangularly advanced; margins unbordered, bisetose, moderately explanate; median line finely impressed; basal foveae large and deep; surface finely punctate, the punctures rather widely spaced, the foveae and basal area

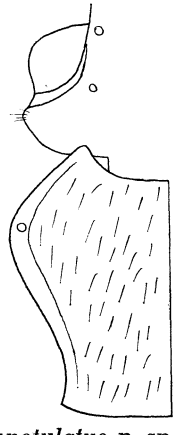


Fig. 10. *Pogonoglossus punctulatus* n. sp., holotype ♀ from Sumuna; left half of head and pronotum.

with deeper punctures, more closely placed. Elytra rather flat, length about 1.65 times width; sides parallel, squarely rounded at shoulders, finely crenulate; basal border entire; apex slightly emarginate, inner and outer angles rounded; basal striole long; striae finely impressed, the intervals flat, densely microscopically punctate, amongst them hair-bearing very small tubercles. Microsculpture little developed, on head and pronotum moderately transverse meshes are visible here and there especially at sides, the basal area of pronotum with small isodiametric meshes at places, no microsculpture on the elytra. Underside: labial palpi with ultimate segments obtuse, penultimate segments 5-setose; the maxillaries have the ultimate segments truncate; an oblong depression just behind metasternum densely closed with golden hairs; metepisterna a little longer than wide in front; the pubescence of the underside much less developed than on upperside, the sterna almost smooth; underside of profemora with a fringe of light brown hairs; claw segment of tarsi haired at sides.

DYAUL: Sumuna, holotype ♀, 9 March 1962.

In the shape of the strongly advanced anterior angles of the pronotum the new species recalls *Pogonoglossus physoides* Andrewes of Java, but the form of the pronotal anterior angles proves to be somewhat inconstant. In all species of Sumatra and Java the elytral striae are deep and the intervals convex. In the new species the striae are much less developed and form in this aspect a transition to *Pogonoglossus glabricollis* van Emden and *unicolor* Macleay both of New Guinea, in which the striae of the elytra are obsolete.

Subfam. **Brachininae**

Pheropsophus verticalis Dejean 1825, Spécies Général Coléop. 1, p. 302.

MUSSAU: Taletasi Lake, 13 sp., 4 June; Talumalaus, 1 sp. 5 Feb.

Distribution: also in New Guinea, Australia and Rennell I. (Solomons).

Variable as to size and color. The specimens examined have pronotum and elytra unspotted.

Summary

Eight new species are described (in the genera *Colpodes, Altagonum, Chlaenius, Pericalus, Stricklandia, Scopodes* and *Pogonoglossus*. In addition 38 species are recorded, 17 for the first time from the Bismarck Islands.

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A List of Danish Aphids

7.: *Rhopalosiphum* Koch, *Longiunguis* v. d. Goot, *Paraschizaphis* H.R.L., *Schizaphis* Börner, *Hyalopterus* Koch, *Pterocomma* Buckt., and additions to Aphididae s. str.

By
Ole E. Heie
Skive Seminarium, Skive.

Parts 1—6 appeared in Entomologiske Meddelelser 1960 (29: 193—211), 1961 (31: 77—96), 1962 (31: 205—224), 1964 (32: 341—357), 1967 (35: 125—141), and 1969 (37: 70—94). The present paper, the 7th part of the list, deals with the remaining genera within Aphididae s.str. (Aphidinae: Rhopalosiphini and subfamily Pterocommatinae) and also includes records of species belonging in genera listed in parts 1—6, but at the time when the part in concern was published not yet known from Denmark.

In the classification followed here (Börner 1952, Börner & Heinze 1957) the aphids are divided into eight families. Aphididae is by far the largest one, with regard to number of world species as well as to number of Danish species.

List of the species

188. *Rhopalosiphum insertum* (Walker, 1848)
189. *Rh. maidis* (Fitch, 1856)
190. *Rh. nymphaeae* (Linné, 1761)
191. *Rh. padi* (Linné, 1758)
192. *Longiunguis elisabethae* Ossiannilsson, 1967
193. *L. luzulellus* H.R.L., 1947
194. *Paraschizaphis scirpi* (Pass., 1874)
195. *Schizaphis jaroslavi* (Mordv., 1921)
196. *Hyalopterus pruni* (Geoffr., 1762)
197. *Pterocomma konoi* Hori in Takahashi, 1939
198. *Pt. pilosum* Buckt., 1879
199. *Pt. populeum* (Kaltenbach, 1843)
200. *Pt. salicis* (Linné, 1758)
201. *Pt. tremulae* Börner, 1940

202 (10a). *Ramitrichophorus hillerislambersi* Ossiannilsson, 1954
203 (14a). *Dactynotus jaceicola* H.R.L., 1939

204 (24a). *Macrosiphum daphnidis* Börner, 1940
205 (28a). *M. lisae* Heie, 1965
206 (39a). *Acyrthosiphon ignotus* Mordv., 1914
207 (47a). *Aulacorthum flavum* F. P. Müller, 1958
208 (55a). *Amphorophora ampullata* Buckt., 1876
209 (55b). *A. gei* (Börner, 1939)
210 (72a). *Pleotrichophorus duponti* H.R.L., 1935
211 (94a). *Myzodium modestum* (Hottes, 1926)
212 (119a). *Decorosiphon corynothrix* Börner, 1939

(The figures in brackets indicate the correct places of the species in the list; no. 10a for instance means that the species in concern actually belongs between nos. 10 and 11).

Genus **RHOPALOSIPHUM** Koch, 1854

188. *Rhopalosiphum insertum* (Walker, 1848)
Rhopalosiphum prunifoliae (pro Fitch, 1855): Theobald 1927, p. 72
Rhopalosiphon oxyacanthae (Schrk., 1801): Börner 1952, p. 70, no. 177

Distribution: Europe, Asia, North America. It is known from Sweden, Finland, and Norway.

Occurrence in Denmark: Very common, especially in autumn. In Jutland collected on Pyrus malus (apple) at Skive (25-5-58, 5-6-58, 26-9-57), on Cydonia japonica at Skørping (21-6-58), on Crataegus at Skive (5-6-58) and Flavenskjold near Sæby (22-9-58), on Sorbus intermedia at Flavenskjold (22-9-58), and on Sorbus sp. at Blokhus (17-6-63). Alate migrants have been collected from the following plants, which do not serve as hosts: Fragaria at Skive (11-10-58) and Epilobium palustre at Blokhus (10-8-63). Colonies observed on Pyrus malus at Madum Sø (25-5-59) and Kjellerup (25-10-64). Swarms of alate individuals observed in the air around Crataegus at Oddense in Salling (25-9-64).

On Funen collected on Pyrus communis at Fåborg (17-10-62) and on Crataegus monogyna at Nyborg (8-7-58).

On Sealand collected on Pyrus communis at Lyngby (20-6-44), on Crataegus at Ringsted (13-10-57), on Sorbus intermedia collected at Ringsted (13-10-57) and observed at Holte (24-10-58); alate male taken by sweeping in a meadow at Tikøb (17-10-65).

On Bornholm collected on Pyrus malus at Bøsthøj (27-5-64, J. Reitzel coll.).

The species has previously been mentioned by Bovien & Thomsen (1945) as *Aphis crataegella,* Danish name: Æbleknopbladlus,

and in annual surveys of plant pests from the State Experimental Station for Plant Diseases and Pests (Statens forsøgsvirksomhed i plantekultur: Plantesygdomme i Danmark, årsoversigter samlet ved Statens plantepatologiske Forsøg, e.g. 1924 (p. 384) and 1926 (p. 807)) as *Aphis fitchii*.

It migrates from Pomaceae (Pyrus, Crataegus, Sorbus, Mespilus, and Cotoneaster) to subterranean parts of Gramineae. The fundatrices hatched from the winter-eggs on apple at Skive in 1959 in the end of April. They reproduced in May, and alate migrants appeared in large numbers on undersides of bent leaves about May 24. The colonies greatly decreased in size during the last days of May. In 1961 the spring migration took place in May, too, but in 1963 it was delayed until the first week of June.

189. *Rhopalosiphum maidis* (Fitch, 1856)
Rhopalosiphon maidis: Börner 1952, p. 69, no. 176

Distribution: In warm climates all over the world. It goes far north in Europe: Netherlands, England, Germany, Sweden, and Poland, but its occurrence here is sporadic.

Occurrence in Denmark: On Sealand collected on Hordeum vulgare out-of-doors in Lyngby (8-10-59, apt., juv., Th. Thygesen coll.) and on Triticum in-doors in Lyngby (6-1-64, juv., J. Reitzel coll.). In Jutland collected on Hordeum vulgare at Herning (2-8-67, al., J. Reitzel coll. et det.).

It is an anholocyclic species. Oviparous females and overwintering eggs are never produced, so hibernation takes place as parthenogenetic females, only. In Central and North Europa the winters are too cold for survival in the open. The colonies found on young barley-plants (in experiments with hibernation of barley diseases) in Lyngby out-of-doors in the autumn 1959 probably died out. Searches in 1960 did not reveal any corn leaf aphids (Thygesen 1962). Overwintering may on the other hand in North Europe take place on cereals in glass-houses as indicated by the find from January, 1964, in Lyngby, but the sporadic emergence of limited attacks indicates occasional immigration by air-borne alate individuals from the south or south-west (Müller & Freitag 1961).

190. *Rhopalosiphum nymphaeae* (Linné, 1761)
Rhopalosiphum nymphaeae: Theobald 1927, p. 60
Rhopalosiphon nymphaeae: Börner 1952, p. 68, no. 174

Distribution: Nearly all over the world. It is known from Sweden and Finland.

Occurrence in Denmark: In Jutland collected on Alisma plantago-aquatica at Nørre Vinge near Tjele (13-7-59). On Sealand collected on Sparganium ramosum at Tikøb (12-8-65, J. Reitzel in lit.) and on Prunus serotina at Humlebæk (6-10-66, J. Reitzel in lit.).

The occurrence of this species in Denmark and its leaf-curling of Nymphaea alba is mentioned by C. Wesenberg-Lund (1943, p. 149). The winter host is Prunus.

191. *Rhopalosiphum padi* (Linné, 1758)
Aphis avenae Kaltenbach, 1843
Rhopalosiphon padi: Börner 1952, p. 69, no. 175

Distribution: All over the world. It is known from Sweden, Norway, Finland, Iceland, the Faroes, and Denmark.

Occurrence in Denmark: One of our most common aphid species.

In Jutland collected on Prunus padus at Fiskbæk near Viborg (2-5-57), Krabbesholm Forest at Skive (19-5-58, 11-5-59), Madum Sø in Himmerland (17-6-58), Studsgård near Herning (20-5-54, B. Petersen coll.), and Lyngballe Forest near Århus (6-10-60), and observed on Prunus padus at Århus (14-5-59), Skørping (27-5-59), Horsens (12-5-59) and Kolding (26-5-65), observed on Prunus serotina in Vilsbøl Plantation in Thy (16-10-64), collected on Agropyrum repens at Ellidshøj (27-6-59), on Capsella bursa-pastoris at Ellidshøj (27-6-59) and Studsgård (9-7-59) and observed on this host at Oddense in Salling (13-7-63); collected by sweeping in a meadow at Juelsminde (28-6-59, al.) and on some plants which are not hosts: Fragaria at Skive (17-9-58, apt.; 11-10-58, al.), Acer campestre at Kjellerup (25-10-64, al.), and Impatiens sp. at Oddense in Salling (19-10-66, al. viv. ♀ and ♂♂); observed on Agropyrum repens and Poa at Krabbesholm Forest (1-7-59, 8-7-59), on Hordeum vulgare at Studsgård (9-7-59), and on grasses at Oddense in Salling (13-7-63) and Skive (15-7-58).

On Funen collected on Avena sativa at Årslev (28-7-56), on Prunus padus at Hylkedam (27-5-57) and on Aegopodium podagraria at Nyborg (9-7-58, 1 al.; this is not a host).

On Sealand collected on Prunus tenella in Copenhagen (10-6-54, colonies with apt. and al., B. Petersen coll.), on Triticum sativum at Lyngby (14-8-62), on Avena sativa at Lyngby (July 1961, Rønde Kristensen coll.), and on some plants which are not hosts: Fraxi-

nus excelsior at Holte (17-10-57, two alate males) and on various trees at Lille Svenstrup near Ringsted (5-10-60, al.).

On other islands collected on Holcus lanatus at Hventgård on Læsø (11-8-57), on Prunus padus at Guldborg on Lolland (15-8-58, 1 al. and dead apt., traces of earlier attack), and on Prunus padus at Brunsgård on Bornholm (26-5-64, J. Reitzel coll.).

Frequently caught in yellow Moericke-trays in Jutland, on Sealand, and on Funen.

Henriksen (1944) recorded *Rhopalosiphum avenae* F. and *Siphonaphis avenae* L., probably meaning *Rhopalosiphum padi* L., from Phalaris canariensis in Copenhagen, Holcus mollis at Gl. Grønholtvang and Vemmetofte Strand, Agropyrum repens in Copenhagen and Tisvilde, all on Sealand, and from Phleum pratense on Lolland. The species is mentioned by S. Rostrup (1900) and Bovien & Thomsen (1945, 1950) as a pest to oats (Danish name: Havrebladlus).

The winter host is Prunus padus, the summer hosts various grasses and Capsella bursa-pastoris (Heie & Heikinheimo 1966). The eggs hatches about April 1 (Jutland in 1957).

Genus **LONGIUNGUIS** van der Goot, 1917

192. *Longiunguis elisabethae* Ossiannilsson, 1967

Longiunguis elisabethae Ossiannilsson, 1967, p. 130

Distribution: Sweden and Denmark.

Occurrence in Denmark: In Jutland collected on Phragmites communis at Egesø near Rønbjerg south of Skive (18-9-58, only one oviparous female occurring in a colony of *Hyalopterus pruni).*

The apterous viviparous female has quite recently been described by Ossiannilsson from Phragmites communis in Dalsland in Sweden. The oviparous female (fig. 7) has not been found before.

Morphology and measurements of the oviparous female do not deviate very much from those of the viviparous female. Hind tibia bears pseudosensoria, but rather few, 10-12, only, placed at random, and it is rather slender, actually not swollen, as the length is 0,70 mm and the largest width 0,06 mm.

Some measurements in mm: Body length 2,50, antenna 1,00, antennal segments I—IV: 0,07:0,07:0,22:0,16:0,13: (0,09+0,26), apical rostral segment 0,09, second segment of hind tarsus 0,14, siphunculus 0,10, cauda 0,15, 14 caudal hairs, 3-3-2 setae on first tarsal segments.

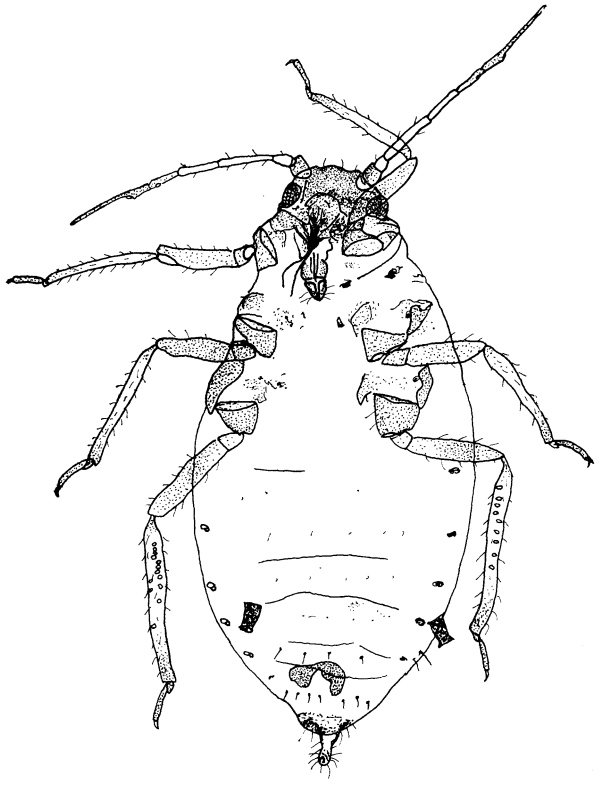


Fig. 7. *Longiunguis elisabethae* Ossiannilsson, oviparous female. Body length 2,50 mm. Drawing of mounted specimen (dorsum and venter both visible).

193. *Longiunguis luzulellus* Hille Ris Lambers, 1947

Longiunguis luzulella Hille Ris Lambers, 1947a, p. 312
Rhopalosiphon luzulellus: Börner 1952, p. 70, no. 178

Distribution: Netherlands, England, Sweden, Poland, Czechoslovakia, U.S.S.R., and Denmark.

Occurrence in Denmark: In Jutland collected in leaf sheats of Luzula sp. in a moor at Rønbjerg south of Skive (22-7-57, al., juv.).

Genus **PARASCHIZAPHIS** Hille Ris Lambers, 1947

194. *Paraschizaphis scirpi* (Passerini, 1874)

Toxoptera typhae Laing, 1923: Theobald 1927, p. 323
Schizaphis (Paraschizaphis) scirpi: Hille Ris Lambers 1947a, p. 324

Schizaphis (Paraschizaphis) scirpi: Börner 1952, p. 71, no. 179

Distribution: Europe, Asia, Africa. It is known from Sweden.

Occurrence in Denmark: On Sealand collected on Typha at Tikøb (17-10-65).

Genus **SCHIZAPHIS** Börner, 1931

195. *Schizaphis jaroslavi* (Mordvilko, 1921)

Schizaphis jaroslavi: Börner 1952, p. 71, no. 184

Distribution: U.S.S.R., Poland, Japan, and Denmark.

Occurrence in Denmark: In Jutland collected on Calamagrostis epigeios at Blokhus (2-8-63, D. Hille Ris Lambers det.). The aphids occurred in huge numbers (al., apt.) at a single locality near a dried-up lake in the dunes in Blokhus coniferous Plantation. In the following years I looked for the species in vain.

Genus **HYALOPTERUS** Koch, 1854

196. *Hyalopterus pruni* (Geoffr., 1762)

Hyalopterus arundinis (Fabr., 1781): Theobald 1927, p. 19
Hyalopterus pruni: Börner 1952, p. 68, no. 172

Distribution: All over the world. It is known from Sweden, Norway, and Finland.

Occurrence in Denmark: Very common all over the country.

Jutland: Collected on Prunus domestica at Lemvig (4-7-59) and on Prunus spinosa at Skive (16-7-61); observed on plum trees at Estvad south of Skive (17-6-59) and Studsgård near Herning (9-7-59); collected on Phragmites communis at Kås in Salling (27-9-56), Egesø near Rønbjerg south of Skive (18-9-58, al., juv., together with oviparous female of *Longiunguis elisabethae*), Næsbydale in Himmerland (27-7-59), and Madum Sø in Himmerland (16-7-62); observed on Phragmites communis at Horne in Vendsyssel (28-7-64), Løkken (23-8-64), Blokhus (7-8-60, 24-7-65), Store Vildmose (19-6-61), Vorså (6-8-62), Harboøre (16-7-59), Skive (24-8-58), Sundsøre (14-8-68), Egeris at Skive (27-8-68), Estvadgård Plantation at Flyndersø (22-8-60), Sønderlem Vig in Salling (30-8-60), Nørre Vinge at Tjele (13-7-59), Mariager (13-7-59), Sønderbæk at Skals Å (3-8-59), Tulstrup at Knudsø (21-7-59), and Brassø at Silkeborg (12-7-60); caught in yellow Moericke-trays at Tylstrup, Borris, and Jyndevad (July 1956).

Funen: Collected on Prunus domestica and on Phragmites communis at Fåborg (both on 16-7-57), observed on Phragmites communis at Kerteminde (7-7-58), and caught in yellow tray at Årslev (6-7-56).

Sealand: Collected on plum trees at Hornbæk (28-7-16, M. Thomsen leg.) and Copenhagen (1-11-17, M. Thomsen leg.), on Prunus persica in Copenhagen (30-10-53, al. and ovip.; B. Petersen leg.), and in yellow tray at Ørslev near Ringsted (July and August 1956); observed on plum tree at Holte (16-8-58) and on Phragmites communis in Malmmose at Holte (15-8-57).

Other islands: Guldborg on Lolland on Beta vulgaris (7-7-51, al.; this is not a host) and on Prunus padus (15-8-58, only 1 al.; this is not a host); observed on Phragmites communis on Tåsinge (3-7-57) and on Læsø (6-8-57).

Henriksen (1944) gives the following localities: Bornholm: Melsted, Nylarsker, Åkirkeby, Hammershus, Jons Kapel, Gudhjem; Lolland: Steensgård; Jutland: Barritskov, Fanø. As a pest to plum it is mentioned in Bovien & Thomsen (1945) and in the annual surveys of plant diseases from the State Experimental Station for Plant diseases and Pests. The Danish name is Blommebladlus.

The winter hosts are species of Prunus (spinosa, domestica, insititia). In summer the aphid can be found both on Prunus and Phragmites.

Prunus persica (peach) is the winter host of the closely related *Hyalopterus amygdali* (Blanchard, 1840). I have several times in the years 1950—52 observed *Hyalopterus* sp. in large numbers on peach in Copenhagen, both in spring and autumn. The aphids collected on peach in October 1953 (see above) do not belong to *amygdali,* however, but to *pruni.* The gynoparae have more than 24 secondary rhinaria on IIIrd antennal segment, and the length of their hind tibia is about 40 times the width. In the oviparous female the length of the hind tibia is about 6 times the largest width.

According to Börner & Heinze (1957) the number of secondary rhinaria on IIIrd antennal segment in *amygdali*-alatae is seldom more than 22, and the hind tibia is 20—23 times as long as wide in alatae and about 10 times as long as wide in oviparae.

Genus **PTEROCOMMA** Buckton, 1879

197. *Pterocomma konoi* Hori in Takahashi, 1939

Pterocomma konoi: Heie & Heikinheimo 1966, p. 116

Distribution: North- and East-Europe and Asia. It is known from Finland.

Occurrence in Denmark: In Jutland collected on Salix sp. at Store Økssø in Himmerland (22-5-59), alate and apterous individuals.

198. *Pterocomma pilosum* Buckton, 1879

Pterocomma pilosum: Börner 1952, p. 66, no. 164

Distribution: Europe and Asia. It is known from Sweden.

Occurrence in Denmark: In Jutland collected on Salix fragilis at Blokhus (15-8-64) and on Salix sp. in Rold Forest in Himmerland (2-10-57), Krabbesholm Forest at Skive (22-4-59, 13-5-59), and at Kjellerup (24-6-64).

199. *Pterocomma populeum* (Kaltenbach, 1843)

Pterocomma populeum: Börner 1952, p. 66, no. 163

Distribution: Europe and Central Asia. It is known from Sweden and Finland.

Occurrence in Denmark: In Jutland collected on Populus at Ydby in Thy (21-6-59) and at Sundsøre in Salling (17-7-63).

200. *Pterocomma salicis* (Linné, 1758)

Pterocomma (Clavigerus) salicis: Börner 1952, p. 67, no. 169

Distribution: Holarctic. It is known from Sweden and Finland.

Occurrence in Denmark: In Jutland collected on Salix sp. at Stensbæk Plantation near Gram (4-7-50, J. G. Worm-Hansen coll.), on Lathyrus pratensis (incidentally, not a host) at Vridsted at Karup Å south of Skive (16-6-57, 1 al. only), on Salix repens at Blokhus (15-5-67, 3-6-67), and in yellow tray at Tylstrup (22-6-56). On Læsø collected on Salix sp. at Hventgård (11-8-57).

201. *Pterocomma tremulae* Börner, 1940

Pterocomma (Clavigerus) tremulae: Börner 1952, p. 67, no. 167

Distribution: Germany, Netherlands, Sweden, England, Poland, Czechoslovakia, Finland, and Denmark.

Occurrence in Denmark: In Jutland collected on Populus tremula at Legind Bjerge on Mors (4-6-59, 21-5-60) and at Madum Sø in Himmerland (29-5-59, 23-5-60).

Additions to previous parts of the list

202 (10a). *Ramitrichophorus hillerislambersi* Ossiann., 1954
Macrosiphoniella (Ramitrichophorus) hillerislambersi Ossiannilsson, 1954, p. 122—123

Distribution: Sweden and Denmark.

Occurrence in Denmark: In Jutland collected on Gnaphalium (Helichrysum) arenarium at Strandkjær near Femmøller, the area of the Mols Laboratory (4-7-60, apt., juv.; Heie 1965).

203 (14a). *Dactynotus jaceicola* Hille Ris Lambers, 1939
Dactynotus jaceicola Hille Ris Lambers, 1939, p. 24
Dactynotus jaceicola: Börner 1952, p. 170, no. 653

Distribution: Netherlands, England, France, Poland, Czechoslovakia, Austria, U.S.S.R., and Denmark. In my collection I also have a sample of *Dactynotus jaceicola* mixed with *D. (Uromelan) jaceae* from Finale near Genova, Italy (collected by my father in June, 1962).

Occurrence in Denmark: On Sealand collected on Brassica napus oleifera (rape) at Dyrehavegård near Copenhagen (30-6-61, 1 al., J. Reitzel coll.). The alate specimen had landed on the plant quite incidentally, only. Centaurea jacea is the host.

204 (24a). *Macrosiphum daphnidis* Börner, 1940.
Macrosiphon daphnidis: Börner 1952, p. 159, no. 596
Macrosiphum daphnes Ossiannilsson, 1959a, p. 38

Distribution: Europe. It is known from Sweden, Finland, and Norway.

Occurrence in Denmark: On the island of Bornholm collected on Daphne mezereum in Almindingen (26-5-64, J. Reitzel leg.). Recorded by Reitzel (1965).

205 (28a). *Macrosiphum lisae* Heie, 1965
Macrosiphum lisae Heie, 1965a, p. 31

Distribution: Outside Denmark recorded from Poland (Huculak 1967).

Occurrence in Denmark: In Jutland collected on Chamaenerium angustifolium at Blokhus at two localities in the

coniferous plantation in the dunes (several collections 1963—67, from June till September), in Hammer Bakker in Vendsyssel (24-7-67), at Råsted near Vemb in West Jutland in a coniferous plantation (1-9-66), and at Simmelkjær north of Herning in a coniferous plantation (27-8-67).

206 (39a). *Acyrthosiphon ignotus* Mordvilko, 1914
Metopolophium ignotum: Börner 1952, p. 156, no. 575

Distribution: U.S.S.R., Poland, Mongolia, Germany, Sweden, Norway, and Denmark.

Occurrence in Denmark: On Sealand collected on Spiraea vanhoutei at Ny Himmelev near Roskilde (7-6-64, J. Reitzel leg.). This record has been published by Reitzel (1965). In Jutland collected at Oddense in Salling on Spiraea arguta (23-6-65, 11-8-65) and on S. vanhoutei (15-8-65).

207 (47a). *Aulacorthum flavum* F. P. Müller, 1958
Aulacorthum flavum F. P. Müller, 1958, p. 91

Distribution: Germany, Poland, and Denmark.

Occurrence in Denmark: In Jutland collected on Vaccinium uliginosum at Blokhus (19-6-63, al., apt., juv.; 29-6-64, al., apt., juv.; 13-7-64, al., apt., juv.; 24-7-65, apt., juv.).

208 (55a). *Amphorophora ampullata* Buckton, 1876
Amphorophora ampullata: Hille Ris Lambers 1949, p. 231
Amphorophora ampullata: Börner 1952, p. 175, no. 688

Distribution: Europe and North America. It is known from Sweden, Norway, and Finland.

Occurrence in Denmark: In Jutland collected on Dryopteris austriaca subsp. spinulosa in coniferous plantation at Blokhus (21-7-64, 22-8-64, 13-9-64, 4-8-65, 31-7-66; apt., juv.). This is a new host record. The normal host in Europe is Athyrium filix-femina, but occasionally it has also been found on other ferns.

209 (55b). *Amphorophora gei* (Börner, 1939)
Nectarosiphon gei: Börner 1952, p. 176, no. 691
Amphorophora gei: Hille Ris Lambers 1949, p. 234

Distribution: Germany, Netherlands, England, Sweden, France, Poland, Austria, U.S.S.R., and Denmark.

Occurrence in Denmark: On Sealand collected on Geum at Espergærde (9-6-67, apt., juv.).

210 (72a). *Pleotrichophorus duponti* Hille Ris Lambers, 1935
Pleotrichophorus duponti: Börner 1952, p. 165, no. 615
Pleotrichophorus duponti: Hille Ris Lambers 1953, p. 121

Distribution: England, Netherlands, Germany, Sweden, Hungary, and Denmark.

Occurrence in Denmark: In Jutland collected on Achillea millefolium at Blokhus (7-7-65, ap., juv.). On Sealand observed on Achillea millefolium at Tikøb (17-10-65).

211 (94a). *Myzodium modestum* (Hottes, 1926)
Myzodium rabeleri Börner, 1950: Börner 1952, p. 121, no. 461
Myzodium modestum: Heinze 1960, p. 820

Distribution: Europe and North America. Not recorded from Scandinavia.

Occurrence in Denmark: In Jutland extracted in a Berlese-Tullgren funnel from soil with mosses collected at Fly south of Skive (September 1964). The species feeds on various mosses.

212 (119a). *Decorosiphon corynothrix* Börner, 1939
Decorosiphon corynothrix: Börner 1952, p. 115, no. 425
Decorosiphon corynothrix: Heinze 1960, p. 820

Distribution: Germany, Netherlands, Austria, Sweden, Norway, and Denmark.

Occurrence in Denmark: In Jutland collected on Polytrichum at Blokhus in coniferous plantation (21-7-64, 24-7-64, 22-8-64; apt., juv.).

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(continued from Entom. Medd. 37, 1969, p. 94)

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Nye danske biller (Coleoptera) 1968.

Af
Victor Hansen
I. E. Ohlsensgade 4, 2100 København Ø.

Siden tillægget for 1967 (Ent. Medd. 36: 409—413) til fortegnelsen over Danmarks biller i Ent. Medd. bind 33, 1964 er der konstateret 7 nye arter for vor fauna, hvortil kommer 3 arter, der i fortegnelsen kun er anført som varieteter.

Gyrinus substriatus Steph. (Fortegn. 59; D.F.XX:189, Georg Ochs i Ent. Bl. 1967: 174, 182). Denne form må anses for en særskilt art.

Helophorus aequalis Thoms. (Fortegn. 63; D.F. IX:38 og XXVI: 19). Denne form må anses for en særskilt art.

Cephennium thoracicum M. & K. (Fortegn. 83; D.F. XXVI:120—121). Rosenvænget, Kbh., i en have: nogle eks. ved sigtning af jord og planterester nær planterødder, især af bregner, okt.-nov. 1968 og juni 1969. Jordbunden var ikke fugtig (V.H. leg. et det.; coll. V.H. og Z.M.).

Ptiliolum brevicolle Matth. (Fortegn. 88, efter *kunzei;* D.F. XXV:193). Dyrehaven, dels et enkelt eks. i hestegødning 17.7.1945, dels i betydeligt antal i en kompostbunke ved Eremitagevildthuset 27.7. — 6.8.1967 (V.H. leg., Cl. Besuchet det.; coll. V.H. og Z.M.).

Oxytelus mutator Lohse (Fortegn. 105, efter *sculpturatus;* D.F. XXVI: 64—65). Arten har antagelig været sammenblandet med *sculpturatus.* Eks. foreligger fra Dyrehaven i hjortegødning, maj, aug., Lejre i hestegødning på skovbund, juni (V.H. leg. et det., coll. V.H.) og fra Kildehøj skov ved Nivå 1. eks. i muldvarpegang, 28.7. (Gunnar Israelson leg. et det.).

Trogoderma angustum Sol. (Fortegn. 239, efter *granarium;* D.F. XXVI:26). Et enkelt eks. (♀), bestemt af Mroczkowski, er

fundet i en beboelseslejlighed i Hellerup 13.6.1959 (meddelt af K. Arevad). Arten, der stammer fra Amerika, har bredt sig og er bl. a. fundet synantropt i Tyskland, Polen, Finland og Sverige. Den har gjort skade i insektsamlinger. Imago undertiden i haver på blomster af *Spiraea.*

Thylodrias contractus Motsch. (Fortegn. 240, efter *Trinodes;* D.F. XXVI:24, 26—27). Denne art, der er beskrevet fra Persien, og som er fundet kosmopolitisk bl. a. i Rusland, U.S.A., Canada og i nyeste tid også i England og Tyskland (Hamburg), er nu også fundet synantropt hos os: Valby, i en beboelseslejlighed, okt. 1964, aug. og okt. 1967 og aug. 1968; imagines klækkede i Skadedyrlaboratoriet om foråret (meddelt af K. Arevad). Larven lever antagelig mest af døde insekter og skal være optrådt som skadedyr i museer. Larven angives også at snylte på kakerlakker.

Anthicus tobias Mars. (Fortegn. 309, efter l. 5 f.n.; D.F. XXVI: 28,29). Jægerspris savværk, nogle eks. under bark på liggende bøgestammer juli 1968, aug. 1969 (Bangsholt leg.), Stampeskov, i kompost i antal 12.—13.9.1969 (V.H. leg. et det.). Arten er beskrevet fra Lilleasien og har i nyere tid bredt sig over Europa. Den er i udlandet fundet i kompost, i affaldsbunker på lossepladser, under sten og under muggent sækkelærred. Den er meget livlig og tager let til vingerne; undertiden taget ved ketsning eller flyvende, især måske henad aften.

Otiorrhynchus porcatus Hbst. (Fortegn. 391, efter *scaber;* D.F. XXVI; 114—115). Grejsdalen i en have (1 eks. krybende fremme 25.8.1968, i antal forsommeren 1969 ved planterødder, især af *Primula,* Ole Jensen leg.); Rosenvænget Kbh., i en have, nogle eks. ved planterødder især af bregner, og på undersiden af udlagte skiferplader (*Primula* fandtes ikke på lokaliteten), maj-juni 1969 (V.H. og J. Th. Skovgaard leg., V.H. det.). Arten, der tidligere især er fundet i bjergegne, er måske ved at brede sig og er fundet bl. a. i Hamburg og Holsten.

Ceuthorrhynchus chrysanthemi Germ. (Fortegn. 426; D.F. XXVI:115—116). Denne form må anses for en særskilt art. Den er genfundet ved Tankefuld ved Fåborg: nogle eks. banket af *Artemisia vulgaris* 12.8.1967.

Summary

Seven species of Coleoptera are recorded as new to the Danish fauna, e.g. *Cephennium thoracicum* M. & K., *Ptiliolum brevicolle* Matth., *Oxytelus mutator* Lohse, *Trogoderma angustum* Sol., *Thylodrias contractus* Motsch., *Anthicus tobias* Mars. and *Otiorrhynchus porcatus* Hbst. Three forms, hitherto considered only as varieties, are declared as separate species, e.g. *Gyrinus substriatus* Steph., *Helophorus aequalis* Thoms. and *Ceuthorrhynchus chrysanthemi* Germ.

Redescriptions of six Therevidae from the Americas, described by J. C. Fabricius and L. Bellardi. (Diptera).

By
Leif Lyneborg
Zoological Museum, Copenhagen, Denmark.

Some recent investigations in old European type-collections forming part of a planned revision of the Palaearctic and Ethiopian Therevidae have given me an opportunity to fix the identity of some species from the Americas, described partly by J. C. Fabricius in 1805, partly by L. Bellardi in 1861. The type-material of the two Fabrician species is in the Zoological Museum of Copenhagen. The type-material of four of the five species of Therevidae described by Bellardi was located in the Torino Museum, from where it was kindly lent me for study by Prof. U. Parenti, assistent director of the museum. The type of the fifth of Bellardi's species: *Psilocephala univittata,* which was not represented in the Bellardi collection of the Torino Museum, was located in the Bigot collection of the British Museum (Nat. Hist.). This has not been treated.

The present paper must be seen also as a step towards a more sound classification of the members of the family Therevidae. The detailed descriptions of the male terminalia follow the outlines given in an earlier paper (Lyneborg, 1968a), in which the apparently comparatively generalized male terminalia of *Thereva* Latr., *Psilocephala* Zett., and *Dialineura* Rond. were described, the descriptions being based on the respective type-species only. It is evident that none of the six species redescribed in the following can be assigned to the genera *Thereva* and *Psilocephala* as was done by the earliest authors. It is therefore not possible to give a relevant binomen to any of the species, with the exception of "*Psilocephala*" *sumichrasti* Bell. which has recently (Cole, 1960)

been placed in the genus *Furcifera* Kröber, 1911 (syn. *Epomyia* Cole, 1923). This is probably a correct assignment, but the species was evidently misinterpreted by Cole.

The following redescriptions also contain a number of measurements. These are all exact, 100 units being equal to 1 mm. The length of the wing was measured from humeral cross-vein to the wing-tip.

1. **senilis** Fabricius.

Bibio senilis Fabricius, 1805, Syst. ant.: 68, 10.

a. Type-material.

There are two specimens, a male and a female, in Fabricius' Copenhagen collection. They are apparently conspecific. The female is labelled "B.senilis /a Am.mer. Schmidt"; the male bears no labels. Both specimens are cleft by an enormous pin, but otherwise they are in a rather good condition, though the male has lost its right third antennal joint and right p_1. In the Kiel collection is a strongly damaged specimen labelled "senilis". This is a male and conspecific with the male in the Copenhagen collection. It is obvious from Fabricius' description that he has only seen the male. I therefore designate the male in the Copenhagen collection (originating from the Sehestedt & Tønder-Lund coll.) as the lectotype of *Bibio senilis* F., 1805, and the specimen has been labelled accordingly.

Regarding the type-locality: "America meridionali, Dom. Schmidt" the following information can be given. This statement of origin is very often found in Fabricius' books from 1792 and onwards, and refers most probably to the German-Danish surgeon J. C. Schmidt (ca. 1728—1807) who spent some years on St. Croix in the West Indies in the last decades of the 17th century (Henriksen, 1921—37: 127). He brought home a collection which became a part of the extensive Sehestedt & Tønder-Lund collection and was treated by Fabricius in the following years. It is evident that "Am.mer." is not St. Croix or any of the other small islands then under Danish administration (see also p. 395). Schmidt (or Smidt as Fabricius spelled the name) must have had sources which have provided him with South American material. Fairchild (1966: 17) has clearly demonstrated that nearly all the Fabrician species of Tabanidae from "America meridionali" have since been taken in Surinam or the Guianas. Therefore, the type-locality of *senilis* may probably be in the same area.

b. Redescription of male lectotype. (Figs. 1—8).

Length. Total: 6.9 mm.

Head. Length 90, height 130, width 150. Eye: length 70, height 125. Gena 5, frontal protuberance 5, occipital protuberance 15. Antennal insertion 90:40. Antennae: first joint 16:10, second joint 8:10, third joint 30:11. Style 13, two-jointed with short spine apically. Proboscis reaches to level of antennal base. Palpi about half as long as proboscis, mainly with dark hairs. Eyes practically touching for a short distance, then rapidly separating, facial margins nearly parallel. Head covered with whitish dust, central parts of occiput more greyish. Frons and face bare. Occiput with whitish pubescence which is especially long on lower part. About 10 postocular setae on each side, and more ventrally about 3 additional setae. First, second and base of third antennal joint yellowish; first joint with whitish dust also. Rest of third joint brownish-black. First joint with a black seta dorsally and ventrally near tip, moreover short, black hairs.

Thorax. Mesonotum: length 200, width 130. 3 n, 2 sa, 1 pa setae. No dc setae can be seen because of the enormous pin. Also pattern of mesonotum is difficult to describe because of this pin. It is predominantly whitish-grey with three darker bands. Pubescence short and sparse, composed of both blackish and whitish hairs. Scutellum: length 50, width 90. Its colour whitish-grey, pubescence whitish, 2 setae. Pleura whitish-grey with whitish pubescence.

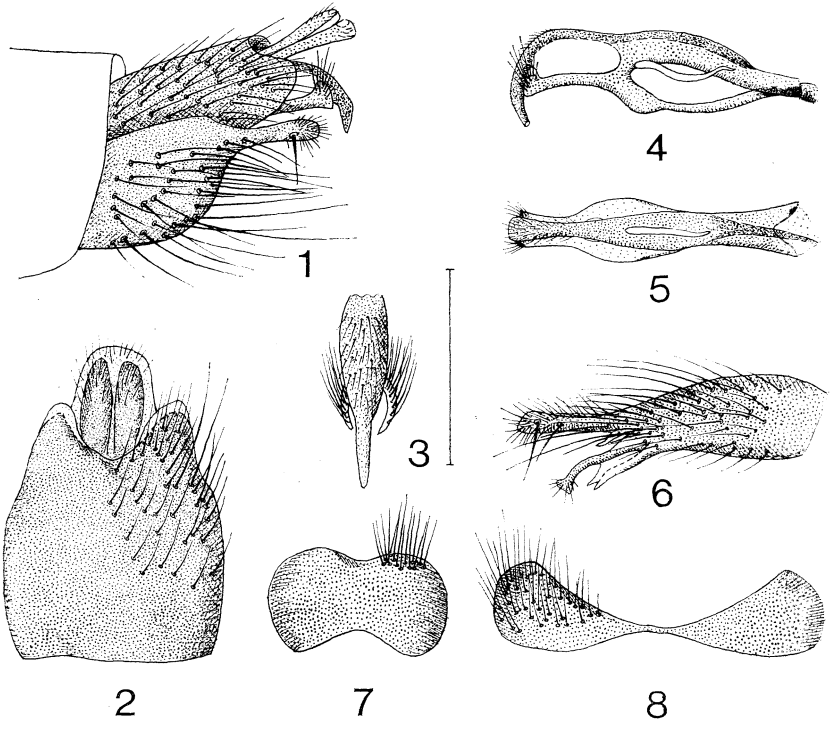
Wing. Length 550, width 225. Basal vein of discal cell oblique. Cell M_3 broadly open. Vein r_4 S-curved but remarkably straight in basal half. Index of cell R_4 210:65. Vein r_1 without hairs on dorsal surface. Ground colour hyaline with greyish tinge. Stigma not distinct. Veins brownish. Halteres light brownish.

Legs. f_1 and f_2 without av setae, on f_1 a single short pv seta near middle. f_3 with 2 short av setae, one at middle, and one near tip; a few much shorter pv setae in apical half. t_1 with 2—3 ad, pd, and pv setae, most of which are shorter than width of t_1. Only one ad and one pd setae are about as long as width of t_1. Length of t_1 175, width 13. t_2 and t_3 with rows of ad, pd, av and pv setae of which the pv setae are short and few. — Coxae whitish-grey. Femora, tibiae and tarsi of a uniformly brownish coloration without darkened tips. All femora with whitish scaly hairs dorsally, which become blackish towards tips. f_1 ventrally with erect whitish

hairs; blackish hairs are intermixed on posterior part and near tip of anterior part. f_2 and f_3 ventrally with blackish and brownish hairs some of which may be scaly. Tarsi dark brownish. Claws and pulvilli normal.

Abdomen. Length 400, width 115. All tergites silvery-white with whitish pubescence, hindmarginal hems not distinct. All sternites brownish with slightly dust and broad yellowish-white hindmarginal hems on sternites 2—5. Sternites 1—3 with whitish hairs, the following with blackish hairs.

Terminalia. Epandrium and gonocoxites dark brownish with blackish hairs. Epandrium (Fig. 2) about as long as broad, anterior margin straight, posterior margin with a moderately deep incision. Gonocoxite with a long, dorsal, distal process which



Figs. 1—8. Male terminalia of lectotype of *"Bibio" senilis* F. — 1. Terminalia in lateral view. 2. Epandrium, cerci and paraprocts in dorsal view. 3. Phallus in caudal view. 4. Aedeagus in lateral view. 5. Aedeagus in dorsal view. 6. Right gonocoxite and its appendages in ventral view. 7. Sternite 8. 8. Tergite 8. Scale: 1 mm for Fig. 3, 0.5 mm for other figures.

overhangs posterior margin of epandrium. Also tip of phallus and the aedeagal processes project beyond level of epandrium (Fig. 1). Gonapophysis without a free end, indicated only as a narrow rod. The stylus (Fig. 6) is comparatively short and narrow, its tip slightly bifurcate (seen in another view). Between stylus and the distal process of the gonocoxite is an additional structure similar to the stylus, but much shorter. The ventral lobe is a broad, weakly sclerotized plate. Cerci and paraprocts of nearly same length, both overhang posterior margin of epandrium. Cerci divided, paraprocts fused. Aedeagus free. The phallus in lateral view (Fig. 4) has a very long and narrow proximal part which is parallel to the longitudinal axis of the aedeagus. Then it suddenly curves for about 60° to the longitudinal axis and the distal part is again curved for about 60°. Seen dorsally (Fig. 5) the phallus is narrow in its proximal part and slightly wider before curving down. It is distinctly set with microtrichia. In caudal view (Fig. 3) the phallus gradually narrows. The dorsal apodeme in lateral view (Fig. 4) is slightly downcurved, seen dorsally (Fig. 5) gradually widening distally. The ventral apodeme in lateral view (Fig.4) converges towards the dorsal apodeme and is slightly longer than this apodeme; in dorsal view (Fig. 5) it gradually narrows towards the distal end. From the base of the ventral apodeme two long processes reach the distal part of the phallus. These processes bear a dorsal group of hairs in their distal end. The ejaculatory apodeme is very short and rudimentary.

c. Description of the female.

Length. Total: 6.0 mm.

Head. Length 80, height 105, width 135. Eye: length 60, height 100. Gena 5, frontal protuberance 5, occipital protuberance 15. Antennal insertion 70:35. Width of frons at level of upper ocelli 20, and at level of antennae 50. Antennae: first joint 15:9, second joint 8:10, third joint 29:11. Style 12. Frons whitish-grey dusted, in upper half with short, blackish hairs. Also rest of head whitish-grey dusted. Face bare. Occiput with whitish pubescence below, about 8 postocular setae and about 3 setae more ventrally. Other characters as in male.

Thorax. Mesonotum: length 150, width 125. 2-3 n, 2 sa, 1 pa setae. dc setae not present. Mesonotum whitish-grey with three dark brownish bands. Other characters as in male.

Wing. Length 460, width 160. Index of cell R_4 210: 65. Otherwise as described for male.

Legs. f_1 and f_2 without av setae, but with a single short pv seta. f_3 with 3—4 short av setae in apical half, and some still shorter pv setae. Chaetotaxy of tibia as in male. Length of t_1 150, width 12. — Coxae whitish-grey. Femora, tibiae and tarsi of a uniformly brownish coloration without darkened tips. All femora dorsally with whitish scaly hairs which become blackish towards tips; ventrally mostly blackish hairs. Claws and pulvilli normal.

Abdomen. Length 375, width 110. Tergites mostly brownish-black with rather distinct hindmarginal hems on tergites 2 and 3, and with silvery-white areas as follows: narrow lateral spots following hind margins of tergites 1—3, and lateral parts of tergites 5 and 6 leaving only a narrow middle band brownish and undusted. Pubescence pale only on lateral parts of tergite 1 and on the silvery-white spots of tergites 2 and 3; otherwise blackish. Sternites brownish with pale hairs on sternites 1—3, blackish on sternites 4—7. Terminal spines of ovipositor long and narrow.

d. Systematical position.

Bibio senilis F., 1805, is a primary homonym of *Bibio senilis* Panzer (1798: 22). Panzer's species is an empidid of the genus *Hilara*. The Fabrician *Bibio senilis* then requires a new specific name. Both Kröber (1912: 245) and Cole (1923: 72, 1965: 351) placed their *senilis* Fabr. in the genus *Psilocephala* Zett. This is evidently wrong, as will appear from a comparison of the description above of the male terminalia of the lectotype of *senilis* with the description of the male terminalia of the type-species of *Psilocephala: imberbis* Fallén, 1814 (cf. Lyneborg, 1968a). Consequently, the *Bibio senilis* F. requires a complete new binomen. This will not be created here.

Kröber (1912: 245) records his *Psilocephala senilis* F. on the basis of a female specimen from Georgia and a male specimen from Brazil. If this female specimen is conspecific with a pair from Florida (Archbold Biol. Sta.) recently sent me as *Ps.? senilis* F. by Prof. Maurice T. James, then it is not the Fabrician species, though a very nearly related species which is apparently undescribed.

Only a few suggestions concerning a possible affinity to other Therevidae shall be expressed here. At the moment it is only pos-

sible to term a few characters in the male terminalia as definitely apomorphic. The peculiar aedeagal processes arising from the base of the ventral apodeme do not belong to the basic type of the aedeagus in Therevidae. Similar processes have so far only been seen in the Palaearctic species *Thereva annulata* F. and in *Thereva vialis* Osten-Sacken and a few other species occurring in the western part of North America. This group of species is certainly of monophyletic origin and may in the future be treated as a separate genus. It does not seem that *senilis* is closely related to this group of species, as it is more advanced in other respects. Among these, first of all the loss of a free end of the gonapophysis must be mentioned (cf. Lyneborg, 1968a). Also the presence of an additional small structure close to the stylus must be noted.

2. **abdominalis** Fabricius.

Bibio abdominalis Fabricius, 1805, Syst. ant.: 68, 12.

a. Type-material.

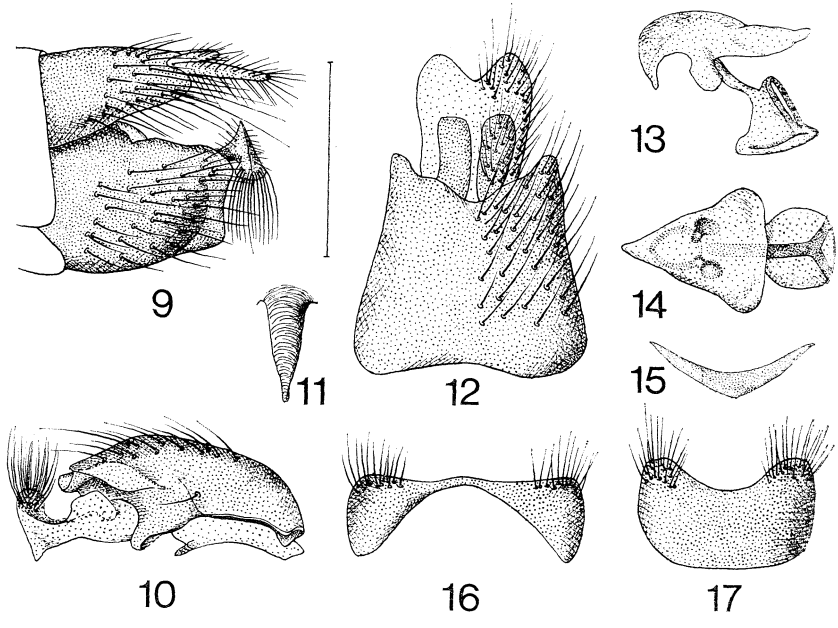
There are two male specimens in the Fabrician Copenhagen collection (originating from the Sehestedt and Tønder-Lund coll.). The specimens are conspecific. The first specimen is labelled "B. abdominalis /a Am. Ins. Schmidt". It is in a rather good condition, though cleft by a thick pin. The left third antennal joint and left p_3 are missing. The second specimen bears no labels and is in less good condition, as it lacks the left antenna, right p_1 and p^3, and left p_1 and p_2. In the Kiel collection is a third specimen labelled "abdominalis". It is conspecific with the two other specimens, and has lost the head, both p_1, and right p_2. All specimens agree well with the original description. The labelled specimen from the Copenhagen collection is hereby designated as the lectotype of *Bibio abdominalis* F., 1805, and has been so labelled. It is redescribed below.

Regarding the location of the type-locality there is a disagreement between the original label and the statement in Fabricius' description. According to the information given on p. 390, "Am. Ins. Dom. Schmidt" certainly refers to St. Croix or another island in the West Indies. Therefore, records of *abdominalis* F. (as a *Thereva* or *Psilocephala*) by later authors (e.g., Wiedemann, 1821: 113, 1828: 236) from South America (Brazil) certainly refer to other species.

b. Redescription of male lectotype. (Figs. 9—17).

Length. Total: 6.5 mm.

Head. Length 85, height 110, width 160. Eye: length 55, height 105. Gena 5, frontal protuberance 5, occipital protuberance 30. Antennal insertion 85:25. Antennae: first joint 24:16, second joint 8:12, third joint 27:15. Style 10, one-jointed (?) with short apical spine. Proboscis reaches to level of second antennal joint. Palpi little more than half as long as proboscis; with few pale hairs. Eyes clearly touching for a distance which equals more than height of ocellar tubercle, then rapidly separating. Frons with greyish-brown dust, and some long blackish hairs. Face bare. Gena with a small group of short blackish hairs. Occiput with whitish dust and with whitish pubescence; about 12 short postocular setae and further 10 setae below these. First and second antennal joints covered with greyish-brown dust; first joint with several black setae dorsally and ventrally. Third joint yellowish near base



Figs. 9—17. Male terminalia of lectotype of *"Bibio" abdominalis* F. — 9. Terminalia in lateral view. 10. Right gonocoxite and its appendages in ventral view. 11. Phallus in caudal view. 12. Epandrium, cerci and paraprocts in dorsal view. 13. Aedeagus in lateral view. 14. Aedeagus in dorsal view. 15. Hypandrium in ventral view. 16. Tergite 8. 17. Sternite 8. Scale: 1 mm for Fig. 11, 0.5 mm for other figures.

blackish around middle and more brownish in the apical half, which is much narrower than the basal half.

Thorax. Mesonotum: length 180, width 150. 3n, 2 sa, 1 pa setae. 2 pairs of dc setae. Mesonotum of a dull greyish-brown colour with only indistinct darker bands. Pubescence very sparse. Scutellum: length 40, width 90, coloured as mesonotum, 4 setae. Pleura greyish with sparse whitish pubescence.

Wing. Length 370, width 160. Basal vein of discal cell oblique. Cell M_3 closed. Vein r_4 S-curved. Index of cell R_4 120:65. Vein r_1 without hairs on dorsal surface. Ground colour hyaline with greyish-brown tinge. Stigma and veins dark brownish. Halteres yellowish.

Legs. f_1 with 1—2 av setae. f_2 without av setae. f_3 with 3—4 av setae in apical half. t_1 with few but strong ad and pv setae, and few much shorter pd setae. The strongest of the ad setae twice as long as width of t_1. Length of t_1 125, width 10. t_2 with 2 strong ad and 1 (-2) strong av setae which are longer than width of t_2. Moreover, 5—6 pd and about 3 pv setae the length of which approximately equally the width of t_2, t_3 with rows of ad, pd and av setae; pv setae absent or at most 1—2 short hairlike setae. — Coxae greyish. Femora greyish with whitish scaly hairs dorsally and normal whitish hairs ventrally. Tibiae and tarsi yellowish-brown with slightly darkened tips. Claws and pulvilli normal.

Abdomen. Length 300—350, width 140—150. All tergites are covered by silvery-white dust and whitish pubescence. In caudal and lateral view the ground coloration is clearly visible, the hind parts of the tergites being yellowish-brown and the fore parts dark greyish. Hindmarginal hems are distinct and whitish on tergites 2 and 3. All sternites also covered by silvery-white dust, in lateral and caudal view with a distinct yellowish-brown coloration.

Terminalia. Epandrium and gonocoxites yellowish-brown with slight whitish dust; with rather sparse pubescence. Epandrium (Fig.12) basally broader than long, both anterior and posterior margins moderately incised. Gonocoxite (Fig. 9) distinctly longer than epandrium, its distal part broadly lamellate. Gonapophysis with a very short free end, not visible in lateral view. The brush-shaped apex of the stylus is very conspicuous in external view (Fig. 9). Seen ventrally (Fig. 10) the stylus has a large, ventral, lamellate extension. The ventral lobe is small. Hypandrium (Fig.

15) is comparatively large. The paraprocts are nearly twice as long as the cerci and fused; both structures overhang hind margin of epandrium. The cerci are divided. The aedeagus is free. The phallus is in lateral view (Fig. 13) short and curved for more than 90° to the longitudinal axis of the aedeagus; the tip not upcurved. Seen caudally (Fig. 11) it gradually narrows. Seen dorsally (Fig. 14) the phallus and the dorsal apodeme together form a broad triangular shield. The ventral apodeme is formed as two strongly diverging rounded flanges. The ejaculatory apodeme is as long as the rest of the aedeagus. It consists of a stem and an enormous bulbous head distally. The head is formed by three sclerotized plates which are at right angles to each other.

c. Systematical position.

The species seems in external characters to represent a most generalized therevid. The elongated paraprocts are no doubt an apomorph character which seems, however, to occur by convergence also in other parts of the family, e.g., in East-Palaearctic species of *Dialineura* Rond. (cf. Lyneborg, 1968b). Also the strongly reduced gonapophysis and the peculiar shape of the ventral and ejaculatory apodemes may be of some importance for further study.

3. **crassicornis** Bellardi.

Thereva crassicornis Bellardi, 1861, Saggio di ditt. messic. 2: 88, 1.

a. Type-material.

A male specimen with an old label of "165" and a recently written label of "T. crassicornis Bell. ♂. No. 165. Messico (Truqui)" was received from the Torino Museum. This specimen is in fairly good condition, though somewhat mouldy and discoloured on head and thorax. All right legs and both third antennal joints are lost. The specimen agrees closely with the detailed original description, and there can be no doubt that it represents the holotype. I have labelled it accordingly.

b. Redescription of male holotype. (Figs. 18—23).

Length. Total: 10.4 mm.

Head. Length 140, height 145, width 235. Eye: length 95, height 125. Gena 20, frontal protuberance 25, occipital protuberance 20. Antennal insertion 100:45. Antennae: first joint 80:35, second joint 10:15, third joint absent. Proboscis reaches to end of first third of first antennal joint. Palpi distinctly shorter. Ocellar

triangle rather small. Eyes very narrowly separated. — The head is discoloured, but all parts seem to be greyish to yellowish-grey dusted. Frons with long, blackish hairs; face with shorter blackish hairs. Pubescence of gena and lower part of occiput golden-yellow. About 7 long, thin postocular setae, and about 10 stouter occipital setae. Antennae blackish, first and second joints with greyish dust and long blackish hairs.

Thorax. Mesonotum: Length 250, width 185. 3 n, 2 sa, 1 pa setae. dc setae cannot be seen. Colour pattern cannot be stated due to discoloration. Pubescence partly composed of long, blackish hairs, partly of short, depressed, golden-yellow hairs. Scutellum: length 250, width 110. Its colour dark (as mesonotum), pubescence long and golden-yellow, 4 setae. Also pleura discoloured, their pubescence long and golden-yellow.

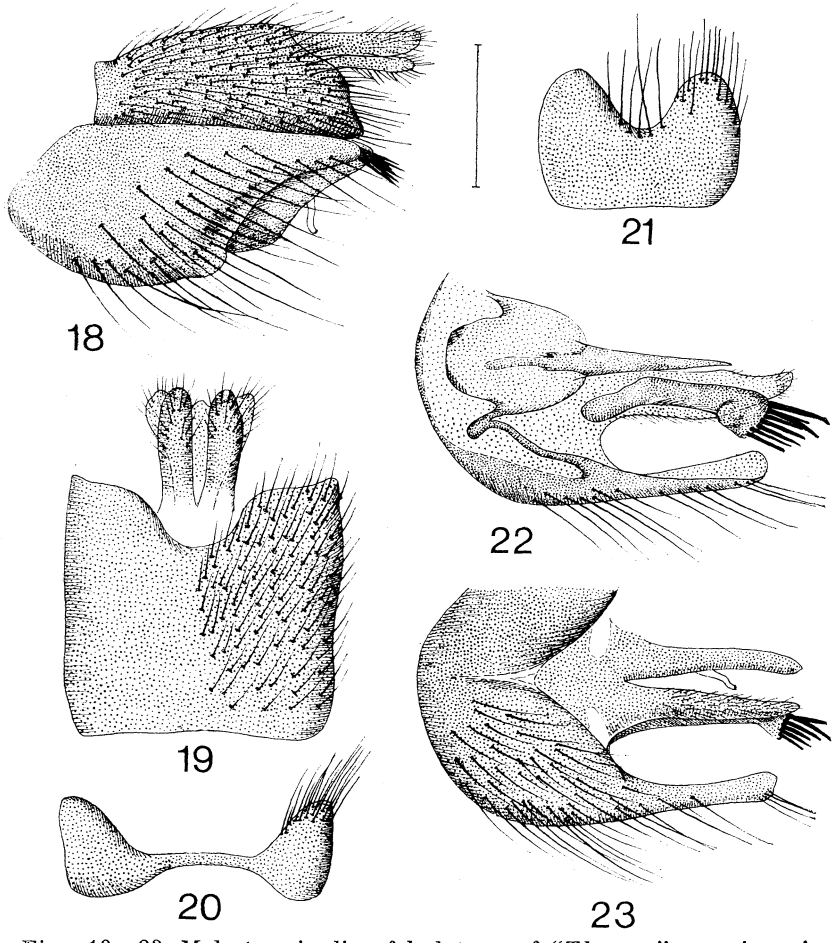
Wing. Length 700, width 275. Basal vein of discal cell oblique. Cell M_3 closed and with a short stalk. Vein r_4 starting with a straight part, then followed by a deep bend. Cell R_4 with an index of 235:120. — Colour slightly brownish with darker stigma, veins dark brownish. Knob of halteres brownish-black.

Legs. f_1 with 2 av, f_2 with 1 av + 1 pv setae. f_3 with 6—7 rather short av setae, and some still shorter pv setae in apical two-thirds. t_1 with some ad, pd and pv setae, some of which are longer than tibial diameter. Length of t_1 225, width 20. t_2 and t_3 with some ad, pd, av and pv setae, of which pv setae to t_3 are very short. — Legs all pale brownish, tibiae most pale. f_1 and f_2 with long yellowish hairs, f_3 with short, adpressed, yellowish and blackish hairs. Claws and pulvilli small.

Abdomen. Length 660, width 180. Tergites largely clear reddish-yellow with blackish rhomboid spots on segments 2—6. Seen dorsally these spots reach the fore corners of each tergite, while at the hind margins they occupy about one third of the entire width of the tergites. The spots are separated from actual hind margins by rather broad hems of reddish-yellow coloration. Pubescence on the blackish spots short and blackish, on the reddish-yellow areas longer and yellowish. Sternites exclusively reddish-yellow, with long and sparse pubescence.

Terminalia. Both epandrium and gonocoxites reddish-yellow, with blackish hairs which are short on epandrium, long on gonocoxites. Epandrium (Fig. 19) nearly square, with a moderately deep incision in posterior margin. Gonocoxite (Fig. 18) exactly as

long as epandrium, projecting as a rather long, dorsal, lamellate process. In lateral view (Fig. 18) the extremely large ventral lobe, the tip of phallus and the strong spines of the stylus are visible. Gonapophysis without free end, its rod (Fig. 22) connected with the lateral part of dorsal apodeme of aedeagus. Hypandrium completely lacking (or fused with the gonocoxites?). These are fused for a long distance ventrally (Fig. 23). The styli are placed



Figs. 18—23. Male terminalia of holotype of *"Thereva" crassicornis* Bell. — 18. Terminalia in lateral view. 19. Epandrium, cerci and paraprocts in dorsal view. 20. Tergite 8. 21. Sternite 8. 22. Left gonocoxite, its appendages and aedeagus in dorsal view after removing the epandrium. 23. Right gonocoxite and its appendages in ventral view. Scale: 0.5 mm.

close to the midline, their distal end with a dorsal process, and with some very stout spines directed downwards. The ventral lobes are very long. They lie close together, are fused at the base (Fig. 23), then form a long, deep fork. Cerci and paraprocts long and of equal length. The paraprocts are fused. Both elements protrude much beyond epandrium. The phallus (Fig. 22) has a long and narrow proximal part, seen laterally it curves for about 90° to the longitudinal axis, ending in a long, narrow, slightly upcurved tip (Fig. 18). The dorsal apodeme (Fig. 22) is oval, connected with the rod of the gonapophysis, and is about four times wider than the proximal part of the phallus. It has a median keel, and its distal end is upcurved. Both ventral and ejaculatory apodemes are rudimentary.

c. Systematical position.

Crassicornis Bell. shows a number of characters in the male terminalia which may be termed apomorphic if compared with the apparently generalized (with a number af plesiomorph characters) terminalia described for *Thereva* and other genera (Lyneborg, 1968a). These apomorph characters can be summarized as follows: gonocoxites fused ventrally; a free hypandrium not present; gonapophysis without a free terminal end; its rod with a strongly sclerotized connection to the aedeagus; the ventral lobes strongly enlarged and fused basally (corresponding to the fusion of the gonocoxites).

Most of these characters (except the large ventral lobes) are also found in *Furcifera sumichrasti* Bell. (see p. 407 and figs. 31-37). A connection between the basal rod of the gonapophysis and the aedeagus, combined with the loss of a free terminal end of the gonapophysis, is also found in a group of Ethiopian, Palaearctic and Oriental genera (e.g., *Phycus* Walk.). This group is also represented in the New World (*Ataenogera* Kröb. and *Pherocera* Cole). In this group of genera the gonocoxites are, however, fully separated (a plesiomorph character), but some surely apomorph characters in the wings separate it from the genera represented by *crassicornis* and *sumichrasti*.

4. **argentata** Bellardi

Thereva argentata Bellardi, 1861, Saggio di ditt. messic. 2: 89,2.

a. Type-material.

A male specimen bearing two old labels, "166" and "Cordova,

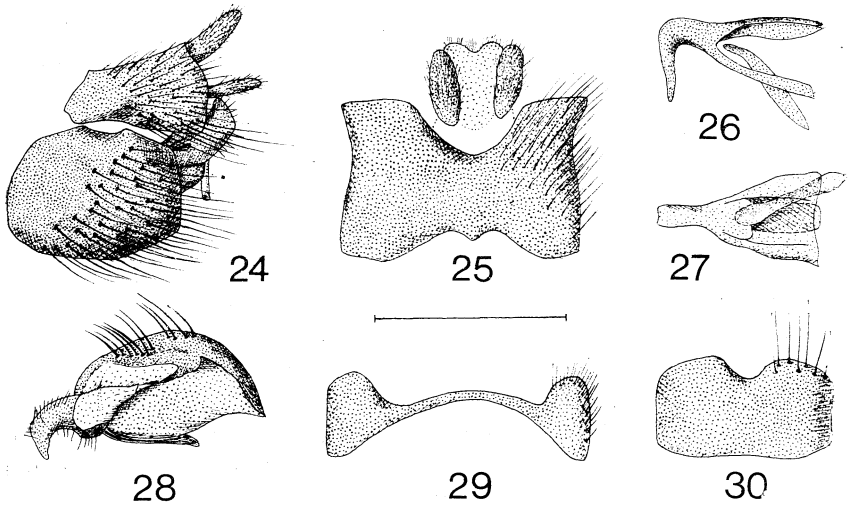
t.c.", and a new label "T. argentata Bell. ♂. No. 166. Messico (Cordova). (Saussure)" was received from the Torino Museum. The specimen is in fairly good condition though slightly mouldy and discoloured. The right third antennal joint, left wing, right p_1, the tibia and tarsus of right p_3, and whole left p_3 are lost.

Bellardi only described the male sex, apparently on the basis of more specimens, as he stated the types to be in "Collezioni di Saussure e Bellardi". Consequently I hereby designate the above-mentioned specimen in the Torino Museum as lectotype and have labelled it accordingly.

b. Redescription of male lectotype (Figs. 24—30).

Length. Total: 6.1 mm.

Head. Length 100, height 135, width 180. Eye: length 75, height 120. Gena 15, frontal protuberance 10, occipital protuberance 15. Antennal insertion 85:50. Antennae: first joint 29:11, second joint 9:14, third joint 44:16. Style 10, incerted on exterior part of apex of third joint; number of joints cannot be seen. Proboscis reaches to level of antennal bases. Palpi slightly shorter than proboscis, brownish-grey with long, whitish pubescence. Eyes touch for a



Figs. 24—30. Male terminalia of holotype of "*Thereva*" *argentata* Bell. — 24. Terminalia in lateral view. 25. Epandrium, cerci and paraprocts in dorsal view. 26. Aedeagus in lateral view. 27. Aedeagus in dorsal view. 28. Right gonocoxite and its appendages in ventral view. 29. Tergite 8. 30. Sternite 8. Scale: 0.5 mm.

short distance. Frons mostly shiny blackish with long, black hairs. Face, genae and occiput whitish-grey dusted. Face bare, genae with short black hairs, while occiput has long, whitish pubescence. About 20 postocular + occipital setae on each side. Antennae blackish, first joint distinctly greyish dusted and with moderately long, blackish setae and hairs.

Thorax. Mesonotum: length 175, width 150. 3 n, 2 sa, 1 pa setae. dc setae seem absent. Mesonotum blackish with a faint, greyish dusting, but obviously without any distinct pattern. Pubescence long (ca. 25) and whitish. Scutellum: length 45, width 80, coloured as mesonotum, 4 setae. Pleura greyish dusted, but pteropleuron more shiny; pubescence long and whitish.

Wing. Length 455, width 165. Basal vein of discal cell oblique. Cell M_3 closed and stalked. Vein r_4 S-curved. Index of cell R_4 135:65. Vein r_1 without hairs on dorsal surface. Ground colour hyaline with greyish-yellow tinge. Veins very pale and stigma not distinct. Halteres blackish.

Legs. f_1 and f_2 have 1 av seta near middle; pubescence on anterior surfaces pale and scaly, on posterior surfaces long and composed of both pale and blackish hairs. f_3 with a row of long av setae, near apex 2 short pv setae. t_1 with 2—3 ad, pd and pv setae, some of which are longer than width of t_1. Length of t_1 150, width 20. t_2 with rows of setae of all four positions, but pd setae short and hairlike. t_3 absent. Femora blackish with slight, greyish dust. t_1 blackish-brown, t_2 yellowish-brown with darkened tip. Tarsi coloured as corresponding tibiae. Claws and pulvilli normal.

Abdomen. Length 335, width 160. The broad and flat abdomen is, when viewed from above, entirely silvery-white dusted, only the extreme margin is blackish. The pubescence is whitish, adpressed on the central parts, more outstanding laterally. In lateral view the lateral parts of the tergites appear shiny blackish, only extreme hind parts of tergites 2 and 3 show a little dusting. Tergites 2 and 3 have distinct whitish hind-marginal hems. The sternites are blackish with only slight dust and with long, pale hairs.

Terminalia. Epandrium and gonocoxites blackish with blackish hairs. Epandrium (Fig. 25) shorter than wide, incised in both anterior and posterior margins. Gonocoxite (Fig.24) distinctly shorter than epandrium, i.e., no projecting hind part. The two gonocoxites are fused for a rather long distance ventrally. The

gonapophysis is present as a long rod, and its free end is represented by a minute tubercle with some hairs. Both stylus and ventral lobe (Fig. 24) are visible in an external, lateral view. The stylus (Fig. 28) is shaped as a broad hook. The ventral lobe (Fig. 28) large and lamellate. Cerci and paraprocts of equal length, distinctly protruding beyond level of epandrium. The paraprocts fused, forming a heart-shaped sclerite. The aedeagus is free. Phallus rather broad basally, seen laterally (Fig. 26) it suddenly curves for about 90°, ending in a rather straight, gradually narrowing, tip. The dorsal apodeme is, seen laterally (Fig. 26), straight, formed by two ridges. Seen dorsally (Fig. 27) it is triangular. Ventral apodeme of same length as dorsal apodeme. Ejaculatory apodeme a little projecting beyond level of distal end of dorsal apodeme, seen dorsally slightly thickened in both ends.

c. Systematical position.

It is at present difficult to give exact information on the relationship of *argentata* Bell. It certainly shows some relation to *Thereva* Latr. and allied genera (cf. Lyneborg, 1968a) in the characters of the male terminalia; this relation, however, is apparently based on plesiomorph characters: gonapophysis with a free end (though very minute); its rod not connected with the aedeagus. Also the presence of 2 supraalars, 2 pairs of scutellars, and some characters in the wing are in common. The combination of a few definetely apomorph characters such as the obvious strongly reduced antennal style, the shortened epandrium, and the fusion of the gonocoxites ventrally may be of some value for further attempts in placing the species. These characters are not found in *Thereva plebeja* L.

5. **sumichrasti** Bellardi.

Psilocephala Sumichrasti Bellardi, 1861, Saggio di ditt. messic. 2: 91,2.

a. Type-material.

Three specimens, two males and a female, were received from the Torino Museum. The first male bears and old label, "167", and a recently written label, "Psilocephala sumichrasti Bell. Messico. Tuxpango (Sumichrast) 167". The second male bears an old label, "Sumichrast/ Orizaba". The female has a small green label with "Orizaba". All specimens are in fairly good condition. Bellardi described only the male sex, and stated the type-locality

to be "Tuxpango presso Orizaba". Both males (and certainly also the female) obviously belong to the type-series collected by Sumichrast, and agree closely with the description by Bellardi. I hereby designate, and have labelled accordingly, the male labelled "167" as the lectotype of *Psilocephala Sumichrasti* Bellardi, 1861.

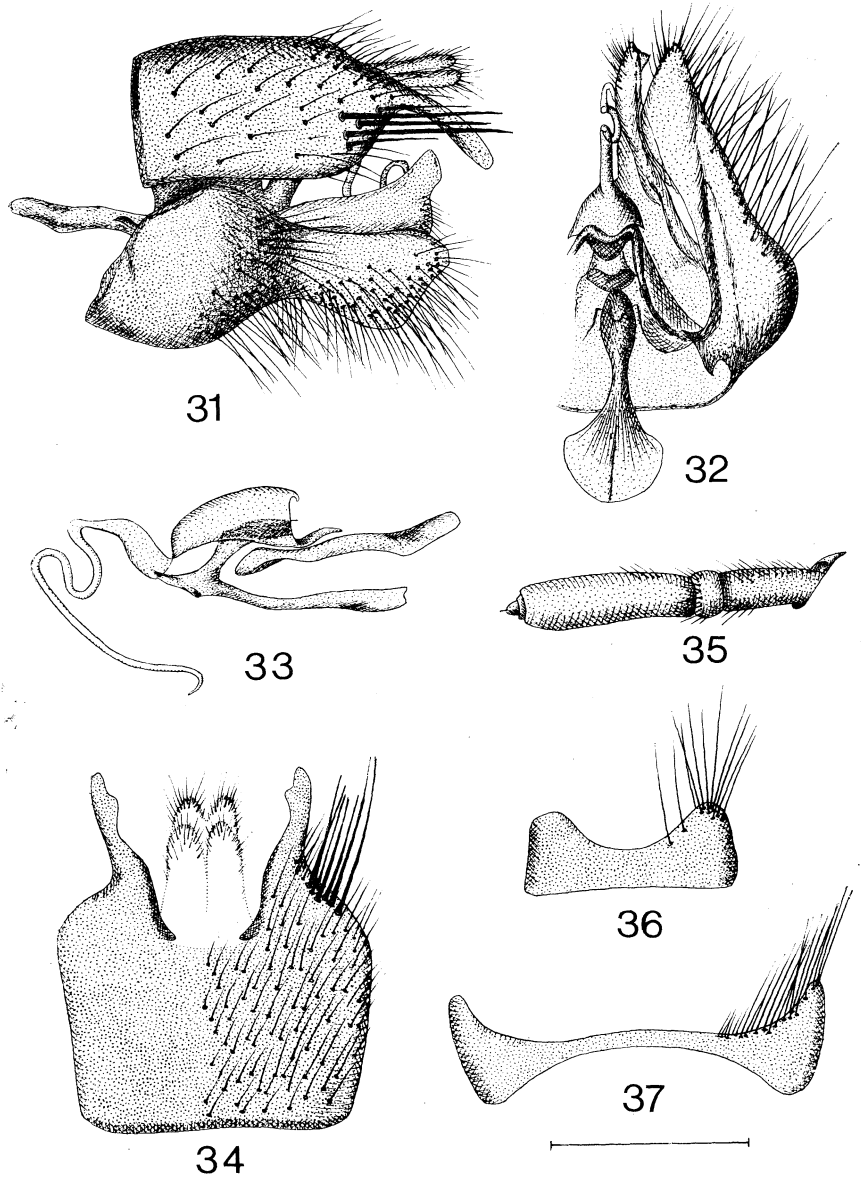
b. Redescription of male lectotype. (Figs. 31—37).

Length. Total: 6.9 mm.

Head. Length 105, height 145, width 175. Eye: length 85, height 140. Gena 5, frontal protuberance 10, occipital protuberance 10. Antennal insertion 85:90. Antennae: first joint 25:10, second joint 8:10, third joint 47:14. Style 5, apically inserted (Fig. 35). Proboscis does not reach level of antennal bases. Palpi about as long as proboscis. Eyes contiguous for a distance equal to height of ocellar tubercle. — The head shows a silvery-white dusting, uppermost part of frons velvet black. Frons and face bare. Gena with rather short, dark hairs. Occiput with longer, whitish hairs. 6 postocular setae which continue in a row of occipital setae with vertical position. Antennae dirty yellowish, first joint with only short pubescence (Fig. 35).

Thorax. Mesonotum: length 220, width 160. 3 n, 2 sa, 1 pa setae. dc setae absent. Mesonotum with a greyish median band (width ca. 60) flanked by two blackish bands which are about 30 wide. The lateral parts of mesonotum greyish. Pubescence moderately long (ca. 15) and pale. Scutellum: length 40, width 70, with a distinct transverse ridge. Seen from behind the part of scutellum caudal to this ridge is brownish-black and densely covered with black dots, indicating sockets of setulose hairs. Only a few of these hairs are intact. They are black and nearly as long as the four marginal setae. This means that the entire hind half of scutellum has a dense covering of long, black, setulose hairs. In dorsal view the entire scutellum is black (not shiny), and seen from in front the part anterior to the ridge has a greyish-brown toment. The pleura are greyish with a brownish-black undusted band from wing-base to hypopleuron.

Wing. Length 480, width 190. Basal vein of discal cell oblique. Cell M_3 closed and stalked. Vein r_4 nearly straight basally, ending in a deep curve. Index of cell R_4 150:70. Vein r_1 without hairs on dorsal surface. Ground colour greyish-brown, with a brownish stigma and a brownish area between r-m and fork of r_{4+5} reaching from costa to m_1. Knob of halteres dirty yellowish.



Figs. 31—37. Male terminalia and antenna of lectotype of *"Psilocephala" sumichrasti* Bell. — 31. Terminalia in lateral view. 32. Left gonocoxite, its appendages and aedeagus in dorsal view after removing the epandrium. 33. Aedeagus in lateral view. 34. Epandrium, cerci and paraprocts in dorsal view. 35. Antenna. 36. Sternite 8. 37. Tergite 8. Scale: 0.5 mm.

Legs. f_1 and f_2 with a single av setae. f_3 with some short av setae in apical two-thirds, and some still shorter pv setae in apical third. t_1 with ad, pd, and pv setae of which the pv are fewest but strongest. Length of t_1 180, width 15. t_2 and t_3 with rows of ad, pd, av and pv setae, the ad and pd of t_3 being particularly numerous though not long. Fore tarsi thickened. Coxae brownish-black, with slight greyish dust. Femora mainly yellowish-brown, dorsal surfaces darker brownish. Pubescence pale. Tibiae yellowish-brown, t_1 darkened at apex, and t_3 darkened in apical half. Fore tarsi blackish, other tarsi yellowish-brown. Claws and pulvilli comparatively small.

Abdomen. Length 300, width 150. Seen from in front the tergites are silvery-grey dusted. Seen from behind the central parts of the tergites 1—3 are brownish-black, while the lateral parts and also the tergites 4—5 are silvery-grey dusted. In lateral view tergite 3 has the fore corners brownish-black. Tergite 2 shows a very broad, whitish, hindmarginal hem. Sternites greyish. All hairs pale. Segments 6—7 are not visible in the type, obviously being telescopically inserted in the other segments.

Terminalia. Both epandrium and gonocoxites are entirely reddish-yellow with yellowish pubescence; epandrium with some strong setae (Figs. 31 and 34). Epandrium (Fig. 34) with anterior margin straight and a deep incision into posterior margin, which is strenghtened by two long, narrow processes. Gonocoxite (Fig. 31) slightly shorter than epandrium, formed by a semiglobular basal part bearing a long and broad, distal process. The two gonocoxites are ventrally fused for a long distance (Fig. 32). Gonapophysis without a free end, forming only a sclerotization along dorsal margin of proximal half of the gonocoxite and with a very strongly sclerotized connection to the aedeagus (Fig. 32). The stylus is distinctly visible in lateral view (Fig. 31), reaching to level of distal end of the gonocoxite, and forming a broad sclerite of a rather complex shape (see also Fig. 32). Also the aedeagus with its strongly sinuate phallus is visible in lateral view. The ventral lobes lie close together ventral to the proximal part of phallus, and arise from the fused ventral margin of the coxites. They are pointed, lamellate structures (not shown in any of the figures). Paraprocts slightly longer than cerci, not overhanging distal processes of epandrium. Both structures are weakly sclerotized and partly fused. A hypandrium is not visible. The aedeagus

itself shows a complicated construction. In lateral view (Fig. 33) the phallus is formed as a very long and gradually narrowing tube which is strongly sinuate. Seen dorsally (Fig. 32), the proximal part of the phallus is short and broad. To its proximal margin is attached the dorsal apodeme, which in lateral view is short and high, forming two lateral, curved and well-sclerotized plates which are fused to the rod of gonapophysis. The central area of the dorsal apodeme is poorly sclerotized. The ventral apodeme is longer than the dorsal apodeme; seen ventrally it is formed by two long, narrow sticks, the distal ends of which are shaped as a showel. The ejaculatory apodeme is longer than rest of aedeagus, its distal end is broad and rounded (Fig. 32), though weakly sclerotized. Dorsal to the proximal end of the ejaculatory apodeme and arising from proximal part of ventral apodeme is a rounded sclerotization forming half part of a funnel. The tergite 8 (Fig. 37) and sternite 8 (Fig. 36) are both comparatively small; this tendency to reduction may obviously be associated with the telescopical nature of the last abdominal segments.

c. Systematical position.

Cole (1923: 31) placed the species in his new genus *Epomyia*. Later, Cole (1960: 168) treated *Epomyia* as a synonym *Furcifera* Kröber, 1911. Whether this action was correct shall not be discussed here. It is, however, evident that Cole has misinterpreted Bellardi's species. This will appear by comparison of fig. 3c by Cole (1960) with fig. 31 of the present paper. Bellardi's species seems to come near to *Furcifera hardyi* Cole, 1960 (= *Epomyia flavipes* Hardy, 1943). Both species have the erect pile on scutellum and about the same dimensions in the antennae. The legs of the lectotype of *sumichrasti* seem darker than described for *hardyi,* though it is worth mentioning that the male syntype (with terminalia identical to those of the lectotype) has legs which may be termed yellowish (except for the tarsi of p_1).

It seems as though *sumichrasti* in several respects represents a most advanced therevid. It clearly shows a number of apomorph characters which are also found in *crassicornis* Bell. (see p. 401). These are as follows: gonocoxites fused ventrally; a free hypandrium not present; gonapophysis without a free terminal end; its rod with a strongly sclerotized connection to the aedeagus; and tergite 8 and sternite 8 relatively much reduced. Further apomorph characters are found in the shaping of the scutellum, in the com-

plexity of the aedeagus, and also in the telescopical abdomen. A dissection of the holotype to *Cyclotelus pruinosus* Walker, 1850 from South America have shown male terminalia of the same basic structure as described for *sumichrasti*.

6. **nigra** Bellardi

Psilocephala nigra Bellardi, 1861, Saggio di ditt. messic. 2: 92, 3.

a. Type-material.

A male specimen with an old label, "169", and a new label, "Psilocephala nigra Bell. 168. Messico (Semper)", was received from the Torino Museum. The specimen was in good condition; only the third antennal joints were missing. It agrees well with the description. Bellardi described only the male sex, and apparently only on one specimen. The specimen in the Torino Museum must then represent the holotype, and I have labelled it so.

b. Redescription of male holotype. (Figs. 38—44).

Length. Total: 10.6 mm.

Head. Length 140, height 160, width 220. Eye: length 105, height 135. Gena 25, frontal protuberance 15, occipital protuberance 20. Antennal insertion 100:60. Antennae: first joint 38:16, second joint 10:16, third joint lost. Proboscis reaches to level of second antennal joint. Palpi distinctly shorter than proboscis. Eyes narrowly separated for a short distance. — Head dark greyish with exclusively blackish pubescence. About 12 postocular setae and a similar number of occipital setae. First and second antennal joints blackish.

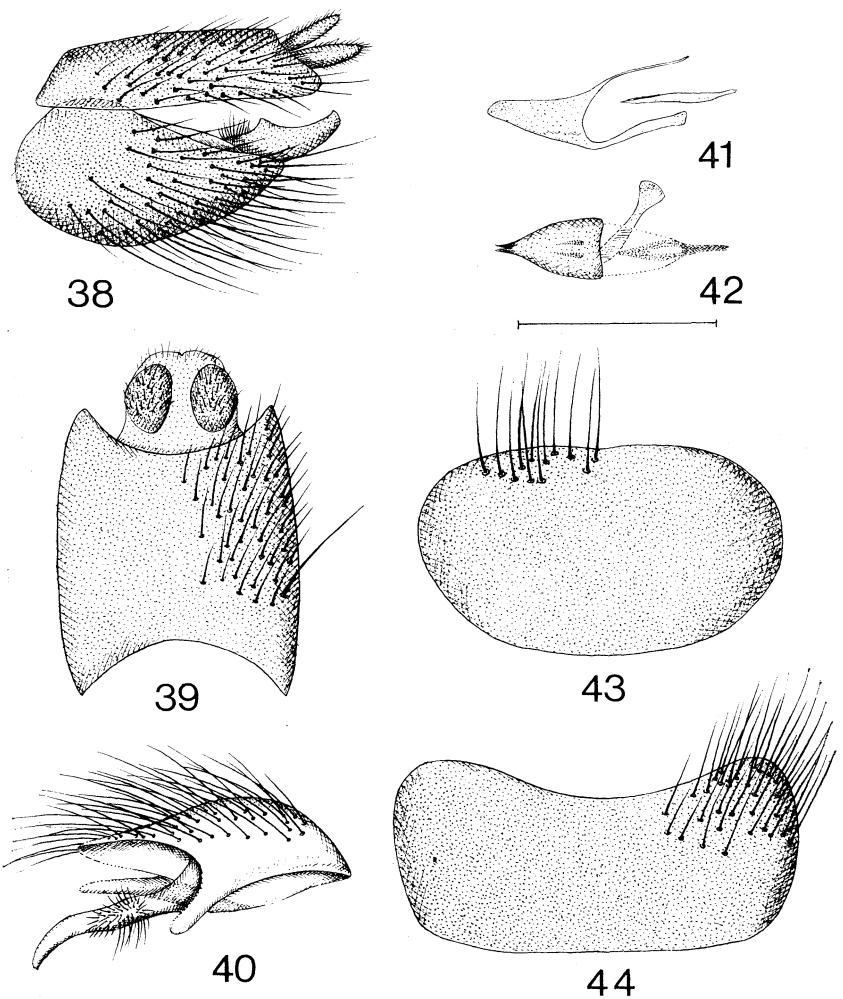
Thorax. Mesonotum: length 250, width 190. 5 n, 1 sa, 1 pa setae. No dc setae are visible. Scutellum: length 50, width 90, 2 setae. Entire thorax blackish with short blackish pubescence.

Wing. Length 720, width 260. Basal vein of discal cell oblique. Cell M_3 broadly open. Vein r_4 forms a very narrow S. Cell R_4 with an index of 215:85. Colour extensively dark brownish, with blackish stigma and veins. Halteres blackish.

Legs. All femora without setae. t_1 with rows of few and short pd and pv setae, also a single short ad is visible. All setae are shorter than width of t_1. Length of t_1 210, width 25. t_2 and t_3 with rows of few and short ad, pd, av, and pv setae. All legs intensively blackish with exclusively short, blackish pubescence. Claws and pulvilli comparatively small.

Abdomen. Length 650, width 180. All tergites and sternites blackish with blackish hairs. Segments 2—5 show dirty yellowish hindmarginal hems. The pubescence of the last sternites is somewhat elongated and crassate.

Terminalia. Epandrium and gonocoxites are comparatively small; blackish with blackish pubescence. Tergite 8 (Figs. 44) and



Figs. 38—44. Male terminalia of holotype of *"Psilocephala" nigra* Bell. — 38. Terminalia in lateral view. 39. Epandrium, cerci and paraprocts in dorsal view. 40. Right gonocoxite and its appendages in ventral view. 41. Aedeagus in lateral view. 42. Aedeagus in dorsal view. 43. Sternite 8. 44. Tergite 8. Scale: 0.5 mm.

sternite 8 (Figs. 43) are comparatively large. Epandrium (Fig. 39) nearly square, with moderately deep incision in both anterior and posterior margins. Gonocoxite slightly shorter than epandrium. Gonapophysis with a long free end (without hairs) which reaches to level of distal end of gonocoxite, in lateral view, however, only narrowly visible (Fig. 38). Hypandrium is present as a ventral triangular sclerite between bases of the gonocoxites. These are not fused ventrally. The stylus (Figs. 38 and 40) projects beyond level of distal end of gonocoxite. The ventral lobe is formed as a rather long, narrow, lamellate process (Fig. 40). Paraprocts slightly longer than cerci. Both structures project beyond level of epandrium. Cerci divided, paraprocts fused. The aedeagus (Figs. 41—42) is free and remarkable simple and weakly sclerotized. The phallus is formed as a short funnel. The dorsal apodeme is reduced to a weak flap attached to the proximal end of phallus. Also the ventral and ejaculatory apodemes are reduced.

c. Systematical position.

"*Psilocephala*" *nigra* Bell. is normally treated as a synonym of "*Thereva*" *lugubris* Macquart, 1840, described from Chile. Whether this is correct shall not be commented on here. Both were placed in the new genus *Melanothereva* by Malloch (1932).

The species is most interesting as it seems to possess an unusually rich number of plesiomorph characters, both in the external structures and in the male terminalia, thus representing an apparently very generalized therevid. These in my opinion plesiomorph characters shall shortly be summarized: eyes separated (though only narrowly), 1 supraalar only; 1 pair of scutellars only; cell R_4 long (index about 2.5); cell M_3 broadly open; basal vein of discal cell oblique; femora without setae; tibiae with few and short setae; male terminalia comparatively small; sclerites of segment 8 comparatively large; gonocoxites not fused ventrally; a free hypandrium present; gonapophysis with a free terminal end; aedeagus free (i.e. no connection to basal rod of gonapophysis).

The lack of hairs on the stylus and also the apparently strongly reduced aedeagus may be termed apomorph characters and may be of some importance for future study of the relationship of the species.

Summary

The paper presents redescriptions of the holotypes or lectotypes of six species of Therevidae from the Americas. The two were described by J. C. Fabricius in 1805 as *Bibio senilis* and *B. abdominalis*, the remaining four by L. Bellardi in 1861 as *Thereva crassicornis*, *Th. argentata*, *Psilocephala sumichrasti* and *Ps. nigra*. Apart from the opportunity for fixing the identity of the species in question, the study made it possible to further elaborate the knowledge of the male terminalia in Therevidae, which no doubt will prove to be of great value for a reclassification of the family.

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The distribution of Orthoptera in Denmark, Scania and Schleswig-Holstein.

By
Knud Th. Holst.

This paper is based on the collections kept in the Zoological Museum, Copenhagen (ZM), the Natural History Museum, Århus (NM) and the Zoological Institute, Lund (ZI). The literature on the area has also been examined, and collections were made during the years 1964—67 by Mr. Peter Esbjerg and the author.

The Orthoptera of the region (Fig. 1) have previously been studied by a number of authors, particularly P. Esben-Petersen in Denmark, Kjell Ander in Sweden and Carl Lunau and Herbert Weidner in Schleswig-Holstein.

Our knowledge of the distribution of the Orthoptera was formerly rather inadequate. Only a few districts had been studied thoroughly, these being Bornholm, North Zealand N. of Copenhagen, the environs of Århus, west from here to Silkeborg and North to Mols, and finally some districts of S. Jutland. This gave an unsatisfactory picture of the distribution of the Orthoptera in Denmark. For example, *Tettigonia viridissima,* very common in Denmark (Fig. 5), was found in only two localities in Funen. Excursions were therefore arranged to other parts of the country, in 1964—66 to S. Zealand, Lolland, Falster, Funen, W. Jutland and other regions of S. Jutland by the author, and in 1965 to W. Jutland by Peter Esbjerg.

In Scania the finds are scattered, apart from the most northerly regions.

In Schleswig-Holstein, collections were made particularly in the southern and eastern parts of Holstein, where the author also made excursions in 1966—67.

During the author's excursion in Denmark and Holstein, the song of the grasshoppers was used to a large extent as an aid in

tracing the animals. It was also recorded on tape in most cases. and oscillograms and sonograms were prepared from this.

Fig. 2 shows the localities in which *Chorthippus brunneus* was found, the most common grasshopper in the region. The figure gives an impression of the density of the collecting sites; in general it may be stated that the region has been evenly investigated.

List of Species

Leptophyes punctatissima (Bosc, 1792). Fig. 3

Scania: Magnarp, 4 ♀, 18.viii.1938 and 1 ♂, ix.1939, Arton (ZI); Båstad, 1 ♂, Thomson (ZI); Brunnby, Mölle and Kullen, several finds (ZI; coll. Tjeder).

Bornholm: Rønne, in gardens (Schiødte, 1842—43). — Zealand: Springforbi, in gardens (Schiødte, 1842—43); Surroundings of Copenhagen, 1 ♀, viii.1873, Meinert (ZM); Copenhagen, 1 ♀, 18.ix. 1872, Løvendal (ZM). — Møn: Møns Klint, 1 nymph, 23.v.1943, Wolff (ZM); St. Damme, in a garden, 3 ♂, 6 ♀, 15—21.ix.1944, Bork-Andersen (ZM). — Falster: 2 ♂, 1 ♀, 18—20.viii.1900, Esben-Petersen (ZM); Næsgaard, 4 ♀, 2 nymphs, 18.viii.1900 and 8.—20.viii.1907, Esben-Petersen (ZM). — Lolland: Maribo (Meinert, 1887—88); Halsted, 2 nymphs, 23.v.1934, Larsson (ZM); Keldskov, 3 nymphs, 1.viii.1913, Esben-Petersen (ZM); Vindeholme Skov, 1 nymph, 10.vii.1958, Bøggild (ZM). — Funen: Pilehuse near Eskebjerg, 1 nymph, 29.vii.1930, Larsson (ZM); Stavrby Skov, on *Pteridium aquilinum*, 18 ♂, 6 ♀, 14 nymphs, 6.viii.1936 and 3.viii.1937 (NM), (Findal, 1937). — Ærø: 1 ♂, 1 ♀, 6 nymphs, 4—15.viii.1946 and 2 nymphs 25.vi.—9.vii.1943,

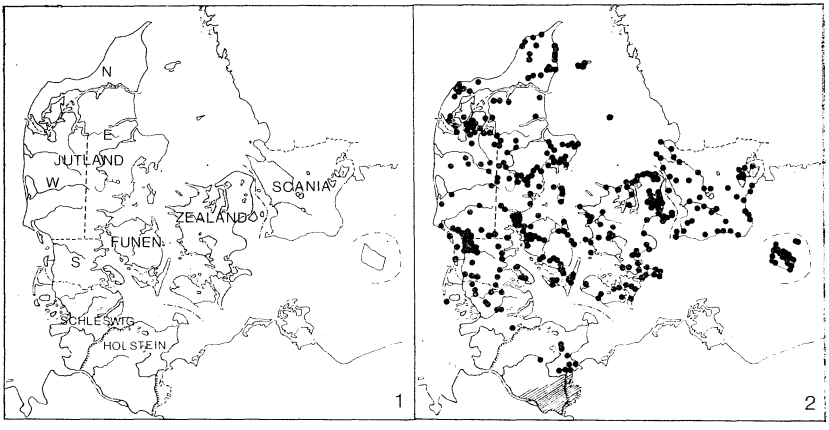


Fig. 1. Denmark, Scania (Sweden) and Schleswig-Holstein (Germany). Fig. 2. Chorthippus brunneus. Hatching means: very common in S. Holstein (after Weidner, 1938).

Worm-Hansen (ZM). — Tåsinge: on a seaside meadow, 1 nymph, 25.vii.1930, Larsson (ZM). — Langeland: Tranckær, 1 ♂, viii. 1896, Schlick (ZM); Fårevejle Skov, 1 nymph, 21.vii.1930, Larsson (ZM). — E. Jutland: (Ranum by Løgstør, viii. (Christiansen, 1912). This record cannot be accepted); Hald, 1 ♀, 12.viii.1911, Esben-Petersen (ZM); near Hald Sø, on leaves of *Fagus silvatica* near the ground, 1 ♀, 8.ix.1966, Holst; Århus, 1 ♂, 1 ♀, 13 nymphs, 28.vii.1887?, Klein (ZM). — S. Jutland: Sønderborg, 1 ♂, 2 ♀, 1 nymph, 15.viii.1886 and ix.1890, 1892 and 1902, Wüstnei (ZM); Skelde, Broagerland, 1 nymph, 30.viii.1891, Wüstnei (ZM); Madeskov, 2 nymphs, 8.viii.1891, Wüstnei (ZM); Kollund, 1 nymph, 29.vii.1940, Leth, and 2 nymphs, 17.vii.1940, Gerhard Nielsen (ZM); Tornskov near Løgumkloster, 3 ♂, 5 ♀, 9.viii.1937, Esben-Petersen (ZM); Povlsskov near Tinglev, 1 ♂, 5.ix.1935, Esben-Petersen (ZM); Rinkenæs, 1 nymph, 15.vii. 1938, Esben-Petersen (ZM); Åbenrå, in a hedge with *Rubus fruticosus* and *Humulus lupulus*, 1 ♀, 1 nymph, 6.viii.1935 (NM), (Findal, 1937). — Als: Lysabild, 2 nymphs, vii.1934 and 30.vii.1935, Hoffmeyer (NM); Tandslet, 1 nymph, 31.vii.1940, Leth (ZM).

Holstein: Warringholz, Krs. Rendsburg (Lunau, 1963). — Hamburg: Winterhude, in a garden (Zacher, 1917).

This species appears to occur particularly in the southern and eastern parts of the region.

Meconema thalassina (De Geer, 1771)

It is recorded in the whole area apart from W. and N. Jutland. It is very common in N. Zealand N. of Copenhagen, perhaps because this is one of the most wooded landscapes in Denmark with many groves and clumps of trees. However, it is also one of the best investigated areas in Denmark.

Conocephalus dorsalis (Latreille, 1804). Fig. 4.

Scania: Valje (Wallengren, 1866), Åhus, seaside meadow, 1 ♂, 4.viii.1930, Gaunitz (ZI), (Ander, 1931); Ravlunda, Klammersbäck (coll. Tjeder); Mälarhusen, in dunes, 2 nymphs, 8.viii.1952, Ardö and Persson (ZI); Löderup, 1 ♂, 1 ♀, 1 nymph, 19.viii.1930, Gaunitz (ZI); Fyleån near Ystad, 1 ♀, 27.vii.1914, Dahl (ZI); Ystads Saltsjöbad, 1 ♀, 7.viii.1952, Ardö and Persson (ZI); Falsterbo, sand beach, 1 ♂, 1 ♀, 11. and 16.ix.1930, Ander (ZI); Skanör, 1 ♀, 16.ix.1930, Ljungbeck, and on a seaside meadow, 3 ♂, 1 ♀, 2.ix.1956, Anderson (ZI); Theisland Dynan near Klagshamn, on *Scirpus maritimus* and *Aster tripolium*, 2 ♂, 3 ♀, 18.ix.1965, Douwes (ZI); Lomma, 1 ♂, Nyholm, and 1 ♂, 29.viii. 1933, Ander (ZM); Bjärred, several finds (ZI); Barsebäckshamn, 1 ♂, 28.viii.1936, Ander, and 1 ♀, ix.1938, Hanström (ZI); Hälsingborg, 1 ♀, 3.viii.1914, Ringdahl (ZI); Lerberget, 1 nymph, Klefbeck (ZI); Ängelholm, 1 ♀, 10.ix.1916, Ringdahl (ZI) and 1 ♂, 1 nymph, on dunes, 24. and 30.vii.1943 (Zi); Höör, 1 nymph, Dahl (ZI).

Bornholm: Between Rønne and Blykobbeå, in *Elymus* dunes (Schiødte, 1842—43); Tejn, in a seaside meadow mainly covered with *Scirpus maritimus, S. palustris* and *Festuca arundinacea,* 5 ♂, 2 ♀, 3.viii.1930, Lohmander (Ander, 1931a); Dammegård near Povlsker, on *Ammophila* dunes, 1 ♂, 19.x.1930, Lohmander (Ander, 1931a); Dueodde, in a meadow, 1 ♀, 1 nymph, 14—15.vii.1930, Bro Larsen (ZM); Dueodde, 2 nymphs, 28.vii.1938, Leth (ZM). — Anholt: 2 nymphs, 10. and 17.vii.1953, Meurling (ZI). — Zealand: Esbønderup, 1 ♂, 31. vii.1911, Larsen (NM); Nivå Strand, 1 ♀, 16.viii.1966, (coll. Esbjerg); Strandmøllen, viii. (Meinert, 1887—88); Charlottenlund, on the beach, viii. (Meinert, 1887—88); Amager, very common in seaside meadows, several finds (ZM); Karlslunde, 1 ♀, 1 nymph, 31.vii.1941, (ZM); 4 km N of Køge, in grass, 1 ♂, 3.viii.1964, Holst (ZM); Køge Strand, 2 ♂, 8 ♀, 1 nymph, 24.viii.1933 (NM); Jungshoved Voldgrav, 1 ♂, 1 nymph, 12.vii.1964, Sejr Jensen (ZM); Kalvehave, in grass near the sea, 1 nymph, 15.vii.1965, Holst (ZM); Langebæk Skov, seaside meadow, 2 nymphs, 13.vii.1930, Larsson (ZM); Knudshoved Odde, on *Scirpus maritimus,* 3 ♂, 2 ♀, 18.viii.1966 and 24.vii.1967 (coll. Esbjerg); Dybsø Fjord, 3 ♀, 29.vii.1905, Esben-Petersen (ZM); Holsteinborg, Glænø Dæmningen and Glænø Østerfed, seaside meadows, in great numbers, 25.ix.1966 (coll. Esbjerg); Skelskør, 3 ♂, 3 ♀, 28.vii.—11.viii.1927; Hoffmeyer (ZM); Korsør, 1 ♂, 1 ♀, 1. and 13.ix.1926, Hoffmeyer (ZM); Korsør Strand, 1 nymph, 3.viii.1952, Bøggild (ZM); Bjerge Klint S. of Kalundborg, 4 specimens observed in *Phragmites,* 1 in *Elymus,* 16.vii. 1964, Holst; Bjerge Strand, in vegetation of *Galium verum, Trifolium arvense, Dianthus deltoides* and different kinds of grasses, 2 nymphs, 15.vii.1964, Holst; The canal from Halleby Å near Bjerge, in *Scirpus,* 15.vii.1964, in great numbers, Holst (ZM); Halleby Å near Osen, in meadows, 1 ♂, 1 ♀, 4 nymphs, 17.vii.1964 (coll. Holst); Bjerge Enge, 3 km from the coast in meadows, 2 ♂, 1 ♀, 17.vii.1964 (coll. Holst);

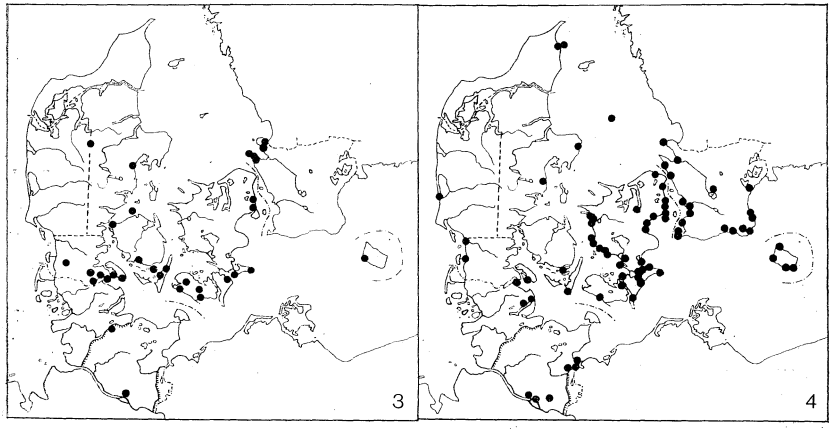


Fig. 3. Leptophyes punctatissima. Fig. 4. Conocephalus dorsalis.

Bognæs, in seaside meadows with *Scirpus*, in great numbers, 19.ix. and 3.x.1964, Esbjerg (ZM; coll. Esbjerg). — Bogø: 5 ♂, 6 ♀, 8.viii.1952, Esben-Petersen (ZM). — Møn: Ulfshale, 2 ♂, 3 ♀, 30.viii. — 5.ix.1944, Worm-Hansen (ZM); Hegneden, Ulfshale, (Hoffmeyer, 1915); Klintholm Havn, seaside meadow, 1 ♂, 28.viii.1966 (coll. Esbjerg). — Falster: Resle Strand, 1 ♀, 17.viii.1965, Møller-Andersen (coll. Esbjerg); Næsgård, in numbers, 3.viii.1905 and 8.—20.viii.1907, Esben-Petersen (ZM; NM); Marienlyst Strand, 1 ♂, 15.vii.1967, Møller-Andersen (coll. Esbjerg). — Lolland: Noret near Majbølle, seaside meadow, 1 ♀, 19.vii.1964, Møller-Andersen (coll. Esbjerg); Rødbyhavn, in *Ammophila-Elymus*, 1 ♂, 5.viii.1964, Holst (ZM). — Tåsinge: In a seaside meadow, 1 ♀, 25.vii.1930, Larsson (ZM), and 1 ♂, 2 ♀, 3 nymphs, 20.vii.1936, Nielsen (NM). — Langeland: Bagenkop, 2 ♂, 1 ♀, 8 nymphs, 22.viii.1964, Martin (ZM; coll. Esbjerg). — N. Jutland: Frederikshavn, on the beach (Schiødte, 1942—43); Rønnerne near Frederikshavn, 6 ♂, 8 ♀, 25.viii.1965, Esbjerg (ZM). — Hirsholmene: Hirsholm, 1 ♂, 20.vii.1966, (coll. Esbjerg). — W. Jutland: Nyminde Strøm, 2 nymphs, 31.vii.1949, Carlo F. Jensen (ZM); Gammelgab, in numbers, 4.viii.1968, Bro Larsen (ZM). — E. Jutland: Katholm S. of Grenå, on *Phragmites*, 1 ♀, 28.vii.1967 (coll. Esbjerg); Norsminde, in numbers, 1964, Overgaard Nielsen (NM). — S. Jutland: Kammersluse near Ribe, 2 nymphs, 6.viii.1930, Larsson (ZM); Rømødæmningen near Skærbæk, 9 ♂, 12 ♀, 26.vii.1940, Leth (ZM); Skelde, 1 ♂, 31.vii.1893, Wüstnei (ZM). — Als: Hørup, 5 ♂, 3 ♀, ix. 1893, Wüstnei (ZM).

Schleswig: Süderbrarup near Schlei, 1 ♀, 7.ix.1959, Torp Petersen (ZM); Falshöft (Lunau, 1963). — Holstein: Rothenhaus (Zacher, 1917); Dummersdorfer Ufer on *Carex* and *Juncus;* Travemünde and Bad Schwartau (Weidner, 1938). — Hamburg: Several finds (Zacher, 1917; Weidner, 1938).

Conocephalus dorsalis is a typical coast animal. As the region has a long coast-line, it is found in several places, and on the coast of Scania, Bornholm, Zealand, Møn, Falster and Lolland it is particularly common, and is probably also common in N.E. Holstein. During the excursions it was sought in S. Funen, near Ringkøbing Fjord in W. Jutland and near the Limfjord, but without success.

It is also found mainly in coast-regions in Norway, in the remainder of Sweden, and in England and Wales.

As will appear from the list, *C. dorsalis* occurs both in moist and dry localities. It can be very common in sea-meadows with *Scirpus,* but it also occurs on other swamp plants and in grass (see the list). It is remarkable that *C. dorsalis,* apparently a typical hygrophil grasshopper, also occurs in littoral dunes with *Psamma-Elymus* and in mature dunes. But where it occurs in both mea-

dows and dunes, as I observed at Bjerge near Halleby Å, W. Zealand, it is more common in the meadows than in the dunes, and the development of the animal to imago seems to take place more rapidly in the meadows. I therefore think *C. dorsalis* belongs more to the meadows than to the dunes. *C. dorsalis* was very common where Halleby Å debouches at Bjerge. Here I found it in Bjerge Enge 1½ km from the coast, but it did not continue from here up the river, even though the swamp vegetation continued.

The microclimate by the coast must be important for the occurrence of *C. dorsalis* in N. Europe. It cannot be salinity near the coast, because it occurs both in salt marshes and in fresh-water swamps, and it cannot be special vegetation, because it occurs in such different kinds of vegetation even though it deposits its eggs in the plant stems. It is not difficult to keep *C. dorsalis* in captivity, even a long way from the coast. It sings and is very lively, so perhaps the microclimate is important for the development of this grasshopper.

Tettigonia viridissima L., 1758. Fig. 5

The map shows that *T. viridissima* has been recorded from many places in Scania and the Danish Islands. The series of dots on North and South Zealand and on Funen are a result of the excursions in 1964—67. The distances were covered by car, and the song of this species was heard overall. In Schleswig and Holstein, *T. viridissima* is probably common in many places.

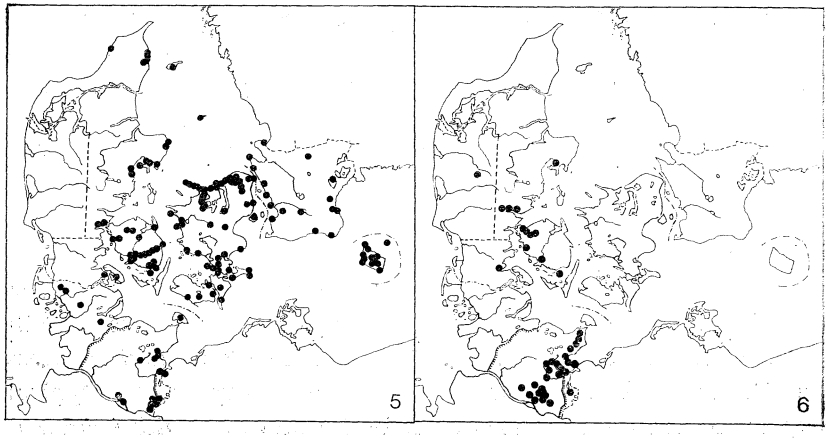


Fig. 5. Tettigonia viridissima. Fig. 6. Tettigonia cantans.

In Jutland this species has a remarkable distribution. It is only localized in some places near the east coast with the exception of the find at Lønstrup in N. Jutland (1 ♂, 19.viii.1965, Esbjerg (ZM)). It probably also occurs in other places, but this must be very local. This species has never been found or heard in Thy near Thisted and in the environs of Silkeborg, both places having been thoroughly investigated. During the excursion it was never heard in W. Jutland or the western part of S. Jutland.

The reason this species does not occur in a great part of Jutland is probably because it is associated with more dry areas than e.g. *T. cantans*. The east coast of Jutland, the Danish Islands and Scania are in the rain shadow of Jutland, which the west wind must pass over. One must also remember that this species lives in trees often several meters above the ground.

Tettigonia cantans (Fuessly, 1775). Fig. 6

Funen: Brenderup, 10 ♂, 1 ♀, 6.viii.1936, Findal (NM); Brenderup, Skovs Højrup, Harndrup and Skovsgårde, 6 ♂, 15.viii.1964, Holst (ZM; coll. Holst); Svanninge Bakker, 4.ix.1938 (Petersen, 1939); Gammeldam, 1 ♂, 2.viii.1937, Findal (NM). — Tåsinge: Bregninge Kirke, 4.ix.1938 (Petersen, 1939). — E. Jutland: Knebel, 1 ♀, 5.viii.1936, Leth (ZM); Grejsdalen, observed since 1939, very common, (Petersen, 1943); Vejle, a few km N. of the town, 3 ♂, 5.viii.1940, Leth (ZM); Grobegårde E. of Vejle, 1 ♂, 12.viii.1943, Leth (ZM). — W. Jutland: Knudmose near Herning, 1 ♂, 13.viii.1939, Leth (ZM). — S. Jutland: Åbenrå, several finds, observed for the first time in 1936, Thau (Findal, 1936).

Holstein: Holstein (Schiødte, 1842—43); Oldenburg, Lensahn, Nienrade, 10 km N of Neustadt and Timmendorferstrand, in great numbers, 4.ix.1966 (ZM; coll. Holst); Mönkhagen V. of Lübeck, 5.ix.1966 (coll. Holst); Lübeck, Lütjenburg, Scharbeutz near Pönitzer See, Segeberg, Wader, Wesin, Pronsdorf, Eilsdorf, Kashagen, Dissau and between Segeberg and Oldesloe (Lunau, 1963 and 1966); Bad Schwartau, Schwarzenbeck, Travemünde, Sachsenwald, Salem Krögers Moor and Oldesloe (Weidner, 1938). — Hamburg: Several finds (Zacher, 1917; Weidner, 1938).

This species is not recorded from Sweden and Norway.

Fischer (1950), Roeber (1951), Kühnelt (1959—60) and Lunau (1966) found that *T. cantans* and *T. viridissima* do not occur together. Over large areas, *T. viridissima* may be common and *T. cantans* absent, and in other areas the opposite may be the case. Only where two areas border on one other can the two species occur together. The same seems to hold in Danmark and Holstein.

From his investigations in Schwaben, S. Germany, Fischer thinks that *T. cantans* is found mainly in humid-cold areas with small temperature-fluctuations and high precipitation, and *T. viridissima* is found in dry, warm areas with great temperature-fluctuations and small precipitation. Something similar seems also to hold in Westphalen (Roeber). Lunau, from investigations in Holstein, thinks that the distribution of these two species depends on the soil in which the eggs are deposited. *T. viridissima* is found in soils which are easily permeable to water and *T. cantans* on soils with a greater water saturation.

In Denmark *T. viridissima* is found mainly in young moraine landscapes with preponderantly clayey soil in E. Denmark and not in the fluvial plains formed by melt-water rivers in the glacial period in W. Jutland. *T. cantans* is common in and near some of the tunnel valleys in E. Jutland. In Funen this species is also common in the north-western and low-lying parts of the island, and towards the east, in the higher-lying parts of Funen, it is replaced by *T. viridissima,* on places where the precipitation is also greater. The greatest part of Funen consists of moraine landscape. I think that the ecology of these two species is more complicated than has been considered till now. Roeber thinks likewise.

It must be pointed out that the oldest find of *T. cantans* in Denmark goes back to 1936. However, it is considered to have been heard in Åbenrå since 1920. Still, it is a rather late observation for a species of this size and with such a strong song. *T. cantans* is probably a new immigrant in Denmark, and possibly with time it will spread to great areas in Jutland, where *T. viridissima* is missing.

Decticus verrucivorus (L., 1758)

This species is found generally throughout the area.

Platycleis denticulata denticulata (Panzer, 1796). Fig. 7

Scania: Mölle, 1 ♀, 29.viii.1931, Ringdahl (ZI); Kullen, 1 ♀, 26.viii.1936, Brinck (ZI); Brunnby, Kullen, 3 ♀, 9.ix.1932, Ossiannilsson/Kemner, and 1 nymph, 29.vii.1961, Ossiannilsson (ZI); Löderup, 1 nymph, 24.vii.1934, Kemner (ZI); Ivetofta (Wallengren, 1866).

Bornholm: Rønne, 3 ♀, 25.vii.1908, Esben-Petersen (ZM); Løvendal, 1 ♀, ix.1900 (ZM); Dueodde, 1 ♀, 31.viii.1927, Hoffmeyer, and 1 ♀, 11.x.1930, Löppenthin (ZM), and common (Bro Larsen, 1931); Svaneke, by light, 4 ♀, 5.vii.1938, Leth (ZM); Pedersker, 2 ♀, 1 ♂, 21.ix.1933, Jensen (ZM); Boderne, 2 ♂, 6 ♀, 29.vii.1938, Leth (ZM); Sose, 1 ♀, 25.ix.1965 (coll. Esbjerg); Ypnested, 1 ♂, vii.1935, Henriksen

(ZM); Galgeløkken near Rønne, 1 ♂, 13.vii.1933, Jensen (ZM); Arnager, 2 ♀, 29.viii.1925, Larsson, 1 ♂, 1 ♀, 1 nymph, 11.vii.1930, Bro Larsen (ZM), and 1 ♀, beneath the cliff on xerophil vegetation (among others: *Elymus*), 11.ix.1930, Lohmander (Ander, 1931a). — Christiansø: 1 nymph, 6.viii.1929, Tuxen, and 1 ♂, 3 ♀, 1.viii.1936, Leth (ZM). — Zealand: Tisvilde Hegn and Asserbo Plantage, 1843 (Meinert, 1887—88). Since that time it has been found regularly during the years. It occurs in the sandy belt in the coniferous forest, in sunny places and in the dunes; Bavnebjerg, Refnæs, 1 ♀, 7.ix.1940, Simonsen (ZM); Kongens Enghave, 2 ♀, 10.xi.1916, Larsen (NM). — Anholt: 1 ♀, Tauber (ZM), and 1 nymph, 18.vi.1949 (Klefbeck, 1951, det. Ander).

Holstein: Besenhorst near Geesthacht, 2 ♀, 13.ix.1937, Titschack (Weidner, 1938); Langenlehstener Heide S. of Gudow near Mölln, common in several places, Göttin S. of Mölln, and Salemer Heide SE. of Ratzeburg (Lunau, 1950).

Ander (1949b) has shown that this species forms different races in Scandinavia. Ander considers that it has immigrated during the Boreal Period when the climate was drier than to day, and the original population was thereafter isolated in specially warm and dry places. It is difficult to explain the distribution of this Orthopteron without accepting it as a relic from the Boreal Period. An examination of the titillator of the animals from Bornholm and Tisvilde shows that it belongs to the subspecies *denticulata*.

Metrioptera bicolor (Philippi, 1830). Fig. 8

Scania: Vomb, Klostersågen and Nygård, several finds between 1930 and 1936, Kemner and Ander (ZI; Ander, 1933).

Holstein: Between Segrahn, Rosengarten and Langenlehstener

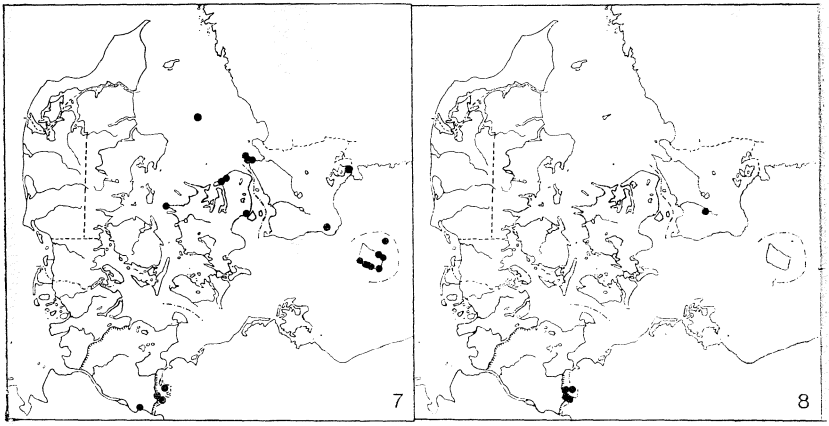


Fig. 7. Platycleis denticulata. Fig. 8. Metrioptera bicolor.

Heide, S. of Mölln in several places, Auf der Heide near Mölln, and Sterley S. of the town (Lunau, 1950); Göttin, on the old highway, 3 ♂, 2 ♀, 25.vii.1967, (ZM; coll. Holst).

The presence of the isolated population in Scania is difficult to explain. Perhaps it is a relic from the Boreal Period, but it can also have migrated at a later period from N. Germany.

Metrioptera roeseli (Hagenbach, 1822). Fig. 9

Zealand: (Bøllemosen, x., Schlick (Meinert, 1887—88). This find cannot be accepted). — Falster: Bøtø on both sides of the embankment in dunes, grass and meadows, observed for the first time 15.viii. 1947, Kryger (ZM), and very common, (ZM; coll. Esbjerg). — Lolland: Meadows in forest, Schiødte (Meinert, 1887—88). In ZM, the label of a male bears Schiødte's writing. This specimen is possibly caught on Lolland. — W. Jutland: Knudmose near Herning, 1 ♂, 13.viii.1939, Leth (ZM).

Holstein: Bliesdorf, Fredeburg, Schmilau, Salemer Heide, Mustin, Dutzow and from around Mölln to Gudow and Göttin, Langenlehstener Tannen and Fortkrug (Lunau, 1950); Ratzeburg (Weidner, 1938). — Hamburg: Boberg, Duvenstedter Brook, Sande and Lohbrügge (Zacher, 1917; Weidner, 1938).

M. roeseli is possibly a relic from the Boreal Period, but it can also have migrated from the population of N. Germany at a later period.

Metrioptera brachyptera (L., 1761). Fig. 10

This species is almost always associated with heathlands or moors. The vegetation is normally *Calluna* and *Erica* with some

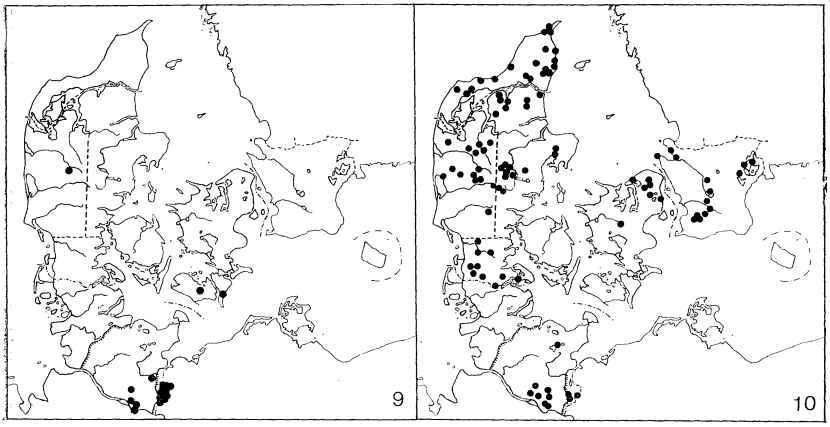


Fig. 9. Metrioptera roeseli. Fig. 10. Metrioptera brachyptera.

Sphagnum. It can also occur in open parts in the woods, in damp places (e.g. N. Zealand). This species often occurs with *Omocestus viridulus*.

This species is more common in Jutland than in the other parts of Denmark. The reason is that heathland is common in Jutland. In older times, a hundred years ago, the heath dominated in W. Jutland. The map shows roughly where in Denmark the soil is preponderantly sandy or clayey. This species is missing on arable land and hardwood forest on clayey soil such as dominates in the Danish Islands, the eastern part of E. and S. Jutland and around the western part of Limfjorden (Schou, 1949).

Pholidoptera griseoaptera (De Geer, 1773). Fig. 11

This species lives almost always in hedges, bushes, edges of woods and open parts of woods. The map shows roughly that it occurs in that part of Denmark where *Metrioptera brachyptera* is not found.

Tachycines asynamorus Adelung, 1902

It is found in many places in the area in glass-houses.

Gryllus campestris L., 1758. Fig. 12

Bornholm: Galløkken Tryde near Rønne, 1 ♀, 1897 (ZM); it seems to have occurred commonly in the southern part of Bornholm in the years 1943—57, according to Arne Larsen; 3 km N. of Rønne, in dunes, 1 ♂, 13.v.1943, Juul Nielsen (ZM; Larsen, 1944); Raghammer Odde E. of Rønne, 1 ♂, 8.vi.1947, Arne Larsen (ZM); Stampen, 4 specimens, 1947, according to Larsen; from the airport near Stampen to

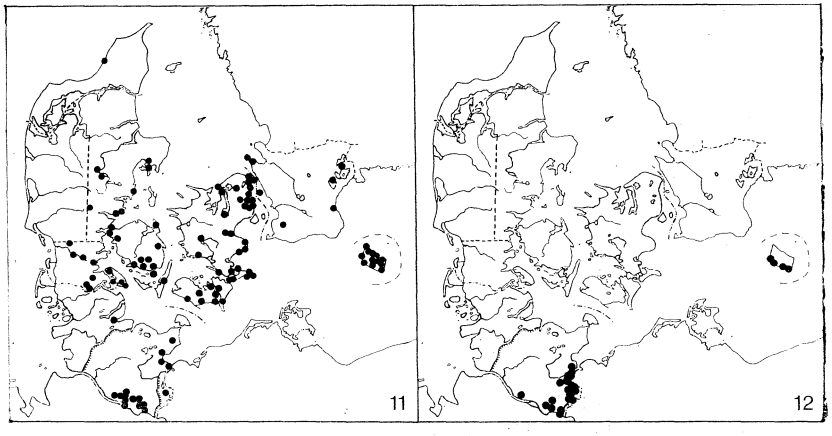


Fig. 11. Pholidoptera griseoaptera. Fig. 12. Gryllus campestris.

Dueodde, very common on sandy soil, 1947, from information by Larsen; Dueodde, 1 ♂, 5.vii.1949?, Ryberg (ZM); the airport, very common, v.1952, Holst.

Holstein and Hamburg: In several localities (Beuthin. 1875; Zacher, 1917; Lunau, 1934, 1936 and 1963; Heydemann, 1936; Weidner, 1938).

The occurrence of this species on Bornholm has been discussed by Spärck and Larsen (1944). Spärck thinks that it is a relic of the Boreal Period. In the years 1947—57 the small population increased because the weather was very warm in this period. Larsen thinks that it was introduced from time to time to Rønne. Several of the finds were made near this town. The last introduction may be by the Russian troops in 1945. I consider that Larsen's theory is the most likely.

Acheta domestica (L., 1758)

This species is found in many places indoors and outdoors on rubbish dumps.

Gryllotalpa gryllotalpa (L., 1758). Fig. 13

Scania: Farhult, 1 ♀, (ZI); Vånga, 1 ♂, 6.vi.1925, Ammitzböll (ZI); Nosaby, 1 ♀, viii.1909, Rosén (ZI); Vram, 2 ♀, 8.vi.1903, Bengtson (ZI); Ljungbyhed, 1 ♀, 24.v.1937, Ander (ZI); Sibbarp, 1 ♀, vi.1956. Franzén (ZI); Råby, Ivetofte and Näsum (Wallengren, 1866).

Bornholm: Arnager, 1 ♀, viii.1937, Arne Larsen (ZM). — Zealand: Østerbro, Copenhagen, in gardens at the beginning of the 19th century (Meinert, 1887—88); Christiansholm, Enrum and Fredensborg (Bergsøe, 1915); Grib Skov and Jægerspris (Meinert, 1887—88); Rosenvænget in Copenhagen, 4 ♂, 2 ♀, great numbers of nymphs, 16.vii. 1878, Conradsen (ZM); Måløv, 1 ♀, 1876 (NM); Vemmetofte, adult and eggs, vii.1885, (Meinert, 1887—88); Bramsnæsvig, 5.vi.1895, Meinert (information in ZM); Hvalsø, 1 ♀ (ZM); Arresødal, 1 ♀, Esben-Petersen (ZM); Langemosegård, Gladsaxe, 1 ♀, 16.viii.1918, Højsgaard (ZM); Frederiksdal, 2 ♀, 3 nymphs, 22.—31.vii.1922, Esben-Petersen (ZM); Bagsværd, in a garden, a great number of eggs and nymphs, 26.vii.1924. Højsgaard (ZM); Kalundborg, 1 ♀, about 1.vi.1934, Kryger (ZM); Helsingør, 1 nymph, 25.v.1937, Nielsen (ZM); Lillerød, 1 ♀, v. 1939, Möhl Hansen (ZM); Allerød, 1 ♂, great number of nymphs, eggs, 27.vii.— 22.ix.1940, 30.v.1941, 17.vii.1941 and viii.1941, Kryger (ZM); Lekkende NE. of Vordingborg, 1 ♀, Löppenthin (ZM); Hesselbjerg near Græsted. 1 ♂, 25.vii.1942 (ZM); Kattehale Mose, 1 nymph, 30.vi.1952, Kristiansen (ZM); Hellerup, 1 ♀, 7.vii1952, Krohn (ZM); Klampenborg, 1 nymph, 10.viii.1954, Andersen (ZM); Strødam, 1 ♀, 1962 (NM). — Nekselø: 2 ♀, 1 nymph, 6.vii.1939, Jensen-Storch (ZM). — Møn: Hunosøgaard, 2 ♂, 15 nymphs, 23.vii.1942, Stephens (ZM). — Falster: Gedser, 2 ♀, 24.vi.1952, Leth (ZM); Torkilstrup, 1 ♀, 16.vii.1936, Kristiansen

(ZM). — Lolland: Maribo, 3 ♀, ix.1874 and vi.1876, Schlick (ZM); Hildesvig Skov, Guldborgland, Koch (Meinert, 1887—88). — Funen: Fåborg, in gardens, and Brahetrolleborg, Strøm-Schiötz (Meinert, 1887—88). — Ærø: 1 ♀, 15.vi.1904, Thorsen (ZM). — E. Jutland: Balskovgård, Rosenholm N. of Kalvø Vig, Rosenkrantz, and Silkeborg, Lotze-Schiötz (Meinert, 1887—88).

Schleswig: Försterei Mörel near Eckernförde (Jessen, 1915); Kappeln (Zacher, 1917). — Holstein: Brockenlande near Neumünster; Lägerdorf near Itzehoe; Anstalt Hörnheim near Kiel; Preetz, Hitzhusen; Bad Bramstedt; Waldhusen and Haffkrug (Lunau, 1963; Zacher, 1917; Weidner, 1938). — Hamburg: Ahrensburg, Eggerstedter Feldmark near Pindeberg, 1915, Poppenbüttel, Beimoor, Bergedorf, Farmsen Ziegeleiteich, 1928, Grossensee, 1892 and Trittau, 1937 (Beuthin, 1875; Zacher, 1917; Weidner, 1938).

It appears to occur in particular in the southern and eastern parts of the region.

Tetrix subulata (L., 1761)

This species is recorded in many places throughout the area.

Tetrix undulata (Sowerby, 1806)
(*T. vittata* Zetterstedt, *T. kiefferi* (Saulcy))

This species is very common throughout the area.

Tetrix nutans (Hagenbach, 1822). Fig. 14
(*T. tenuicornis* Sahlberg)

Holstein: Alt Mölln (Lunau, 1950).

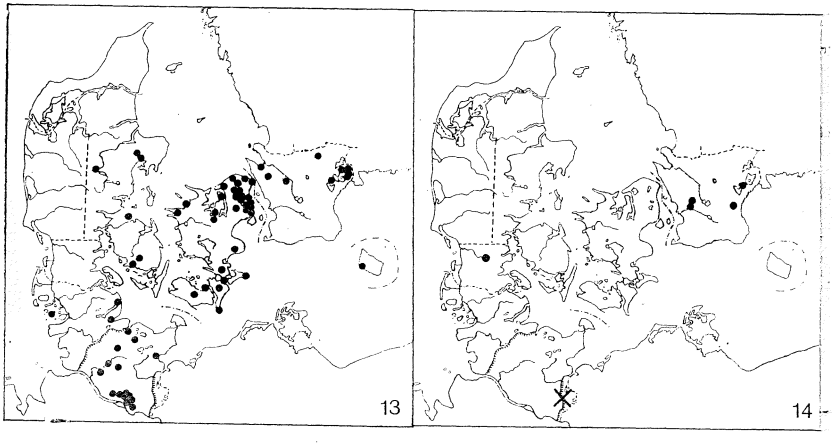


Fig. 13. Gryllotalpa gryllotalpa. Fig. 14. Tetrix bipunctata. × Tetrix nutans.

Tetrix bipunctata (L., 1758). Fig. 14
(*T. kraussi* Saulcy)

Scania: Nosaby, 1 ♀, vi.1905, Rosén (ZI); Reslöv, 1 ♀, Rosén (ZI); Farstorp, 1 ♀, vii.1898, Rosén (ZI); Degeberga, 1 ♀, 5.v.1938, Ehnbon (ZI).

Bornholm: Almindingen, 1 ♂, 4.viii.1940, Johnsen (ZM). — S. Jutland: Hjartbro, 1 ♀, 8.ix.(?)1934, Findal (NM).

This species is recorded in Sweden from Scania in the South to Lapland in the North. In Europe to day it has a boreo-alpine distribution. Ander (1949a) thinks that this species migrated to Scandinavia in the late Yoldia Period or early Ancylus Period. Ragge (1963) thinks that it managed to survive the glaciation in the British Isles. The isolated find in S. Jutland seems to be the last trace of an animal which migrated early on.

Podisma pedestris (L., 1758)

This species has been recorded in Sweden from Scania in the South to Lapland in the North (Ander, 1945, 1953).

Psophus stridulus (L., 1858). Fig. 15

Scania: Glades in forest in NE. Scania (Wallengren, 1866); Vånga, 3 ♂, Rosén (ZI); Farstorp, 1 ♂, 1894, Rosén, and 1 ♂, 1916, Rydén (ZI); Munka-Ljungby, 2 ♂, 1915, Ringdahl (ZI); Yngsjö Havsbad, 2 ♂, 20.ix.1949, Lohmander, and 1 ♂, 2 ♀, 23.ix.1951, Sjösted (ZI).

Zealand: N. Zealand (Müller, 1766 and 1776).

In Sweden this species extends to mid-Sweden (Ander, 1945).

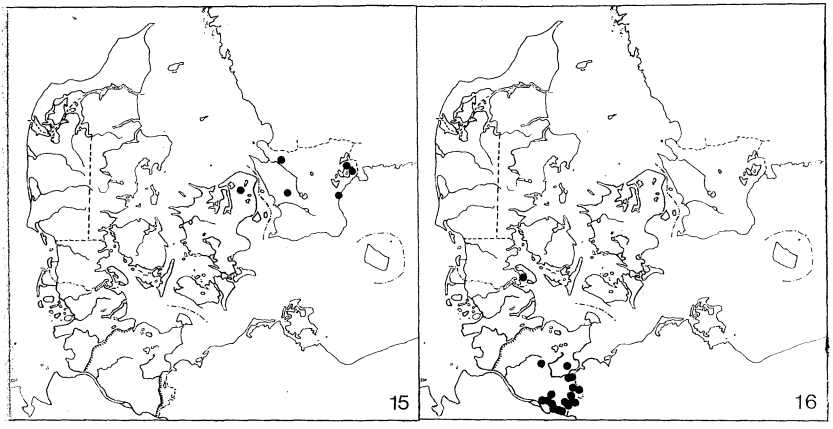


Fig. 15. Psophus stridulus. Fig. 16. Oedipoda caerulescens.

Locusta migratoria L., 1758

This species has from time to time migrated to the area, both in ph. *solitaria* and ph. *gregaria*.

Schistocerca gregaria (Forskål, 1775)

In the Zoological Museum in Copenhagen there is a specimen labelled "Samsø" with an old label. This may be wrong, but this species from time to time migrates to the southern part of the British Isles, so perhaps it also can find its way to Denmark.

Oedipoda caerulescens (L., 1758). Fig. 16

S. Jutland: Sønderborg, 3 specimens in Altonaer Museum, Wüstnei (Weidner, 1938).

Hamburg and Holstein: Several finds (Zacher, 1917; Weidner, 1938; Lunau, 1950).

This species is recorded from Särö, Halland, Sweden, two specimens (Ander 1945).

Sphingonotus coerulans (L., 1767)

Holstein: Rothenhaus near Trittau, 2.ix.1888 (Weidner, 1938); Grambek S. of Mölln, 1946 and 1947 (Lunau, 1950).

This species is recorded from many places in S. Sweden (Ander, 1945).

Bryodema tuberculata tuberculata (Fabricius, 1793). Fig. 17

Jutland: in sandy regions (Fabricius, 1793); Mors, common on moors (Schade, 1811); Vind Sande near Holstebro, in numbers, 1870 and 1871; Hjelm Hede S. of Skive, 1870, between Vrove and Vristed near Viborg, in numbers, 1871 and 3 ♂, 2 ♀, 27.vii.1872 (ZM), Herning, Vendsyssel, in numbers and Nibe (all Meinert, 1887—88); Høllund SW. of Vejle, 1 ♂ (ZM); Lille Vildmose, 11 ♂, 3 ♀, vii.—viii.1891, Jensen (ZM); Henne near Varde, in numbers, about 1896 (Knudsen, 1911; ZM); Hammer Bakker, 1 ♀, 1899, Nordstrand (NM); Hjarbæk, 1 ♂, 1901 (ZM); Gatten Hede SE. of Løgstør, 6 specimens, 1900—01 (Hald, 1902), and 3 ♂, viii.1904, Thygesen (ZM); Ashøje E. of Thisted, 1 specimen, 1901 (Hald, 1902); Rakkenborg Hede at Ulbjerg near Viborg, 21.ix.1904, Binderup and Sjøstrup Heder near Års, Rom Hede, 3 specimens, 1902, and 1 ♀, 28.vii.1904 (all Esben-Petersen, 1902; ZM); Bejstrup near Fjerritslev, 1 ♂, ix.1912, Søndergård (ZM); Ansager near Varde, 1 ♂, 1 ♀, ix.1911, (ZM; Marcussen, 1914); W. of Skersø near Æbeltoft, 2 specimens, 18.viii.1908 (Thygesen, 1911); Glyngøre, Salling, about 1908 and Torsted and Grimstrup Hede near Herning (Thamdrup, 1938); Als Odde near Mariager Fjord, in a plantation, 3 specimens, 10.viii.1916, (Pedersen, 1917); Vrads Sande, in numbers, 5.viii.1940 (NM); Vestre Skole, Silkeborg, 1 ♀, 23.viii.1941, Esben-Petersen (ZM); Tandrup Hede

in Himmerland near Urhøje, in numbers, 10.ix.1939, 17.ix.1939, 3.viii. 1940, 30.vi.1941 (Nørgaard, 1942; ZM; NM); Gunderup Gd. near Tandrup Hede in Himmerland, 1 ♂, Sørensen (ZM); Ovtrup Hede, 4 specimens, 28.viii.1937, 3.viii.1938, (Nørgaard, 1942; ZM); Løgstør, 1 ♀, 19.ix.1939 (Nørgaard, 1942); Abild Hede, in numbers, 3.viii. 1949 (NM).

Schleswig: 2 specimens, Wüstnei (Weidner, 1938). — Hamburg: Winterhude, 1873—74 (Beuthin, 1875; Weidner, 1938).

This species has not been found in Jutland since 1949. Some of the known localities in Jutland were investigated during the excursions in 1964—67, without results. The animal may have been lost from Jutland, Schleswig and Holstein. The reason for the disappearance of this species is the development of heath cultivation.

Bryodema tuberculata is a typical continental animal, with its main distribution in Central Asia. It has or had its most northwesterly distribution in Jutland. The nearest occurrences are on Lüneburg Heide in N. Germany and Öland in the Baltic Sea (Sweden). From his investigation on Öland, Ander (1949a) thinks that it is a relic from the Boreal Period, but this cannot be the case with the former population in Jutland, as the heathland is a product of cultivation, which developed with the introduction of agriculture, and which was maintained by sheep farming, cutting heath peat and burning-off the heath. The natural vegetation of Jutland is forest. The connection south and east over the heaths in Germany and Poland gives the possible route for the immigration of this species.

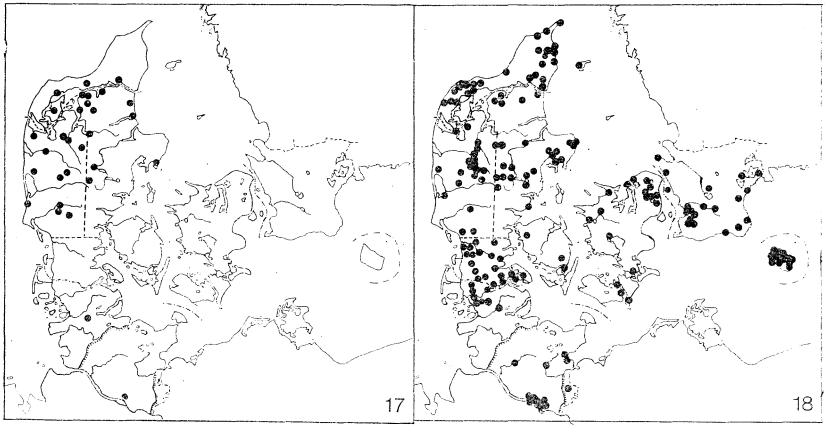


Fig. 17. Bryodema tuberculata. Fig. 18. Omocestus viridulus.

Mecostethus grossus (L., 1758)

It is found in damp places throughout the area. It is particular common along the great water-courses in Jutland.

Chrysochraon dispar (Germar, 1835)

Holstein: From Herrenfähre to Schellbruch near Trave NE. of Lübeck and Genin 4 km SW. of Lübeck (Lunau, 1950).

This species has been recorded in Sweden from Öland, Gotland, Västmanland and Närke or Uppland.

Stenobothrus stigmaticus (Rambur, 1839)

This species has been found in a few localities in SE. Holstein (Weidner, 1939; Lunau, 1950). It is not recorded from Sweden or Norway.

Stenobothrus lineatus (Panzer, 1796)

Holstein: Sachsenwald and Rothenhaus E. of Hamburg.

This species has been recorded from several localities in SE. Holstein and near Hamburg (Weidner 1939, Lunau 1950). It is not recorded from Sweden or Norway.

Omocestus viridulus (L., 1758). Fig. 18

This species often occurs together with *M. brachyptera* on heathland and moor, but it can also occur in both damper and dryer localities. By comparing Fig. 10 and Fig. 18 it will also been seen that *O. viridulus* has a greater distribution. Like *M. brachyptera* it is more common in Jutland than on the Danish Islands. It is worth noticing that it is very common on Bornholm, where *M. brachyptera* has not yet been found.

Omocestus ventralis (Zetterstedt, 1821) Fig. 19

Scania: In NE. Scania (Wallengren, 1866); Esperöd, Björnstorp and Kabusa (Haij, 1888); Finjasjön, Fjellfotasjön, Yddingesjön, Räften near Lund and Ringsjön (Haij, 1888); Oppmanna, Arkelstorp, 1 ♂, 2 ♀, Rosén (ZI); Fjälkestad, 2 ♂, 1 ♀, Rosén (ZI); Grönhult, Vånga, 1 ♀, Ammitzböll (ZI); Degeberga, 1 ♂, 9.viii.1930, Draning (ZI); Höör, 1 ♂, Rosén, and 1 ♀, viii.1949, Dahl (ZI); Munkarp, 2 ♂, 1 ♀, viii. 1949, Dahl (ZI); St. Olof, 1 ♀, 14.viii.1930, Draning (ZI); Ystad, 1 ♀, Ammitzböll (ZI); Kåseberga, 1 ♀, 29.viii.1931, Kemner (ZI); Hyby, Bökeberg, several finds, Ander, Kauri (ZI); Skabersjö, 2 ♂, 8.viii.1931, Ljungtved (ZI); Skabersjö (coll. Tjeder); Torup, 1 ♂, 1 ♀, 31.vii.1931, Ljungbeck (ZI); Väderön, 1 ♂, 24.viii.1949, Ringdahl (ZI).

In the area investigated this species was only found in Scania.

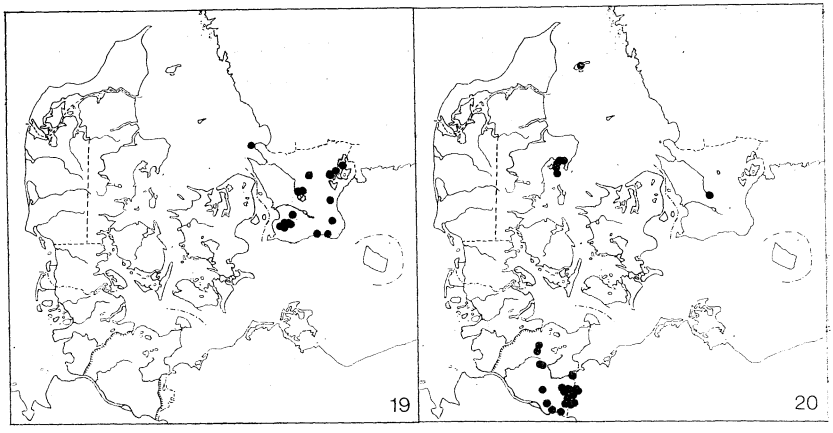


Fig. 19. Omocestus ventralis. Fig. 20. Omocestus haemorrhoidalis.

Meinert (1887—88) mentions it as being found in Nykøbing Lyng, Odsherred, and Esben-Petersen (1916 and 1917) near Viborg. This find cannot be accepted as I have not been able to trace the specimen. In Sweden it is recorded from Scania in the South to Upland, Vestmanland and Vermland in Middle Sweden. In N. Germany it is very scattered.

Omocestus haemorrhoidalis haemorrhoidalis (Charpentier, 1825). Fig. 20

S c a n i a : Bosjökloster, 1 ♀, vii.1949, Dahl (ZI).

L æ s ø : 1 ♀, 25.vii.1933, Findal (NM).

E. J u t l a n d : Strandkær near Femmøller, several finds near "Molslaboratoriet", mainly on sandy moraine with *Calluna* and scanty growth of grass (ZM; NM; coll. Gärdefors; coll. Esbjerg; coll. Holst); Femmøller, 1 ♂, 1.ix.1932 (NM); Handrup Bakker, 1 ♂, 28.viii.1933, Bro Larsen (ZM); Viderup, 1 ♂, 2 ♀, 1964, Gärdefors (ZM); N. of Bogens, 1 ♀, 1964, Gärdefors (ZM); Ellemandsbjerg, 1 ♂, 1 ♀, 25.vii. 1962, Johnsen (NM) and 1964, Gärdefors (coll. Gärdefors).

H o l s t e i n a n d H a m b u r g : Several finds (Zacher, 1917; Weidner, 1938; Lunau, 1950); Forst Neumünster, 1 ♂, 1 ♀, 5.ix.1966 (coll. Holst).

In other parts of Sweden it is recorded from Öland, Gotland and Västergötland (Ander, 1945, 1949a and 1953). Ander thinks that it is a relic from the Boreal Period. It is difficult to explain the distribution without accepting it as a relic.

Chorthippus brunneus brunneus (Thunberg, 1815). Fig. 2

This species is very common throughout the area (see the map).

The costal field of ♂ tegmina is very variable in its width, and it can sometimes resemble that of *Chorthippus biguttulus*, but the number of stridulatory pegs on the inner surface of the hind femur shows that it belongs to this species. There was no relation between the numbers of pegs and the width of the costal field of ♂ tegmina. 22 males were examined. The number of pegs on the hind femur ranges from 52 to 78, but the width of the costal field shows no regular variation from animals with a low number to those with a high number of pegs. There is no transition between *Ch. brunneus* and *Ch. biguttulus* in Denmark.

The number of pegs was counted on the hind femur of 189 males and dotted in on a map, but there was no regularity in the distribution.

Chorthippus mollis mollis (Charpentier, 1825). Fig. 21

S. Jutland: Søgård near Bjergskov, 1 ♂, 5.viii.1935 (Findal, 1937; NM); Ribe, 2 ♂, 1 ♀, 25.vii.1940, Leth (ZM).

Schleswig: Enge near Leck and Süderlügumer Dünen (Lunau 1950). — Holstein: Besenhorst near Geesthacht, Büchen, Eschеburg and Rothenhaus (Weidner, 1938); Göttin, on the old highway, 2 ♂, 25.viii.1967, Holst (ZM); Forst Neumünster, 2 ♂, 5.ix.1966, Holst (ZM). — Hamburg: Boberg, Borsteler Moor and Holm Dünen (Weidner, 1938).

This species it not found in Sweden. Ander (1933) mentions it as being found in Åhus, Scania, but he later cancelled this record (Ander, 1945). It is found under more dry conditions than *Ch. brunneus*.

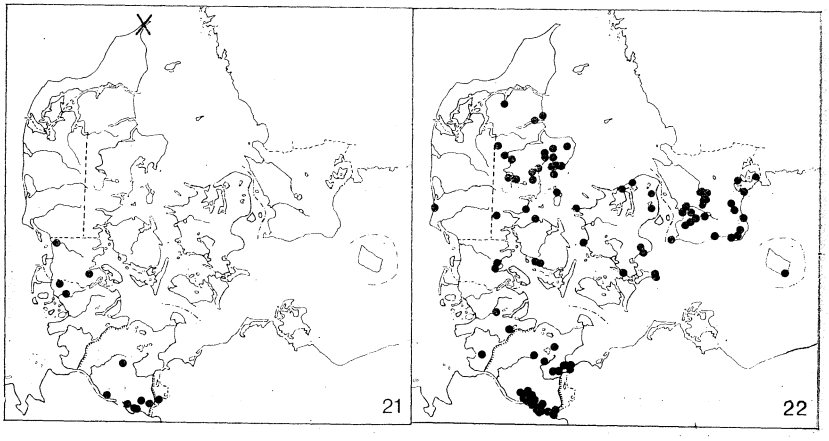


Fig. 21. Chorthippus mollis. x = Chorthippus vagans (many finds).
Fig. 22. Chorthippus biguttulus.

Chorthippus biguttulus biguttulus (L., 1758). Fig. 22

This species has a scattered distribution in the area. It seems, however, to be more common in some parts of Scania and E. Jutland and in the southern part of Holstein and Hamburg. It is a little more xerophil than *Ch. brunneus*.

Ander (1949a) thinks that this species is a fairly late immigrant, but as its distribution in the area is now better known, I cannot agree with this view.

Chorthippus vagans (Eversman, 1848). Fig. 21

N. Jutland: Ålbæk Klitplantage, in the sandy belt in the plantation, 3 ♀, 24.viii.1965, Esbjerg (ZM); Skagen Klitplantage, 1 ♂, 1 ♀, 19.ix.1965, Bræstrup (ZM); Kirkeklit near Skagen, 1 ♂, 4 ♀, 6.viii.1966, Holst (ZM; coll. Holst); 3 km N. of Skagen, in a heath, 1 ♂, 2 ♀, 6.viii.1966, Holst (ZM); on the dune of Grenen, 1 ♂, 1 ♀, 6.viii.1966, Holst (ZM); Råbjerg Mile, 1 ♂, 1 ♀, 7.viii.1966, Holst (ZM) and in numbers, 21.vii.1966 (coll. Esbjerg); Bunken Klitplantage, 3 ♂, 1 ♀, 7.viii.1966, Holst (ZM; coll. Holst).

The occurrence of this species in Denmark is very surprising. It seems to occur only at Skagen N. of Ålbæk and Råbjerg. Esbjerg and the author looked for it during the excursions in the dunes and in the sandy belts in the coniferous forest near the west coast more south in Tværsted Plantage, Ugerby Klitplantage, Lökken and Blokhus, without any results. The northern part of Denmark, where this species occurs, has a greater number of hours of sunshine than the remainder of Jutland, and this may be the reason for its occurrence here.

Myrmeleotettix maculatus was also found to be very common together with *Ch. vagans*, and also *Ch. albomaginatus* near the coast. *Ch. brunneus* has not been recorded at all near Skagen.

This species is not recorded in Sweden. The nearest finds were in Germany and Poland, where it is very sparse and rare. It was found by Haake S. of Hamburg (Zacher, 1917) and in Hartz, Mark, the debouchment of the Wista and Mierzeja Wislana (Harz, 1957).

It can be difficult to understand how this species reached Skagen, so far to the north of its main distribution area. Perhaps it was introduced from Middle Europe by car. Skagen is a very popular holiday place, and many Germans spend their holidays here. Grasshoppers and remains of grasshoppers are often seen on the car radiator, and it could be brought to Skagen in this way. More probably, it is a relic from the Boreal Period.

Chorthippus apricarius apricarius (L., 1758). Fig. 23

Scania: In NE. Scania (Wallengren, 1866); Nosaby, 4 ♂, 6 ♂, vii.1905, Rosén (ZI); Oppmanna, Arkelstorp, 1 ♂, 3 ♀, viii. 1905, Rosén (ZI); Horna, Åhus, 1 ♂, 3.viii.1930, Gaunitz (ZI); Maglehem, 15 ♂, 14 ♀, 11.—17.viii.1930, Gaunitz (ZI); Degeberga, 1 ♀, 9.viii.1930, Gaunitz (ZI); Forsakar, Degeberga, 1 ♀, vii.1949, Dahl (ZI); Brösarp, 1 ♀, 14.ix.1931, Kemner (ZI); Skäralid, 1 ♀, 13.vii.1941, Heinze (ZI); Åstorp, Söderåsen, 1 ♀, 28.vii.1941, Heinze (ZI); Brandstad, 1 ♂, 16.viii.1933, Ander (ZI); Höör, 3 ♂, 1 ♀, 1949, Dahl (ZI); Bosjökloster, 1 ♂, vii. 1949, Dahl (ZI); Rövarekulan, 1 ♂, 1 ♀, vii.1949, Dahl (ZI); Jonstorp, 1 ♂, 3.vii.1933, Ehnbom (ZI); Ystad, 6 ♂, 8 ♀, 1906—09, Ammitzbøll (ZI); Kabusa near Ystad, 2 ♀, 19.vii.1931, Lauerbeck (ZI); Lund, several finds, Ander and Heinze (ZI); Flädie, 1 ♂, 1 ♀, 5.viii.1931, Ander (ZI); Torup, 1 ♂, 12.vii.1937, Ljungbeck (ZI); Torna Hällestad, 1 ♀, 6.ix.1932, Ander (ZI); Sandby, several finds, Ander (ZI); Lomma, 1 ♂, 21.vi.1948, Berden (ZI); Råå, 1 ♂, 1 ♀, 20.vi.1936, Brinck (ZI). — Ven: 3 ♂, 4 ♀, 13.—20.vii.1949, Princis (ZI).

Zealand: Masnedsund, 6 ♂, 6 ♀, 29.vii.1905, Esben-Petersen (ZM); Knudskov, Knudshovedodde, 2 ♂, 4.viii.1964, Holst (ZM). — Bogø: 3 ♂, 1 ♀, 8.viii.1922, Esben-Petersen (ZM). — Falster: Stangerup, 2 ♂, 2 ♀, 4.viii.1905, Esben-Petersen (ZM). — Lolland: Sundby and Strandby near Nykøbing, 3 ♂, 2 ♀, 10.viii.1905 and 1.viii. 1913, Esben-Petersen (ZM); Keldskov, 2 ♂, 1 ♀, 1.viii.1913, Esben-Petersen (ZM); Toreby, 1 ♀, 12.viii.1945, Worm-Hansen (ZM); Storskoven near Guldborg, 1 ♂, 1 ♀, 16.vii.1930, Larsson (ZM); Søholt and Skørringe near Maribo, 3 ♂, 6 ♀, 5.viii.1964, Holst (ZM). — W. of Saksköbing, 1 ♂, 1 ♀, 6.viii.1964, Holst (ZM); Berritsgård, 5 ♂, 2 ♀, 15.ix. 1967, Holst (ZM; coll. Holst). — Langeland: Henninge, Klæsø Gård and Spodsbjerg, very common, 6.ix.1964, Holst (ZM); Spodsbjerg, 2 ♂, 2 ♀, 18.vii.1965, Holst (ZM). — Tåsinge: vii. and viii. 1910 (Poulsen, 1911); Bregninge Kirke, 2 ♀, 3 nymphs, 19.vii.1965, Holst (ZM). — Funen: Ørbæklunde, Rallebæk, Vr. Åby and N. of Hedeskov, very common, 4.—5.ix.1964, Holst (ZM; coll. Holst); Stejlebjerg near Assens, Sandager, Tanderup, Favrskov and Galgehøj near Gelsted, very common, 19.—20.vii.1965, Holst (ZM; coll. Holst); Brenderup, 1 ♂, 6.viii.1938, Findal (ZM); Årup, 8 ♂, 7 ♀, 19.vii.1935 (NM). — E. Jutland: Femmøller and Strandkær, found very commonly during the years since 1932, Esben-Petersen, Findal, Holst (ZM; NM); Knebel, 1 ♂, 1 ♀, 1937, Leth (ZM); Vornæs near Kalvø Vig, 1 ♀, 24.vi. 1939, Esben-Petersen (ZM); Æbeltoft, 1 ♂, 1 ♀, 8.vii.1934, Larsson (ZM); W. of Grenå, 3 ♂, 2 ♀, 2 nymphs, 4.viii.1966, Holst (ZM); Skanderborg, found very commonly during the years since 1904, Esben-Petersen, Findal (ZM; NM). — S. Jutland: Near Åbenrå, several finds (Findal, 1937).

Schleswig: Eckernförde (Weidner, 1938); N. of Rendsburg, 2 ♂, 1 ♀, 5.ix.1966, Holst (ZM; coll. Holst). — Holstein: Malente-Gremsmühlen and Bad Schwartau (Weidner, 1938); Oldenburg, Nienrade, Tiimmendorfer Strand, Bad Segeberg and N. of Nortorf, in great

numbers, 4—5.ix.1966, Holst (ZM; coll. Holst). — H a m b u r g : Gross-Borstel, Lokstedt and Rodenbeck (Weidner, 1938).

This species is often found in the edge of ditches where the grass is cut, or in dryer spots with half-wilted grass.

Its distribution in the area is very extraordinary. In Scania it is recorded almost overall, but it does not seem to have reached Bornholm. More extraordinary is the fact that it has not been recorded in N. Zealand. It has a general distribution in Southern Zealand, Falster, Lolland, Langeland, Funen, S. Jutland, Schleswig and Holstein, here probably because of the southern position of the area.

Ander (1949a) thinks that this species is a fairly late immigrant, but now that its extraordinary distribution in the area is better known, I cannot agree with this view.

Chorthippus albomarginatus albomarginatus (De Geer, 1773). Fig.24

This species occurs practically overall near the coast in mature dunes, sometimes in the dunes with *Psamma-Elymus* and in the grass. It is found together with *Conocephalus dorsalis,* but its distribution in the area differs from that of *C. dorsalis,* and it is not so typical a coast animal as *C. dorsalis.* It occurs inland in western Jutland, Holstein, Bornholm and some parts of Scania. In other part of the range of distribution it occurs both near the coast and inland.

The microclimate near the coast must be of importance for *Ch.*

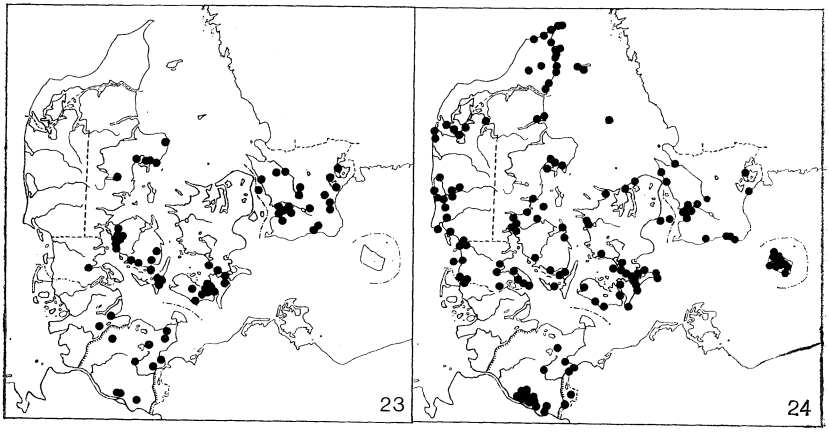


Fig. 23. Chorthippus apricarius. Fig. 24. Chorthippus albomarginatus.

albomarginatus. Contrary to *Conocephalus dorsalis* it is not so lively in captivity, and compared with other Acrididae it is very difficult to make it sing. An investigation of the ecology of this species would be of great interest.

Chorthippus dorsatus dorsatus (Zetterstedt, 1921). Fig. 25

Scania: NE. Scania (Wallengren, 1866); Fjälkestad, 1 ♂, 1 ♀, Rosén; Rövarekulan, 1 ♂, vii.1949, Dahl (ZI); Drakamölla, Maglehem, 4 ♂, 11.viii.1930, Gaunitz (ZI); Höör, 5 ♂, 2 ♀, viii.1949, Dahl (ZI); Lund, several finds, Ander (ZI); Torup, 1 ♀, 31.vii.1931, Ljungbeck (ZI).

Bornholm: (Meinert, 1887—88); Åremyre, 1 ♀, 5.viii.1929 (Ander, 1931a). — Zealand: Grønnehave near Elsinore, 4 ♂, 3 ♀, 16. viii.1872, Budde-Lund (ZM); Gribskov, 2 ♂, 1 ♀, 23.vi.1964, Holst (ZM); Asserbo, 1 ♀, 7.viii.1932, Worm-Hansen and 3 ♂, 18.ix.1965, Edelmann (ZM); Ellemosen near Tisvilde, 1 ♂, 8.viii.1961, (coll. Esbjerg); Stængehus in Tisvilde Hegn, several finds, Esbjerg and Holst (ZM; coll. Esbjerg); Lynæs, 1 ♀, 8.iv.1964, Holst (ZM); N. of Nykøbing (Meinert, 1887—88); Hillerød, 1 ♂, 29.vii.1907, Esben-Petersen (ZM); Ørholm, 2 ♂, 2 ♀, 5.ix.1941, Larsson (ZM); Dyrehaven, 1 ♀, 1.ix.1872 (ZM); Frederiksdal, 1 ♂, 4.ix.1872 (ZM); Farum Mose, in numbers, vii.1963 (coll. Esbjerg); Bognæs, 1 ♂, 17.ix.1964 (coll. Esbjerg); Holbæk, 1 ♂, 17.ix. 1905, Larsen (NM); Gevninge, 1 ♂, 8. viii. 1872 (ZM); Køge Ås (Findal, 1937); Tystrup, 1 ♂, 1 ♀, 28.viii.1941, Johnsen (ZM); Suserup, 1 ♀, 27.viii.1941, Johnsen (ZM). — Falster: Storskoven, in numbers, 5.viii.1905, Esben-Petersen (ZM; NM); Næsgård, 1 ♂, 5.viii.1905, Esben-Petersen (ZM). — Lolland: Strandby, 1 ♀, 1.viii.1905, Esben-Petersen (ZM); Toreby, 1 ♀, 12.viii.1945, Worm-Hansen (ZM). — Funen: Mindedal, in numbers (Findal, 1937). — E. Jutland: Near Århus (Meinert, 1887—88); Funder, 2 ♂, 2 ♀, 26.viii.1906, Savværket near

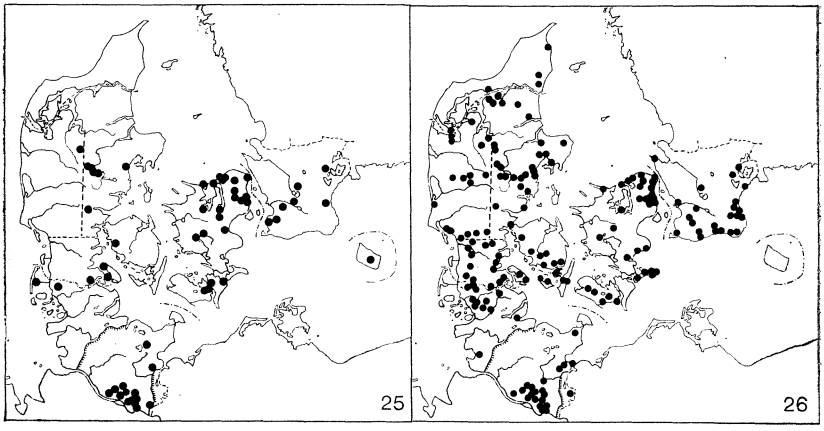


Fig. 25. Chorthippus dorsatus. Fig. 26. Chorthippus longicornis.

Silkeborg, 1 ♀, 2.ix.1906, Silkeborg Østerskov, 4 ♀, 19.ix.1905, Funder K., 1 ♂, 12.viii.1936, and Jenskær near Silkeborg, 2 ♂, 27.viii.1934, all Esben-Petersen (ZM); Vingsted near Vejle, 8 ♂, 8 ♀, 22.vii.1940, Leth (ZM). — S. Jutland: Rinkenæs, 2 ♂, 1 ♀, 15.vii.1933, Esben-Petersen (ZM). — Als: Sønderborg, 1 ♂, 2 ♀, viii.1891, Wüstnei (ZM); Nordborg, 5.ix.1935 (Findal, 1937).

Schleswig: Archsum on Sylt (Zacher, 1917); Emmesböll, 1 ♀, vii.1891, Wüstnei (ZM). — Holstein: Malente-Gremsmühlen, Bad Schwartau, Büchen, Friedrichsruh, Geesthacht, Reinbek, Rothenhaus near Trittau, Sachsenwald, and Schönberg (Beuthin, 1875; Zacher, 1917; Weidner, 1938). — Hamburg: Boberg, Borsteler Moor, Duvenstedter Brook, Fuhlsbüttel, Holm, Mühlenkamp and Zollenspieker (Zacher, 1917; Weidner, 1938).

In the remainder of Sweden it occurs very sparsely in the southern part.

Chorthippus longicornis longicornis (Latreille, 1804). Fig. 26

Ander (1949a) considers that this species, which is not recorded from Öland and Gotland, must be a late immigrant. Ragge (1963) thinks the same is the case in Britain because it is not recorded on the Isle of Man, Scilly, Ireland, Lundy and the Outer Hebrides. I consider the same applies to Denmark. It will be seen from the map that it is not recorded from Anholt and Læsø, which however do not offer a good habitat for this species, nor from Bornholm. Samsø and several other islands where collections were made. It is also rare in N. Jutland, which it seems to have difficulty in reaching across Limfjorden.

This species is common in moist grass. I have examined several localities in Thy without any results, but south of Oddesund, I find it very common in several places.

Chorthippus montanus (Charpentier, 1825).

This species is recorded in Sweden from the north to the south, including Scania (Ander, 1945, 1953). In Holstein and Hamburg it is observed in several localities (Weidner, 1938; Lunau, 1963).

Gomphocerippus rufus (L., 1758).

Scania: NE. Scania (Wallengren, 1866); Skrärelid, Söderåsen, 1 ♀, 13.ix.1947, Ander (ZI); Löderup, 1 ♀, 30. vii.1929, Gaunitz (ZI); Kulla Gunnarstorp, 1 ♂, 1944, Heinze (ZI); Skabersjö (coll. Tjeder).

This species is recorded in the other parts of Sweden from the South to the North, except from Lapland. From NW. Germany it is only found near Hamburg, but Weidner (1938) thinks that this find is doubtful.

Myrmeleotettix maculatus (Thunberg, 1815).

This species is common overall in the area, on sandy soil.

Zoogeographical Remarks

The number of species found in the area is restricted to 40, which is a small number compared with Central or South Europe. The reason is the north-westerly position of the area in Europe, with mainly temperate maritime climate. The great majority of Orthoptera are thermophilous and xerophilous, and a number of the species are in fact found more frequently in the southern (warmer) and eastern (more continental) part of the area. Examples of these are the species: *Leptophyes punctatissima* (Fig. 3), *Tettigonia viridissima* (Fig. 5) and *Chorthippus apricarius* (Fig. 23).

Several species have their northern limit in this part of Europe (W. Germany, Denmark, The Scandinavian Peninsula). The following reach to Holstein: *Stenobothrus stigmaticus, Stenobothrus lineatus, Tetrix nutans* (Fig. 14), if we leave out the find on Gotland (Ander, 1945), and *Gryllus campestris,* if it is considered to be introduced from time to time into Bornholm.

Some Orthoptera are restricted to several places in Holstein, and also a few places north of here: *Metrioptera bicolor* (Fig. 8), which also is recorded in Scania, *Metrioptera roeseli,* on Falster, Lolland and W. Jutland, and *Oedipoda caerulescens* (Fig. 16) from Sønderborg and Särö, Halland, Sweden.

Otherwise, the eastern part of Holstein between Lübeck and Lauenberg is one of the richest in species in the region, with several xerophil species. This can only be a result of the southerly position of the area and of the presence of a number of mild tunnel valleys and melt-water valleys.

The following reach to S. Jutland: *Chorthippus mollis* (Fig. 21), and to Funen and the middle of Jutland: *Tettigonia cantans* (Fig. 6).

Chorthippus vagans (Fig. 21) must be mentioned in particular, with its most northerly occurrence on Skagen.

Several species are found in especially warm localities and have a sporadic spread to South Scandinavia and Schleswig-Holstein; in particular: *Platycleis denticulata* (Fig. 7), *Metrioptera bicolor* (Fig. 8), *Metrioptera roeseli* (Fig. 9), *Sphingonotus coerulans*,

Oedipoda caerulescens (Fig. 16), *Chrysochraon dispar, Omocestus haemorroidalis* (Fig. 20) and *Chorthippus vagans* (Fig. 21).

Some of these species, perhaps all of them, may be relics from the warm and dry Boreal Period. At this time Denmark formed a land-bridge between North Germany and the Scandinavian Peninsula, and many animals and plants immigrated during this period. In the last part of the Boreal Period the climate was warmer and dryer than to day, and probably more of the above mentioned species have been common in the area. With the later, moist climate of the Atlantic Period or more probably during the Subatlantic Period, the original number has been divided into a series of isolated populations. Ander (1949a, 1949b) thinks the same is the case for *Platycleis denticulata, Omocestus haemorrhoidalis, Sphingonotus coerulans* and *Metrioptera bicolor*. It is difficult to explain the appearance of the above mentioned Orthoptera in the area, without assuming them to be relics from the Boreal Period. For some species which are only recorded in a few places, it can be a question of immigration at a later time (e.g. *Metrioptera* from N. Germany), or they may have been introduced (*Chorthippus vagans* to Skagen from Central Europe), though it is less likely.

Some species have an eastern distribution in the area. These are: *Podisma pedestris, Omocestus ventralis* and *Gomphocerippus rufus* from Scania, *Tetrix bipunctata* (Fig. 14) from Scania and a single record from S. Jutland, and *Psophus stridulus* (Fig. 15) from Scania and perhaps N. Zealand.

Of these species, the following reach to N. Sweden: *T. bipunctata, P. pedestris,* and *G. rufus*. For this group a northern immigration to the Scandinavian Peninsula might be possible, although the finding of *T. bipunctata* in S. Jutland does not indicate this. It is more probable that they are early immigrants from the south in the Allerød Period or perhaps in the early part of the Boreal Period, when the climate was more continental than today. In Europe and Asia today they have a more continental distribution. The following extend to Middle Sweden: *P. stridulus* and *O. ventralis*. These species can only reach S. Scandinavia over Denmark, and probably with the above-mentioned group. These two species have also a continental spread.

As examples of Orthoptera which have been late immigrants might be mentioned *Chorthippus longicornis* (Fig. 26) and perhaps *Tettigonia cantans* (Fig. 6).

Acknowledgments

I wish to express my thanks to Professor Carl H. Lindroth, Zoological Institute, Lund, Dr. S. L. Tuxen, Zoological Museum, Copenhagen, and Dr. B. Schjøtz-Christensen, Natural History Museum, Århus, for allowing me to work with the collections at these institutions. Also to Dr. Bo Tjeder, Lund, Mr. Carl Lunau, Lübeck, and Mr. Peder Nielsen, Silkeborg, my thanks for their kindness in helping me find localities, to Mr. E. Torp Petersen, Mr. Ole Bøggild, Mr. Carl F. Jensen, Mr. Dag Gärdefors, Mr. Niels Jacobsen and Mr. Niels Illeris, who sent me material from all parts of Denmark, and to Dr. Kjell Ander, Mr. Arne Larsen and Mr. Poul Hald Mortensen for information about specific occurrences. Finally, I am grateful to the Danish State Research Foundation, which financed the investigations of the material in the Zoological Museum, Copenhagen, and of the material collected on the excursions, and to Iapetus Steenstrups Fondation, which covered the greater part of the expenses of the excursions 1964—67.

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—, 1939: Stenobothrus stigmaticus Ramb. neu für Schleswig-Holstein. — Bombus: 29—30.

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Oversigt over Entomologisk Forenings møder og ekskursioner 1968-1969.

Møder.

11. sept. 1968. Dr. A. F. L. O'Farrell, Armidale talte om: Physiological colour change and its significance in the biology of some Australian Odonata. Diskussion: Anker Nielsen, Niels Haarløv, J. Birket-Smith. 24 medlemmer og 5 gæster til stede.

Som nye medlemmer proponeredes Hans Dreisig Jensen, Helge Rambring, Inga Rahbek, Bodil Noe-Nygaard og Poul Frederiksen.

9. okt. Lektor, dr. phil. Anker Nielsen fortalte om den 13de internationale Entomolog-kongres i Moskva, august 1968, og ingeniør N. L. Wolff fortalte om ekskursionen til Taschkent efter kongressen. Diskussion: N. P. Kristensen, O. Bakkendorf, N. Møller Andersen, A. M. Hemmingsen, Bodil Noe-Nygaard og S. L. Tuxen. 30 medlemmer og 2 gæster til stede.

23. okt. Cand. mag. Henri Mourter talte om: Bremsen *Dermatobia hominis*' biologi og skade i Mellemamerika. Diskussion: O. Bakkendorf, W. van Deurs, S. L. Tuxen, Math. Thomsen, Anker Nielsen, F. Søgaard Andersen, Ellinor Bro Larsen, Johs. Keiding, Niels Haarløv, Holger Madsen, A. M. Hemmingsen og Leif Lyneborg. 23 medlemmer og 2 gæster til stede.

30. okt. Klubaften. 12 medlemmer til stede.

6. nov. Dr. phil. S. L. Tuxen: Hvorfor er Apterygoterne insekter og ikke tusindben — samt lidt om indtrukne munddele. Diskussion: Anker Nietsen, N. P. Kristensen, Henning Lemche, O. Bakkendorf og A. M. Hemmingsen. 32 medlemmer til stede.

13. nov. Klubaften. 13 medlemmer til stede.

4. dec. Lektor B. Bejer-Petersen og cand. agro. Thyge Thygesen aflagde beretning om henhv. skovbrugets og landbrugets skadedyr i 1968. Diskussion: N. L. Wolff, Niels Haarløv, Ellinor Bro Larsen, Ole Karsholt, Jørgen Jørgensen, Anker Nielsen og Leif Lyneborg. 28 medl. til stede.

18. dec. Julemøde. Der vistes lysbilleder fra rejsen til Leningrad, Moskva og Taschkent i forbindelse med den 13de internationale Entomologkongres, august 1968. Dr. phil. S. L. Tuxen kommenterede. 29 medlemmer og gæster til stede.

22. jan. 1969. Cand. scient. Hans Dreisig talte om: Biologi og døgnrytme hos skovkakerlakken *Ectobius lapponicus*, samt lidt om lysudsendelsen hos St. Hansormen. Diskussion: Anker Nielsen, Ole Karsholt, Henrik Enghoff, F. Bangsholt, N. L. Wolff, W. van Deurs, Bent Muus, Niels Haarløv og Poul Jeppesen. 32 medlemmer til stede.

Som nyt medlem proponeredes Bengt E. Janzon.

29. jan. Klubaften. 17 medlemmer til stede.

5. febr. Amanuensis, tandlæge Sv. Kåber, Arhus, talte om: Aktuelle problemer inden for dansk sommerfuglefaunistik. Diskussion: W. van Deurs. N. L. Wolff, O. Bakkendorf, Niels Haarløv, Thyge Thygesen, Ole Karsholt, Leif Lyneborg, N. Møller Andersen, F. Bangsholt, J. Lundquist. 46 medlemmer og 1 gæst til stede.

Som nyt medlem proponeredes Preben Jørgensen.

19. febr. Prof. Jørgen Birket-Smith: På millionfangst i Afrika. 86 medlemmer og gæster til stede. Efter foredraget fejredes foreningens 101. fødselsdag.

Som nye medlemmer proponeredes Olle Elofsson, Hanne Milan Petersen og Ole Christensen.

26. febr. Klubaften. 8 medlemmer til stede.

Som nye medlemmer proponeredes Eivind Palm og E. Huusfeldt Larsen.

5. marts. Auktion over dr. H. Volsøe's og grosserer Ebbe Wivel's bøger, samt over diverse anden entomologisk litteratur. 49 medlemmer og 2 gæster til stede.

19. marts. Fortsættelse af auktionen over entomologisk litteratur. Overlærer Carolsfeld-Krausé's bøger samt en række bind af Danmarks Fauna. 66 medlemmer til stede.

26. marts. Meddelelser om fund af nye og sjældne biller i 1968 blev givet af Victor Hansen, F. Bangsholt, Hans Gønget, K. Arevad, K. B. Lindhardt og Anker Nielsen. 23 medlemmer til stede.

Som nyt medlem proponeredes Nelly Mikkelsen.

16. april. Meddelelser om fund af nye og sjældne sommerfugle i 1968 blev givet af en lang række medlemmer. 46 medlemmer til stede.

30. april. Ordinær generalforsamling. — 1. Højesteretsdommer Victor Hansen valgtes til dirigent. — 2. Formanden aflagde beretning. Der var i det forløbne år afholdt 15 møder med gennemsnitligt 40 deltagere, 4 klubmøder med gennemsnitligt 12 deltagere og 2 ekskursioner med henhv. 19 og 12 deltagere. I beretningen kom formanden desuden ind på Entomologiske Meddelelsers fremtid. — 3. Kassereren forelagde de reviderede regnskaber for foreningen og fondene — enstemmig godkendelse og decharge. — 4. Formanden redegjorde for Entomologisk Fonds historie og lagde op til en diskussion af eventuelle muligheder for at forøge kapitalen. Det blev vedtaget, at også den anden halvdel af renterne lægges til kapitalen. — 5. Børge Petersen genvalgtes som redaktør og N. Haarløv og N. Møller Andersen som øvrige bestyrelsesmedlemmer. — 6. O. Schaltz og W. van Deurs genvalgtes som revisorer og H. Friis-Jensen som revisorsuppleant. — 7. Formanden oplæste en redegørelse fra prof. N. Haarløv om nedsættelsen af et fredningsudvalg. Bestyrelsen bemyndigedes til at nedsætte et sådant udvalg. — 8. Ingen ønskede ordet til eventuelt. 36 medlemmer og 1 gæst til stede.

Som nyt medlem proponeredes Jørgen Tranum Jensen.

Ekskursioner.

5. juni 1969. Ekskursion til Jægerspris Nordskov. Ekskursionsleder F. Bangsholt. Emner bl. a. strandengs- og skovmosefauna. 18 deltagere.

7. sept. Ekskursion til Suserup Skov ved Tystrup Sø. Ekskursionsleder overlærer H. Friis-Jensen. Emne: Træborende insekter i levende og dødt træ. 22 deltagere.

Regnskab for Entomologisk Forening 1968.

Indtægt

Kassebeholdning pr. $^1/_1$ 1968	kr.	9.127,28
Renter (legat 200,00, bank 37,03, giro 112,51)	-	349,54
Kontingenter 10.375,50 + abonnementer 2.946,49	-	13.321,99
Statstilskud	-	4.000,00
Rask-Ørsted Fond 4000,00, Carlsbergfondet 4000,00	-	8.000,00
Statens alm. videnskabsfond (Noona Dan)	-	11.774,33
Jubilæumsauktionen		8.017,25
Salg af hefter og særtryk af Ent. Medd.	-	5.010,54
Universitetsbibl. for bytteforbindelser	-	2.600,00
Deltagerbidrag ved jubilæumsfesten	-	4.851,00
Salg af plastikæsker	-	378,65
	kr.	67.430,58

Udgift

Trykning af Entomologiske Meddelelser	kr.	37.346,22
Trykning af særtryk	-	4.144,31
Meddelelser om møder samt porto	-	6.285,07
Møder og ekskursioner	-	1.894,70
Køb af plastikæsker	-	787,50
Jubilæumsfesten	-	13.490,62
Diverse	-	622,72
Kassebeholdning pr. $^{31}/_{12}$ 1968	-	2.859,44
	kr.	67.430,58

Status.

Aktiver

Girokonto	kr.	3.376,22
Bankkonto	-	1.329,03
Kontant beholdning	-	840,27
	kr.	5.545,52
Kontingentrestancer	kr.	180,00

Passiver

Tilhørende Kongresfondet m. m.	kr.	2.001,04
„ Entomologisk Fond	-	685,04
„ foreningens driftskonto	-	2.859,44
	kr.	5.545,52

Regnskab for Kongresfondet m. m. 1968.

Indtægt

Kassebeholdning pr. 1/1 1968	kr.	5.506,77
Overført fra Entomologisk Fond	-	243,12
Renter	-	762,00
	kr.	6.511,89

Udgift

Depotafgift	kr.	11,40
Købt obligationer	-	4.499,45
Kassebeholdning pr. 31/12 1968	-	2.001,04
	kr.	6.511,89

Status.

Aktiver

Obligationsbeholdning nom.	kr.	11.400,00
Kassebeholdning pr. 31/12 1968	-	2.001,04
	kr.	13.401,04

Passiver

Kongresfondet m. m.	kr.	13.401,04

Regnskab for Entomologisk Fond 1968.

Indtægt

Kassebeholdning pr. 1/1 1968	kr.	1.482,83
Renter 645,00, aktieudbytte 2,55	-	647,55
Obligation udtrukket	-	200,00
Gaver 100,00 + 10,00	-	110,00
	kr.	2.440,38

Udgift

Depotafgift			kr.	12,40
Overført til Kongresfondet			-	243,12
Købt obligationer			-	1.499,82
Til disposition (323,77 ÷ 12,40)	kr.	311,37		
Fondets kapital tilhørende	-	373,67		
Kassebeholdning pr. 31/12 1968	kr.	685,04	-	685,04
			kr.	2.440,38

Status.

Aktiver

Obligationsbeholdning nom.	kr.	12.100,00
Aktie pålydende	-	20,00
Kassebeholdning pr. 31/12 1968	-	685,04
	kr.	12.805,04

Passiver

Entomologisk Fond	kr.	12.493,63
Til disposition	-	311,37
	kr.	12.805,00

Regnskab for Oluf Jacobsens Legat 1963.

Indtægt

Renter	kr.	205,00

Udgift

Depotafgift	kr.	5,00
Overført til foreningens driftskonto	-	200,00
	kr.	205,00

Status.

Aktiver

Obligationsbeholdning nom.	kr.	5.000,00

Passiver

Legatet	kr.	5.000,00

København, 20. februar 1969

F. Bangsholt
kasserer.

Regnskabet revideret og befundet rigtigt. Bank- og girokonti samt kasse- og obligationsbeholdningens tilstedeværelse konstateret.

København, 12. april 1969

O. Schaltz. *Wilhelm van Deurs.*

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Hefte (No.)	1 (p. 1—96)	udkom	15. 3. 1969
„ „	2 (p. 97—192)	„	16. 6. 1969
„ „	3 (p. 193—288)	„	10. 10. 1969
„ „	4 (p. 289—450)	„	30. 12. 1969

Printed in Denmark

Krøyers Bogtrykkeri, Lyngby