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Remarques sur quelques Hyphydrus (Coleoptera : Dytiscidae)

(et redescription d'un type de Fabricius).

(Quatorzième note)

par R. Mouchamps
Liège — Belgique.

Le Dr S. L. Tuxen du Musée Zoologique de Copenhague a eu l'extrême obligeance de nous communiquer le type unique d'*Hyphydrus scriptus* Fabricius dont la définition systématique était incertaine. Nous profitons de l'occasion pour publier quelques remarques intéressantes sur certaines espèces du genre et décrire une nouvelle forme des Iles de la Sonde.

***Hyphydrus* (s. str.) *detectus* Falkenström** (fig. 1).

Falkenström, Lingn. Sc. Journ., 15, 1936.
= *orientalis* Zimmermann, Kol. Rundsch., 16, 1930, p. 37 (partim).
= *pieli* Guignot, Note Ent. Chin., III, 8, 1936, p. 133, fig. 1.
= *orientalis* Gschwendtner, Kol. Rundsch, 25, 1939, p. 3.
= *detectus* Brinck, Lunds Univ. Årsskr., Bd. 13, nº 12. 1943, p. 8, fig. 1d.
= *detectus* Balfour-Browne J., Proc. R. Ent. Soc. Lond. B, 13, 1944, pp. 128, 130, fig. 4.

Nous ne pouvons que confirmer la synonymie établie par J. Balfour-Browne en 1944 et la complêter par les déterminations récentes. Après examen de tous les "*Hyphydrus orientalis*" de la collection Zimmermann (Zoologische Sammlung des Bayerischen Staates — Munich), nous y avons retrouvé quelques *detectus* Falk. L'auteur allemand aurait méconnu les deux formes! Si l'on reprend les travaux de Falkenström (1940), Brinck (1943) et Balfour-Browne (1944), on constate que les caractères distinctifs utilisés par ces auteurs, néanmoins

exacts, sont d'interprétation difficile. Lorsqu'on examine les métatibias de cette espèce et ceux des formes voisines, on remarque immédiatement qu'ils sont courts et rectilignes alors qu'ils paraissent beaucoup plus longs et sinueux ailleurs. Seul, *Hyphydrus pulchellus* Clark, présente aussi ce caractère, mais la ponctuation du dessus est bien moins dense. Cette remarque est applicable aux deux sexes et nous parait donc bien utile.

Chine: Foochow (coll. Zimmermann — sub *orientalis* Clark).
Shaowu — Fukien (500 m.), J. Klapperich (16—18/VI/1937).
Nanking, mai 1928, (Dr. J. G. Needham), (I. R. S. N. B.).
Hangchow, 15-5-1928, (Dr. J. G. Needham), (I. R. S. N. B.).
Ningpo, (I. R. S. N. B.).

***Hyphydrus* (s. str.) *brincki* Guignot** (fig. 2 et 3).*

Guignot, Bull. Soc. Ent. Fr., 1946, p. 72, fig. 1
= *guignoti* mihi in litt.

Chine: S. Peking, near temple ..., 26/XI/1927, (Dr. J. G. Needham),
Nanking, mai 1928, (Dr J. G. Needham) (Institut Royal des Sciences Naturelles de Belgique).

Le Dr. F. Guignot d'Avignon, a eu l'amalité de comparer nos spécimens avec le type d'*H. brincki* Guignot et de nous signaler la synonymie précédente.

Cette espèce se place dans le difficile groupe de l'*Hyphydrus orientalis* Clark. Elle se distingue d'*orientalis*

* Hlisnikovský (Acta Entomologica Mus. Nat. Pragae. XXIX, 1953—1954, p. 85) a décrit, sur deux femelles, un autre *Hyphydrus* de Chine qui nous parait proche de *brincki* Guignot et d'*orientalis* Clark. Les caractères pronotaux seraient différents? Signalons aussi que *Hyphydrus vagus* Brinck est synonyme d'*eximius* Clark et non de *laeviventris* Sharp comme le signale cet Auteur.

Clark et d'*eximius* Clark par la forme particulière des mésotarses. Ces derniers sont longs, plutôt grêles, l'avant dernier article près de deux fois plus long que le précédent et garni, chez le mâle, de poils sétigères en bande étroite sur toute la face inférieure. Le dernier article est effilé et terminé par deux ongles minces et peu arqués. Elle s'écarte de *detectus* Falkenström et de *pulchellus* Clark, non seulement par ce caractère, mais encore par le profil sinueux des métatibias. Elle se rapproche aussi de *laeviventris* Sharp, mais la ponctuation abdominale est bien plus forte et plus dense, ne respectant qu'une étroite bande médiane lisse et brillante. De plus, la ponctuation du dessus est un peu moins inégale.

L'aedéage est très caractéristique. Si le pénis se rapproche effectivement de celui d'*eximius* Clark, les paramères sont beaucoup plus larges que ceux des espèces voisines et portent une touffe de poils raides en dedans de l'apex.

Comme chez tous les *Hyphydrus* s. str. les éperons métatibiaux sont serrulés (Guignot).

***Hyphydrus* (s. str.) *eximius* Clark** (fig. 4).

Clark, Trans. Ent. Soc. Lond., (3), I, 1863, p. 421.
Balfour-Browne J., Proc. R. Ent. Soc. Lond., B, 13, 1944, p. 129, 130, fig. 2.
= *japonicus* Sharp, Trans. Ent. Soc. Lond., 1873, p. 54.
= *frontalis* Sharp, On Aquat. Carn. Col.. 1880—82, p. 381.
= *orientalis* Falkenström, Ark. f. Zool., 27A, (1), 1933, p. 7.
= *japonicus* Falkenström, Ark. f. Zool. 32A, (18), 1940, p. 8.
= *vagus* Brinck, Lunds Univ. Årsskr., Bd. 13, nº 12, 1943, p. 4, fig. 1a, 2.
= *japonicus* Brinck, Lunds Univ. Årskr., Bd. 13, nº 12, 1943, p. 6, fig. 1b, 3.
= *eximius* Balfour-Browne J., Proc. R. Ent. Soc. Lond., B, 13, 1944, p. 129, 130.

Après avoir étudié plusieurs séries d'*Hyphydrus* japonais, nous avions mis en doute la synonymie établie par Balfour-Browne en 1944. Nous avions cru y distinguer

deux formes différentes (cf. *vagus* et *japonicus* Brinck). Le Dr. J. Balfour-Browne, l'aimable Conservateur du British Museum, a vérifié, à nouveau, les types d'*Hyphydrus eximius* Clark et *japonicus* Sharp. Sa conclusion est formelle: il s'agit d'une seule et même espèce et il nous communique un couple d'*Hyphydrus japonicus* Sharp (determ.). Il nous signale en outre, que parmi les *japonicus* de Sharp, on retrouve, sans systématisation et avec de nombreuses formes intermédiaires, les deux types d'aedéages publiés par Brinck. Nous avons alors disséqué tous les exemplaires mâles de Chine et du Japon. Tous les caractères externes et la forme des paramères concordent parfaitement. Seul, le lobe médian de l'aedéage montre une plasticité anormale et les formes extrêmes semblent appartenir à des espèces différentes. La confrontation des faits précédents montre que nous sommes en présence de "nuées hybrides" (J. Balfour-Browne in litt.) et il n'est pas possible, actuellement, de séparer les deux formes.

En 1954 (Bull. Ann. Soc. Ent. Belg., 90, p. 40), le Dr F. Guignot décrivait un nouvel *Hyphydrus* du Japon (*H. paromoeus*). D'après la description et les renseignements communiqués (in litt.), cette nouvelle espèce serait bien différente d'*eximius* Clark.

Hyphydrus (Apriophorus) scriptus Fabricius et *Hyphydrus (Apriophorus) stipes* Sharp (fig. 5, 6, 7).

Hyphydrus scriptus n'a pas été décrit par Fabricius en 1801 (Syst. Eleuth., I, p. 257) (Coleopterorum Catalogus, A. Zimmermann, pars 71, 1920, p. 44), mais bien en 1798 (Suppl. Ent. Syst., p. 65), comme l'avait déjà remarqué Sharp (On Aquat. Carn. Col., 1880—82, p. 377).

Dytiscus scriptus Fabricius 1798, a été incorporé par l'illustre Entomologiste aux *Hydrachna* Fabricius 1801, eux-mêmes partiellement synonymes d'*Hyphydrus* Illiger 1807. En 1838, Aubé (Spec. Col., VI, p. 459) re-

décrit méticuleusement l'espèce, et, faute de preuves, c'est à l'auteur français qu'elle est attribué.

Sharp (l. c., p. 377) crée ultérieurement *Hyphydrus stipes* qui, après un sort variable, tombe finalement en synonymie avec *scriptus*.

Enfin, Alluaud (Bull. Soc. Ent. Fr., 1897, p. 211) découvre une variété femelle réticulée qui parait bien caractérisée.

Le type de Fabricius parait n'avoir jamais été examiné et Sharp lui-même base son interprétation de l'espèce sur l'examen d'un des deux exemplaires de la collection Dejean ("*Hyphydrus scriptus?* h. in Ins. Bourbon"). C'est vraisemblablement aussi l'exemplaire "typique" d'Aubé.

Autre complication: *Dytiscus scriptus* Fabricius serait indien ("habitat in Indiae aquis. Dom. Daldorff"). Les dénomination "Indes", "Indes Orientales", "Iles des mers du Sud", ont été initialement utilisées par les navigateurs qui avaient doublé le Cap des Tourmentes (Cap de Bonne-Espérance) et désignent souvent les Iles voisines de Madagascar, et plus spécialement l'Ile Maurice où les escales étaient fréquentes à cause de l'excellence de son port. Alluaud (Ann. Soc. Ent. Fr., 1916, p. 45) a déjà rectifié cette erreur.

Ce problème de synonymie et de paternité restait insoluble sans l'examen du type de Fabricius. Mais existait-il encore?

Le Dr S. L. Tuxen du Musée Zoologique de Copenhague a eu l'amabilité de rechercher, puis de nous communiquer le type de cet *Hyphydrus* litigieux. Le type, unique, appartient au Musée Zoologique de Kiel (Collection Fabricius), mais se trouve, pour l'instant, en dépôt au Musée Zoologique de Copenhague. Il s'agit d'une femelle, relativement bien conservée, légèrement immature. La taille est de $4 \times 2{,}7$ mm.

Les exemplaires malgaches (Institut Royal des Scien-

ces Naturelles de Belgique) examinés n'étaient pas tout-à-fait identiques au type de Fabricius.

Les Dr Villiers et Colas (Muséum de Paris) nous ont alors communiqués quelques spécimens de Maurice. La correspondance de ces exemplaires avec le type de Fabricius était parfaite.

Nous nous trouvions en présence de deux espèces distinctes que Sharp avait déjà isolées en 1880. L'auteur anglais avait noté, que chez *stipes* Sharp, la microponctuation était très dense, tandis que chez *scriptus* Fabricius, elle est moins dense et plus fine.

Après examen de mâles et femelles des deux espèces, nous avons dressé un tableau comparatif des caractères distinctifs principaux.

Hyphydrus scriptus F.	*Hyphydrus stipes* Sharp
Ponctuation élytrale double, la microponctuation à points bien plus fins que les gros.	Ponctuation élytrale double, la microponctuation à points plus développés, mais encore plus fins que les gros.
Microponctuation relativement éparse et un peu inégalement répartie.	Microponctuation plus dense et plus régulièrement répartie.
Ponctuation du dessous plus superficielle et un peu moins dense. Milieu du métasternum à peu près lisse.	Ponctuation du dessous mieux imprimée et plus dense. Milieu du métasternum encore distinctement ponctué.
Avant dernier article des pro- et mésotarses rembrunis. Trois derniers articles des métatarses également brunâtres.	Avant dernier article des pro- et mésotarses rembrunis. Deux derniers articles des métatarses à peine rembrunis, souvent concolores.
Apophyse prosternale fortement denticulée à l'union de son tiers moyen et postérieur. La dent est précédée d'une forte touffe de poils raides.	Apophyse prosternale non ou à peine denticulée, la dent est remplacée par une touffe de poils raides qui se prolonge vers l'avant, presque sans interruption avec la touffe antérieure.
Pro- et mésotarses plus nettement dilatés, surtout le premier article.	Pro- et mésotarses moins nettement dilatés.

Protrochanters dilatés d'avant en arrière à sommet externe très prolongé, redressé et pointu, précédé d'une gouttière très marquée.	Protrochanters comprimés d'avant en arrière, à sommet externe peu prolongé et obliquement tronqué, précéde d'une gouttière peu marquée.
Tubérosité interne émoussée.	Tubérosité interne spiniforme.
Bourrelet apical anal simple.	Bourrelet apical anal un peu triangulé.
Aedéage: Pénis étroitement triangulaire avec l'échancrure apicale profonde mais étroite. Paramères avec l'apex plus sinué.	Aedéage: Pénis largement triangulaire subrectangulaire, avec l'échancrure apicale large et peu profonde. Paramères avec l'apex peu sinué.
♀. Pronotum réticulé sur le disque.	♀. Pronotum à fond lisse.
Dernier sternite abdominal reticulé et à ponctuation fine.	Dernier sternite abdominal lisse entre les points qui sont gros, subfovéolés.

Remarque: Nous ne connaissons pas la var. *soarezicus* Alluaud qui aurait les élytres densément réticulés.

Ces quelques caractères justifient amplement la séparation des deux espèces, magistralement ébauchée par Sharp, admise puis refusée par Régimbart et les auteurs modernes.

Nous connaissons *Hyphydrus scriptus* Fabricius des Iles de la Réunion et Maurice. Peut-être existe-t-il aussi à Madagascar? *Hyphydrus stipes* Sharp est largement répandu sur la dernière île. Quant à *Hyphydrus scriptus* Boheman de Caffrerie (Ins. Caffr., 1, 1848, p. 249), il s'agit certainement d'une toute autre espèce.

***Hyphydrus (Apriophorus) keiseri* n. sp.** (fig. 8).

Forme large et trapue, même un peu gibbeuse. Tête ferrugineuse, ponctuée et réticulée, à bord antérieur obsolètement tronqué et rebordé. Palpes maxillaires et antennes ferrugineux. Pronotum transversal à bords latéraux convergents vers l'avant mais peu arqués; à sur-

face lisse, couverte d'une ponctuation double, très dense, subcoriacée en arrière du bord antérieur et en avant du bord postérieur, mais bien plus espacée sur le disque. Il est brun foncé, éclairci latéralement. Bord postérieur anguleusement saillant au millieu, mais l'angle est fortement arrondi. Elytres à bords latéraux ne continuant pas ceux du pronotum, ferrugineux, et couverts d'un dessin noirâtre ainsi schématisé: une petite tache posthumérale, deux bandes transversales, l'une anté-médiane, l'autre, plus large, post-médiane, plus ou moins réunies l'une à l'autre au milieu, mais toujours interrompues en taches isolées dans le sens de la largeur. Apex taché de noir. Ponctuation et microponctuation très denses, les gros points environ deux fois plus gros que les fins. Strie discale visible dans ses deux-tiers antérieurs.

Dessous brun-foncé, couvert d'une ponctuation bien imprimée, assez dense, un peu plus espacée et plus faible au milieu du métasternum. Apophyse prosternale robuste, anguleusement saillante à l'union des $^1/_3$ moyen et postérieur, en forme de biseau peu aigu. Protrochanters simples, à bord antérieur un peu sinué, non étirés. Pattes ferrugineuses avec les pro- et mésotarses nettement dilatés. Dernier sternite abdominal transversalement impressionné.

Fig. 1. Profil tibial chez *Hyphydrus detectus* Falk. (à gauche) et *orientalis* Clark (à droite).

Fig. 2. Aedéage d'*Hyphydrus brincki* Guignot.

Fig. 3. Mésotarses chez *Hyphydrus brincki* Guignot (à gauche) et *orientalis* Clark (à droite).

Fig. 4. *Hyphydrus eximius* Clark: profil du lobe médian (a. Tokyo, b. Japon, c. Japon, d. Kioto, e. Nanking, f. Japon.).

Fig. 5. *Hyphydrus scriptus* Fabricius: aedéage.

Fig. 6. *Hyphydrus stipes* Sharp: aedéage.

Fig. 7. Protrochanter chez *Hyphydrus scriptus* F. (en haut) et *stipes* Sharp (en bas).

Fig. 8. *Hyphydrus keiseri* n. sp.: aedéage.

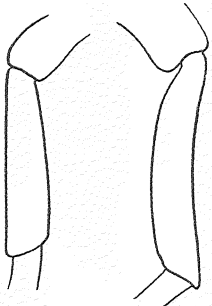


fig. 1

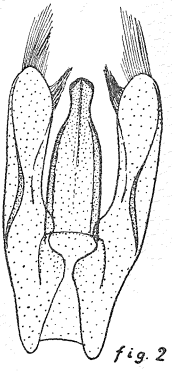


fig. 2

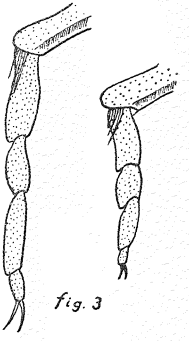


fig. 3

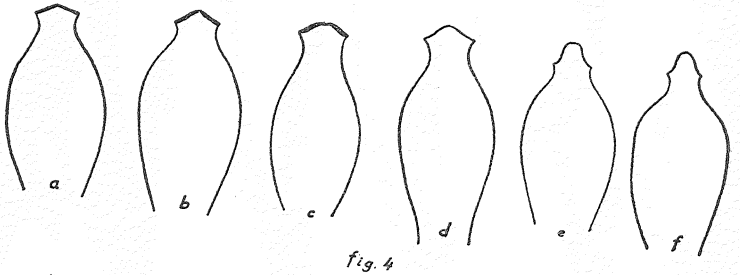


fig. 4

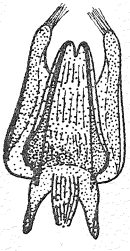


fig. 5

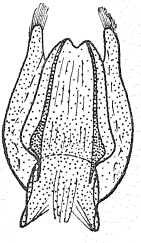


fig. 6



fig. 7

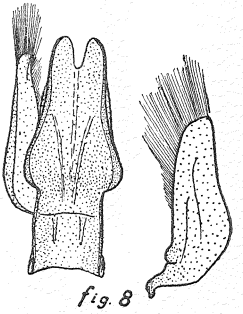


fig. 8

Aedéage: Pénis à bords latéraux faiblement convergents; apex plutôt large, longuement, mais assez étroitement échancré. Paramères plus courts que le lobe médian, fortement poilus, assez larges et à sommet effacé.

♂: taille: 4,9 × 3,5 mm.

♀: identiques aux mâles, mais les tarses sont moins dilatés et le fond pronotal est réticulé. La ponctuation élytrale est plus inégale. Prosternum transversalement comprimé, en carème et non en biseau. Protrochanters encore plus simples, à bord antérieur régulier. Abdomen à fond réticulé et dernier sternite simplement convexe.

Taille plus faible: long.: 4,3 à 4,4, larg.: 2,9 à 3,1 mm.

Grande espèce qui ne peut guère être confondue avec aucune autre. Rappelle un peu l'*Hyphydrus sumatrae* Régimbart, mais la ponctuation est bien plus dense, la taille et la coloration du dessus sont différentes.

A première vue, on pourrait la confondre avec *Hyphydrus excoffieri* Régimbart, mais le mode de ponctuation (simple et non double) est différent.

Je dédie cette belle espèce au Docteur Fred Keiser, de la Section Zoologique du Musée d'Histoire Naturelle de Bâle (Suisse), qui m'a permis l'étude d'un matériel intéressant.

West Sumba: Rua (31/8/1949) Dr Bühler et Sutter. (Musée du Bâle).

Institut Royal des Sciences Naturelles
de Belgique.

Indflyvningen af sommerfuglen *Acherontia atropos* L. (Dødningehovedet) i Danmark i året 1956 samt omtale af artens optræden i andre lande.

Af Ib Norgaard.

De såkaldte "sommerfuglevandringer" er et af de problemer, som lepidopterologien i de senere år har beskæftiget sig meget med. Det har vist sig, at disse vandringer er mere omfattende, end man hidtil har været klar over. Flere af de arter, man før regnede for "fastboende" i landet, må nu anses for at være "tilflyvere", selv om det ikke kan udelukkes, at enkelte individer forbliver her i landet og endog formerer sig i et vist omfang. Hovedparten af de i landet optrædende individer af de pågældende arter må regnes at være kommet udefra. Der henvises i øvrigt til Niels L. Wolffs omtale af indflyvningen af *Celerio lineata livornica* Esp. i Danmark i 1952, Ent. Medd. bind XXVI side 590—606; se især side 591—92.

De vandrende sommerfugle er ofte ret uanselige arter, som er upåagtede af ikke-samlere, hvorfor detaljerede oplysninger om arternes optræden rundt om i landet er yderst vanskelige at opnå. Selv et så stort dyr som *Celerio lineata livornica* blev ikke i nævneværdigt omfang bemærket af "lægmænd" her i Danmark under den store indflyvning i juli-august 1952, til trods for, at der må have været tusinder af eksemplarer i luften over Danmark i den periode. Hovedgrunden må være den, at dyret på grund af sine opførselsvaner ikke tiltrækker sig almenhedens opmærksomhed. Af de i 1952 i Danmark fundne ialt 52 eksemplarer blev kun 5 eksemplarer fundet tilfældigt af lægmænd, mens resten blev fundet af samlere: de 38 ekspl. på lys — fortrinsvis kviksølvdamplamper — og 9 ekspl. fundet sværmende eller sugende på blomster. Det må antages, at dyret om dagen holdt sig skjult.

Anderledes ligger det med *Acherontia atropos* L. Denne art søger overhovedet ikke til blomster for at suge næring, og dens interesse for lys er tilsyneladende begrænset. Da den heller ikke kommer til sukkerlokning, er det en art, man ikke kan gå ud at lede efter. Kviksølvdamplamperne — fremtidigt benævnt HG-lamper — har dog ændret billedet noget, idet *atropos* har vist nogen tilbøjelighed til at søge til denne specielle lysgiver.

Af de i august-september 1956 i Danmark fundne, kendte eksemplarer af *Acherontia atropos* blev kun de 34 ekspl. — 17,8 % — fundet af samlere — i adskillige tilfælde endda ikke under indsamling — mens resten — 157 ekspl. — 82,2 % — blev fundet af tilfældige lægmænd. Denne forskel i kategorien af findere af de 2 arter skyldes sikkert, at *Acherontia atropos* åbenbart ikke tager det så nøje med sit opholdssted i de lyse timer. Dertil kommer, at *atropos* har en forkærlighed for at søge ind i bistader, hvor den formentlig gør sig til gode med biernes indhøstede nektar. Videre kender de fleste mennesker her i landet "Dødningehovedet" — om ikke af udseende, så dog af omtale. Vel er langt fra alle de "Dødningehoveder", som samlere i tidens løb er blevet præsenteret for af lægmænd, *Acherontia atropos*, men når endelig lægmænd finder en *atropos*, er de oftest ikke i tvivl om, at det virkelig er et "Dødningehoved", de har fundet. Sluttelig har vel også *atropos*'s størrelse nogen betydning.

Disse forhold gør, at man har chance for at fremskaffe et godt billede af indvandringen af dette iøjnefaldende dyr, idet naturligvis de samme forhold gør sig gældende i udlandet. Vore nabolande har registreret fundene i 1956 af *atropos* i de respektive lande, og tilskyndet af ing. cand. polyt. Niels L. Wolff i Hellerup og redaktør Knud Juul i Åbyhøj har jeg påtaget mig at fremskaffe de pålideligst mulige oplysninger om artens indflyvning i Danmark i efteråret 1956. Det skal med det samme siges, at det ikke er muligt at kontrollere alle fundene.

Jeg har benyttet oplysninger, der venligst var tilstillet mig af såvel redaktør Knud Juul — som havde modtaget en del oplysninger som svar på en opfordring i "Flora & Fauna" — som af ing. Niels L. Wolff. Jeg har videre modtaget en del oplysninger om fundene på Bornholm af fhv. bladhandler J. Chr. Jensen, Rønne, ligesom jeg selv var i besiddelse af en del oplysninger fra samlere på Sjælland. Jeg beder disse medsamlere modtage min bedste tak for deres venlige hjælp.

For at få fundene i bistader med, fik jeg optaget en opfordring i "Tidsskrift for Biavl" om at meddele mig evt. fund af "Dødningehovedet" i bistader i efteråret 1956, hvilket gav en lang række besvarelser. En del af disse var "gengangere" af tidligere meldte fund, men der var dog adskillige nye fund imellem. En henvendelse til Zool. Museum i København viste, at museet trods den megen omtale i dagspressen kun havde modtaget eet ekspl. — tilmed yderst defekt.

Acherontia atropos L., "Dødningehovedet", vor største sommerfugleart, regner vi til faunaen her, idet der ikke

er tvivl om, at der findes eksemplarer, der har tilbragt hele deres livscyklus i Danmark. Arten findes så godt som hvert år her i landet — oftest kun i ganske få ekspl. Det må formodes, at der finder en indflyvning sted i forsommeren. Denne indflyvning er ganske lille og iagttages som regel slet ikke. Hunnerne fra denne tidlige indflyvning lægger deres æg her, og larverne udvikles, de forpupper sig, og i gunstige år klækkes de i aug.-sept. De fremkommer samtidigt med, at den almindeligvis noget større efterårs-indflyvning udefra finder sted. Klimaet i Danmark hindrer dyrene i at overvintre. Forsøg har ganske vist vist, at *atropos*-pupper kan tåle indtil 8 graders frost, men i realiteten dør alle udendørs overvintrede alligevel, selv om vi undtagelsesvis har en mild vinter.

Arten hører hjemme i de varme middelhavsegne: Nordafrika og Lilleasien. Der er den ganske almindelig og endogså talrig. Den har imidlertid vandringstilbøjeligheder, og hvert år vandrer den mod nord. Der er fundet eksemplarer så langt mod nord som nord for polarcirklen. Det har vist sig, at imagines, som vitterligt har fløjet disse flere tusinde kilometre, ser ganske friskklækkede ud, og det kan således ikke af udseendet afgøres, om dyret er "indfødt" eller indfløjet.

Atropos er et kraftigt dyr. Den er udstyret med en særlig kort og stiv sugesnabel, hvormed den kan gennembore vokslåget over såvel vilde som tamme biers honningceller. Den er tillige den eneste sommerfugl, der er i stand til at udstøde lyde.

Larven lever på forskellige planter, fortrinsvis af natskyggefamilien. Her i landet findes den mest på kartoffelplanter. Den æder kun om natten og er skjult om dagen. Den kan dog findes ved hjælp af de karakteristiske ekskrementer og — oftere — som puppe ved kartoffeloptagningen i oktober.

Acherontia atropos er gammelkendt her i landet. I

hvert fald i 1795 blev der iagttaget et eksemplar, der sad på flyvebrættet på et bistade i Almind præstegård hos St. St. Blichers far, Niels Blicher. V. Strøm's "Større Sommerfugle" — 1891 — anfører: "Fundet overalt i Landet, men enkeltvis og sjælden, Sept.-Oktober, meget sjældnere af overvintrede Pupper i Juni. Kun disse sidste Individer synes at kunne forplante Arten hos os." På det tidspunkt var man ikke klar over, at der fandt indflyvning sted både i juni og i sept.-okt. Siden da fandtes enkelte eksemplarer næsten hvert år, nogle år slet ingen. Andre år fandt der en større indflyvning sted, hvad man kan se af meldingerne om fund. Sådanne år med større indflyvning var: 1908, 1918 og 1935. Men ingen af disse indflyvninger har dog kunnet måle sig med den kæmpeindflyvning, der fandt sted i aug.-sept. 1956.

I året 1956 blev der ifølge de hidtil fremskaffede oplysninger fundet 193 imagines og 1 larve af *Acherontia atropos* i Danmark. En af disse imagines blev fundet død i et bistade i maj 1956. Det er uden tvivl et eksemplar fra efteråret 1955. Det er blevet dræbt af bierne og har ligget i bistadet hele vinteren. Fundet er blevet gjort ved forårsrengøringen. Det næste fund blev gjort den 3. juli 1956, og dette ekspl. er utvivlsomt en indvandrer, der tilhører den tidlige — fåtallige — indvandringsbølge, der sædvanligvis hvert år spredes mod nord fra de sydlige hjemegne. Fundet af dette ekspl. kan ikke regnes for usædvanligt.

De næste fund blev først gjort i august 1956, og disse dyr må regnes for fortroppen af den usædvanligt store indvandringsbølge, der kulminerede i begyndelsen af september 1956. Ialt er rapporteret 191 ekspl. af efterårsindvandrede imagines, dog med det forbehold, at enkelte af eksemplarerne kan være "indfødte". Sammenholder man imidlertid tallene fra Danmark med tallene fra vore nabolande, som også viser en voldsom stigning i fundene af *atropos*, må man have lov til at anse den

chance for, at et fundet ekspl. skulle være "indfødt", for så lille, at den er uden betydning.

Den ved Strandbygård ved Østerlars på Bornholm den $^{5}/_{9}$ 1956 fundne larve af *atropos* må antages at være efterkommer af en hun fra juni-indflyvningen, og det kan yderligere styrke formodningen om, at de i september 1956 iagttagne eksemplarer alle skulle være indflyvere, fordi man kan slutte med nogen sikkerhed, at de "danske" larver endnu ikke var nået så langt i deres udvikling, at de kunne have nået at blive klækkede.

Følgende fund af *Acherontia atropos* blev gjort i Danmark i 1956:

De i Danmark i 1956 fundne eksemplarer af *Acherontia atropos* i kronologisk rækkefølge

(de med * mærkede er fundet i eller ved bistader:
de med ○ mærkede er larver).

*1 stk. i maj 1956 — død i bistade hos fru Karen Folmer Larsen, "Lindrumhus", Strøby Strand pr. Strøby, Sjælland. Kun dyrets hårde dele tilbage. Dyret bortkastet.

1 stk. den $^{3}/_{7}$ 1956 i Horsens på kældertrappe i Løvenørnsgade af uk. dreng. Coll. Mogens Jacobsen, Bøghsgade 51 A, Horsens. Medd. Knud Juul.

*1 stk. den $^{16}/_{8}$ 1956 ved Åbenrå under bistade hos Chr. Mikkelsen, Genner by i Ø. Løgum sogn. Dyret ikke indsamlet.

1 stk. den $^{20}/_{8}$ 1956, indleveret til førstelærer H. Eriksen, på Lihme skole. Finder uk. Coll. Lihme skole i Salling.

1 stk. den $^{27}/_{8}$ 1956 i Randers på Petromax-lygte i have hos Knud Holm Hansen, P. Knudsensgade 8, Randers. Coll. Knud H. Hansen. Medd. Knud Juul.

1 stk. den $^{28}/_{8}$ 1956 i Vang på Bornholm, siddende om dagen på en ribsbusk, af fru Marie Eriksen, Vang. Dyret ikke indsamlet. Medd. mig af Niels L. Wolff.

*1 stk. i august 1956 i Haraldslund, ca. 20 km syd for Randers, død i bistade hos A. Christensen, Hinnerup. Coll. Norgaard.

1 stk. i august 1956 ved Hjembæk Strand på Norddjursland, på kalksten ved strandkanten, af Th. Meltofte Hansen, Bredstrup v. Grenå. Coll. Meltofte Hansen.

1 stk. i slutningen af august 1956 i Sjælborg ved Hjerting nær Ho Bugt i Vestjylland. Finder uk. Coll.? Medd. mig af Brink Jacobsen, Alslev pr. Varde.

2 stk. i slutningen af august 1956 i Dronninglund i Vendsyssel. Fundet døde af? Coll. Chr. Christiansen, Rosenvænget 3, Dronninglund. Medd. Knud Juul.

*1 stk. i slutningen af august 1956 i Laurbjerg (ca. 15 km SSV for Randers), på bagsiden af bistade hos lærer S. M. Flade, Laurbjerg skole. Dyret ikke indsamlet.

*1 stk. i slutningen af august 1956 i Hvidbjerg i Salling, i bistade hos fru Rigmor Nielsen, Hvidbjerg. Coll. Hvidbjerg skole.

*1 stk. i slutningen af august 1956 i Alslev ved Varde på en husmur umiddelbart ved siden af 20 bistader hos Brink Jacobsen. Coll. Alslev skole.

1 stk. indleveret i slutningen af august 1956 til Harndrup skole på Fyn. Fundet af bestyrer Jens Frode Hansen, Drejø Odde, Thurø, på en bagdør i Harndrup. Coll. Harndrup skole.

1 stk. i august 1956 i Thurø Plantage på et æbletræ af Paul Hansen. Coll. Thurø kommuneskole. Medd. mig af bestyrer Jens Frode Hansen, Drejø Odde, Thurø.

1 stk. i slutningen af august 1956 ved Vedde v. Munke Bjergby i NV-Sjælland. Finder uk. Coll. Hjarne Sørensen, Haraldslundsvej 28, Kgs. Lyngby.

September 1956.

1 stk. den 1/9 1956 på fiskerbåd c. 100 sømil NV af Grådyb Barre i Nordsøen, en pæn hun. Coll. Wilh. van Deurs, Gentofte. Medd. mig af Niels L. Wolff.

1 stk. den 1/9 1956 i Nr. Broby på Fyn. Finder uk. Coll. Groth. Medd. Knud Juul af Bent Cardel, Odense.

1 stk. den 1/9 1956 i Bøjden ved Fåborg af Groth. Coll. Groth. Medd. Knud Juul af Bent Cardel, Odense.

1 stk. den 1/9 1956 i Slagelse, på en tøjstolpe på Irisvej. Finder uk. Coll. lærer E. Schrøder, Slagelse. Medd. mig af P. K. Nielsen, Slagelse.

1 stk. den 1/9 1956 i Klemensker på Bornholm, i et soveværelse på "Nordholt". Finder uk. Coll.? Medd. mig af J. Chr. Jensen, Rønne.

*1 stk. den 2/9 1956 i bigård på gården "Rosenvang" lidt nord for Slagelse. Dyret ikke indsamlet. Medd. mig af P. K. Nielsen, Slagelse.

1 stk. den 3/9 1956 i Vallø, på HG-lampe i værelse hos skytte E. Kielstrup, Vallø Dyrehave. Coll. E. Kielstrup.

1 stk. den 4/9 1956 i Ringe på Fyn, en han, fanget af Svend Kaaber, Kbhvn. Coll. Sv. Kaaber.

1 stk. den 4/9 1956 i Hyllinge i Sydsjælland af dyrlæge H. K. Jensen, Hyllinge. Coll. H. K. Jensen.

1 stk. den 4/9 1956 i Ulse i Sydsjælland af malermester Tage Jensen, Ulse. Coll. Tage Jensen.

1 stk. den 4/9 1956 i Vallø Dyrehave på HG-lampe af skytte E. Kielstrup. Coll. H. K. Jensen, Hyllinge.

2 stk. den 4/9 1956 i Vang på Bornholm i vognporten til brugsforening. Det ene ekspl. bortfløjet, det andet — en han — fundet død den 7/9 1956. Coll. Niels L. Wolff, Hellerup.

1 stk. den 4/9 1956 ca. ½ km nord for Åkirkeby på Bornholm, formentlig ikke indsamlet. Medd. mig af J. Chr. Jensen, Rønne.

1 stk. den 5/9 1956 på stranden på Fanø om eftermiddagen af Leif Warner, Nordby, Fanø. Skæbne uk. Efter medd. i "Vestkysten" 7/9 1956.

2 stk. den 5/9 1956 i Klosterlund ved Engesvang st. i Jylland, 2 hanner, kl. ca. 23 på HG-lamper af Anker Uhrback, Frederiksberggade 19, Silkeborg. Coll. A. Uhrback. Medd. Knud Juul.

1 stk. den 5/9 1956 set på en pæl i Jerup, ca. 12 km NV for Frederikshavn. Ikke indsamlet. Medd. mig af Henning Krabbe, Frederikshavn.

5 stk. den 5/9 1956 i Legind Bjerge Plantage på Morsø i Jylland. Ifølge skovfogeden dèr blev 2 stk. fanget, de 3 andre ikke indsamlet. De 2 stk. coll. Lødderup skole. Medd. mig af Sv. Kaaber, Kbhvn.

1 stk. den 5/9 1956 om morgenen i Nymindegab plantage i Vestjylland af kaptajn Per Winge. Coll. Per Winge. Efter medd. i "Vestkysten" 6/9 1956.

1 stk. den 5/9 1956 fanget på en butiksdør i Skelskør. Finder uk. Efter medd. i "Sorø Amtstidende" 7/9 1956.

1 stk. den 5/9 1956 i Vallø Dyrehave på HG-lampe af skytte E. Kielstrup. Coll. Kielstrup.

1 stk. den 5/9 1956 fanget ca. ½ km nord for Åkirkeby på Bornholm. Skæbne uk. Medd. mig af J. Chr. Jensen, Rønne.

1 stk. den 5/9 1956 landet på en fiskerbåd på rejse fra Tyskland til Rønne, indsamlet ved bådens ankomst til Rønne. Skæbne uk. Medd. mig af J. Chr. Jensen, Rønne.

o1 larve fundet den 5/9 1956 ved Strandbygård i Østerlars på Bornholm. Finder uk. Skæbne uk. Medd. mig af J. Chr. Jensen, Rønne.

1 stk. den 6/9 1956 ved Skive i Jylland, en han, af Carsten Kromann. Medd. mig af Johs. Storm-Olsen, Kbhvn.

1 stk. den 6/9 1956 i Frederikshavn i en have af uk. finder. Coll. H. Krabbe, Frederikshavn.

1 stk. den 6/9 1956 i Vallø Dyrehave på HG-lampe af skytte E. Kielstrup. Coll. G. Hejgaard, Kbhvn.

*1 stk. den 6/9 1956 i Olsker på Bornholm, under taget på et bistade på Lille Hollændergård. Finder uk. Ikke indsamlet. Medd. mig af J. Chr. Jensen, Rønne.

1 stk. den 7/9 1956 ved Skive i Jylland, af Carsten Kromann. Medd. mig af Johs. Storm-Olsen, Kbhvn.

2 stk. den 7/9 1956 i haver i Frederikshavn. Findere uk. Coll. Henning Krabbe, Frederikshavn.

1 stk. den 7/9 1956 i Esbjerg på bladbygningen "Roser & Tidsler". Coll. en af bladets typografer. Efter medd. i "Vestkysten" 7/9 1956.

1 stk. den 7/9 1956 på Tåsinge. Finder uk. Coll. Groth. Medd. mig af Niels L. Wolff.

1 stk. den 7/9 1956 i Brudager på Fyn. Finder uk. Coll. Groth. Medd. mig af Niels L. Wolff.

1 stk. den 7/9 1956 i Svendborg på Fyn. Finder uk. Coll. Groth. Medd. mig af Niels L. Wolff.

*1 stk. den 7/9 1956 i Svendborg, under flyvebrættet på bistade, omsværmet af bier hos E. Scheurer, Dr. Holmesvej 51, Svendborg. Coll. Svendborg Zool. Mus.

1 stk. den 7/9 1956 i Nærum på Sjælland. Finder uk. Coll. A. Dalberg, Kbhvn.

1 stk. den 7/9 1956 i Fægangen i Sorø skov på egetræ af Svend Svendsen, Sorø. Coll. Sorø Borger- og Realskole. Efter medd. i "Sorø Amtstidende" 8/9 1956.

1 stk. den 7/9 1956 i Ulse i Sydsjælland af malermester Tage Jensen, Ulse. Coll. Tage Jensen.

1 stk. den 7/9 1956 i Vallø Dyrehave på HG-lampe af skytte E. Kielstrup. Coll. E. Kielstrup.

*1 stk. den 7/9 1956 i Gimlinge pr. Flakkebjerg på Sjælland i foderkassen i bistade hos sognepræst I. P. Jacobsen, Gimlinge. Dyret blev aflivet men senere ødelagt.

1 stk. den 7/9 1956 i Vang på Bornholm, i lygtehuset på en elektrisk lampe af P. West. Skæbne uk. Medd. mig af Niels L. Wolff.

1 stk. den 7/9 1956 ca. 3 sømil ret øst for Årsdale på Bornholm af Sven Clausen. Coll. Preben Holst, Kbhvn.

1 stk. den 7/9 1956 i Rønne på Bornholm af gartner Kyhn, Rønne. Skæbne uk. Medd. mig af J. Chr. Jensen, Rønne.

1 stk. den 7/9 1956 i Rønne på Bornholm af lærer Abildtrup. Skæbne uk. Medd. mig af J. Chr. Jensen, Rønne.

1 stk. den 7/9 1956 i Rønne havn på Bornholm, i en sildekasse, af Mogens Nielsen, Rønne. Coll. Mogens Nielsen. Medd. mig af J. Chr. Jensen, Rønne.

*1 stk. den 8/9 1956 i Egens by i Sydmols i Jylland, i bistade, af Anton Pedersen, Egens by. Coll. Rønde Gymnasium.

1 stk. den 8/9 1956 i have i Frederikshavn af uk. finder. Coll. Henning Krabbe, Frederikshavn.

1 stk. den 8/9 1956 i Kgs. Lyngby på Sjælland af uk. skoleelev. Coll. Bjørn Galløe, Kgs. Lyngby.

1 stk. den $^{8}/_{9}$ 1956 i Slagelse på HG-lampe i soveværelset hos P. K. Nielsen. Coll. P. K. Nielsen.

1 stk. den $^{8}/_{9}$ 1956 i Vallø Dyrehave på HG-lampe af skytte E. Kielstrup. Coll. Kielstrup.

1 stk. den $^{9}/_{9}$ 1956 i Mårslet ca. 10 km syd for Aarhus af Karsten? Coll. Karsten? Medd. mig af Knud Juul.

1 stk. den $^{9}/_{9}$ 1956 i Horsens. Fundet død på en gade af H. Aamann, Hornborg pr. Flemming. Coll. E. Kielstrup, Vallø.

1 stk. den $^{9}/_{9}$ 1956 i have i Frederikshavn af uk. finder. Coll. Bent W. Rasmussen, Kbhvn.

1 stk. den $^{9}/_{9}$ 1956 i Vesterø havn på Læsø, på masten af kutter FN 66, der var på bedding. Fundet af fiskeskipper Bech, Vesterø. Coll. Byrum Realskole.

*1 stk. den $^{9}/_{9}$ 1956 i Nielstrup, Sydsjælland, i et bistade. Dyret peb, så biavleren ikke turde røre det. Døde 2 dage senere og var nu demoleret af bierne. Coll. tømrer Willy Nielsen, Haslev. Medd. mig af malermester Tage Jensen, Ulse.

1 stk. den $^{9}/_{9}$ 1956 i Vallø Dyrehave på HG-lampe af skytte E. Kielstrup. Coll. Kielstrup.

1 stk. den $^{10}/_{9}$ 1956 i Skive af Carsten Kromann. En hun. Coll. C. Kromann. Medd. mig af Johs. Storm-Olsen, Kbhvn.

1 stk. den $^{10}/_{9}$ 1956 på Dokkedal Hede (midtvejs mellem Mou og Dokkedal ved Ll. Vildmose) af uk. finder. Coll. Mou skole. Medd. Knud Juul af lærer Jens Peter Jensen, Mou skole.

*1 stk. den $^{10}/_{9}$ 1956 i Vinterslev Mark ved Hadsten i Jylland, under låget i bistade hos Alfred Møller. Coll. Møllers svoger i Kbhvn.

1 stk. den $^{10}/_{9}$ 1956 i have i Frederikshavn af uk. finder. Coll. Henning Krabbe, Frederikshavn.

1 stk. den $^{10}/_{9}$ 1956 i Byrum på Læsø af uk. finder. Coll. C. M. Poulsen, Silkeborg. Medd. Skat Hoffmeyer.

1 stk. den $^{10}/_{9}$ 1956 i Aarhus på cykelbanen af Torben Rosenquist Sørensen. Dyrets "stemme" blev optaget på stålbånd af statsradiofonien. Skæbne uk. Efter medd. i "Jyllandsposten" $^{15}/_{9}$ 1956.

1 stk. den $^{10}/_{9}$ 1956 i Rødovre i oplyst køkken hos W. Hachke. Coll. W. Hachke.

1 stk. den $^{10}/_{9}$ 1956 i Vallø Dyrehave på HG-lampe af skytte E. Kielstrup. Coll. G. Hejgaard, Kbhvn.

1 stk. den $^{10}/_{9}$ 1956 på Dueodde fyr på Bornholm af fyrpasser A. Madsen. Coll. Norgaard.

*1 stk. den $^{11}/_{9}$ 1956. Fundet død og stærkt beskadiget i bistade under honningslyngning. Stadet havde været udstationeret i Ho-Oksby sogn i Vestjylland. Ikke indsamlet. Medd. mig af fhv. mejeribestyrer J. J. Jensen, Ribevej 23, Bramminge.

*1 stk. den 11/9 1956 i Bramminge på en husmur umiddelbart ved siden af bistade hos fhv. mejeribestyrer J. J. Jensen, Ribevej 23, Bramminge. Coll. samler i Bramminge.

1 stk. den 11/9 1956 i Mollerup ved Nykøbing Mors. Finder uk. Coll. C. M. Poulsen, Silkeborg. Medd. Skat Hoffmeyer.

1 stk. den 11/9 1956 i Hjøllund, ca. 13 km syd for Herning. Dyret fløj mod oplyst vindue hos savværksejer Skotte Møller. Coll. Steen Skotte Møller. Efter medd. i "Aftenposten" 13/9 1956.

1 stk. den 11/9 1956 i Odense af Jarby. Coll. Jarby. Medd. mig af Niels L. Wolff.

1 stk. den 11/9 1956 i Vallø Dyrehave på HG-lampe af skytte Kielstrup. Coll. E. Kielstrup.

1 stk. den 11/9 1956 i Vang på Bornholm, en han, kl. ca. 20 på HG-lampe i regn og storm af Niels L. Wolff. Coll. Niels L. Wolff.

*1 stk. den 11/9 1956 i Rønne lufthavn (Arnager) under et bistade. Skæbne uk. Medd. mig af J. Chr. Jensen, Rønne.

1 stk. den 12/9 1956 ved Funder, ca. 8 km vest for Silkeborg på autoværn af Svend V. Poulsen, Herning. Coll. Sv. V. Poulsen.

1 stk. den 12/9 1956 i Ølgod, ca. 18 km sydøst for Skjern, på en elmast af uk. finder. Skæbne uk. Medd. mig af Sv. V. Poulsen.

1 stk. den 12/9 1956 i Rønne på Bornholm på Borgmester Nielsensvej af uk. finder. Skæbne uk. Medd. mig af J. Chr. Jensen, Rønne.

1 stk. den 14/9 1956 i Hyllested ved Grenå, en han, af Skat Hoffmeyer, Aarhus. Coll. Skat Hoffmeyer.

1 stk. den 14/9 1956 i Silkeborg. Finder uk. Coll. C. M. Poulsen, Silkeborg. Medd. Skat Hoffmeyer.

1 stk. den 14/9 1956 ved Fåborg af Groth. Coll. Groth. Medd. mig af Niels L. Wolff.

*1 stk. den 15/9 1956 i Kirkebyen Ulfborg, ca. 20 km sydvest for Holstebro, død i bistade hos Kristian Birk, Ulfborg. Coll. Norgaard.

2 stk. den 15/9 1956 i haver i Frederikshavn af uk. findere. Coll. Henning Krabbe, Frederikshavn.

1 stk. den 15/9 1956 i Bramminge i Nørregade af uk. findere. Coll. C. Fold. Medd. mig af fhv. mejeribestyrer J. J. Jensen, Ribevej 23, Bramminge.

1 stk. den 15/9 1956 i Silkeborg af uk. finder. Coll. C. M. Poulsen, Silkeborg. Medd. Skat Hoffmeyer.

*2 stk. den 15/9 1956 ved Fuglebjerg på Sjælland, under låget på 2 bistader på "Amlinggård" hos gårdejer Alfred Løkkegaard. Ikke indsåmlede.

1 stk. den 15/9 1956 i Valby sporvejsremise. Fundet død af uk. finder. Coll. Johs. Storm-Olsen, Kbhvn.

1 stk. den 16/9 1956 på heden ved Ringkøbing i Vestjylland af C. O. Bangsgaard, Rindom Villaby, Ringkøbing. Coll. C. O. Bangsgaard. Medd. Knud Juul.

1 stk. den 16/9 1956 ved Ringkøbing Fjord af C. O. Bangsgaard, Rindom Villaby, Ringkøbing. Coll. C. O. Bangsgaard. Medd. Knud Juul.

1 stk. den 16/9 1956 i Vilsund, ca. 10 km sydvest for Thisted, af Karl V. Stausholm. Coll. Stausholm. Medd. mig af Sv. V. Poulsen, Herning.

1 stk. den 16/9 1956 i have i Frederikshavn af uk. finder. Coll. Henning Krabbe, Frederikshavn.

1 stk. den 16/9 1956 i Knudsker skolegård på Bornholm af lærer Friberg. Coll. Knudsker skole. Medd. mig af J. Chr. Jensen, Rønne.

1 stk. den 17/9 1956 i have i Frederikshavn af uk. finder. Coll. Henning Krabbe, Frederikshavn.

1 stk. den 17/9 1956 i Visby præstegård i det sydvestlige Thy, på et træ. Coll. pastorinde Andersen. Medd. mig af lærer Bjarne Riis, Visby skole.

1 stk. den 17/9 1956 i Næsby ved Odense af C. Fold. Coll. C. Fold. Medd. mig af Niels L. Wolff.

1 stk. den 17/9 1956 i Vemmelev på Sjælland om dagen på en telefonpæl af vejmand Jespersen. Coll. P. K. Nielsen, Slagelse.

1 stk. den 18/9 1956 i Arnager på Bornholm i et gartneri af uk. finder. Coll.? Medd. mig af J. Chr. Jensen, Rønne.

1 stk. den 19/9 1956 på græsrabatten på hovedvej 11 ved 23 km stenen i Visby kommune (sydvestlige Thy) af uk. finder. Coll. Visby skole. Medd. mig af lærer Bjarne Riis, Visby skole.

1 stk. den 20/9 1956 i Fole i Sønderjylland i et ladevindue hos sognefoged Jørgen Hansen. Coll. Fole skole.

1 stk. den 20/9 1956 i Gudumholm i Nordøsthimmerland. Finder uk. Coll.? Medd. Knud Juul af lærer Jens Peter Jensen, Mou skole.

*1 stk. den 20/9 1956 i bistade i Oldrup Hundslund, nordøst for Horsens. Dyret aflivet med sprit. Coll. Vald. Nielsen, Hundslund.

1 stk. den 20/9 1956 i Visby skolegård (sydvestlige Thy) af uk. finder. Coll. Visby skole. Medd. mig af lærer Bjarne Riis, Visby skole.

1 stk. den 20/9 1956 i Gundsømagle, nord for Roskilde, på en gård, af uk. finder. Coll. Gundsømagle skole. Medd. mig af lærer Hagb. Bluhme.

1 stk. den 20/9 1956 på Charlottenborg i Kbhvn., død, af Jens V. Steensgaard, Guldborgvej 25, Frederiksberg. (Bagkrop og bryst uden vinger tilsendt Zool. Mus. i Kbhvn.). Medd. mig af J. G. Worm-Hansen.

3 stk. den $^{21}/_{9}$ 1956 på stranden ved Søndervig ved Ringkøbing af Z. Jensen, Tarp pr. Guldager. Coll. C. M. Poulsen, Silkeborg, Medd. Skat Hoffmeyer.

1 stk. den $^{22}/_{9}$ 1956 i Herning på en husmur i Th. Nielsensgade, en hun. Finder uk. Coll. Børge Poulsen, Vinkelgade 13, Herning. Medd. mig af Sv. V. Poulsen, Herning.

1 stk. den $^{22}/_{9}$ 1956 i Rønne på Bornholm på elværket. Finder uk. Coll. Preben Holst, Kbhvn.

1 stk. den $^{23}/_{9}$ 1956 i Almindingen på Bornholm, død på savværket, af uk. finder. Coll.? Medd. mig af J. Chr. Jensen, Rønne.

1 stk. den $^{24}/_{9}$ 1956 i Løjt Kirkeby, ca. 6 km nordøst for Åbenrå, i fælde i haven hos lærer Erik Bundgård. Coll. Bundgaard. Medd. Knud Juul.

1 stk. den $^{24}/_{9}$ 1956 i Rønne på Bornholm på plankeværk, først indsamlet den $^{25}/_{9}$ af uk. Coll. J. Chr. Jensen, Rønne.

*1 stk. den $^{25}/_{9}$ 1956 i Vindstrup pr. Fuglebjerg, ca. 15 km nordvest for Næstved, halvdødt i bistade på "Amlinggård", af gårdejer Alfred Løkkegaard. Coll. urmager Løkkegaard, Fuglebjerg.

1 stk. den $^{25}/_{9}$ 1956 i Mellemskoven på Østfalster på HG-lampe af H. Hendriksen, Kbhvn. Coll. H. Hendriksen.

1 stk. den $^{27}/_{9}$ 1956 i "Vissø Mose" ved Løjt Kirkeby ved Åbenrå af lærer Erik Bundgaard, Løjt Kirkeby skole. Coll. Bundgaard. Medd. Knud Juul.

1 stk. den $^{28}/_{9}$ 1956 i Flous, ca. 15 km øst for Randers af uk. dreng. Coll. K. Lemvigh-Hammer, Vester Altanvej 24, Randers. Medd. Knud Juul.

*1 stk. den $^{30}/_{9}$ 1956 i Dyngby, 5 km østsydøst for Odder, død og defekt i foderkassen i bistade, bortkastet. Medd. mig af biavler Jens Arne Rasmussen, Dyngby.

1 stk. den $^{30}/_{9}$ 1956 i Rønne på Bornholm af rentier Bech. Coll. J. Chr. Jensen, Rønne.

Udaterede fund i september 1956:

1 stk. i første uge af sept. 1956, død men ubeskadiget på en sti ved Holte kirke på Sjælland. Coll. Svend Dahl Larsen, Holte. Medd. mig af lærer Kaj Sørensen, Classensgade, Kbhvn.

1 stk. i 3. uge af sept. 1956 i Skyum sogn i Thy af uk. finder. Coll.? Medd. mig af lærer Bjarne Riis, Visby skole, Thy.

1 stk. i 3. uge af sept. 1956 i Hansted by i Thy af uk. finder. Coll.? Medd. mig af lærer Bjarne Riis, Visby skole, Thy.

1 stk. i 3. uge af sept. 1956 i Thisted by af uk. finder. Coll.? Medd. mig af lærer Bjarne Riis, Visby skole, Thy.

2 stk. den 18.—21. sept. 1956 i Mellemskoven på Østfalster af skovløber Pedersen. Coll. Pedersen. Medd. mig af H. Hendriksen.

1 stk. i 1. halvdel af sept. 1956 i Aarhus, ihjelkørt på Åboulevarden, af en fætter til Torben Rosenquist Sørensen, Aarhus. Efter medd. i "Aarhus Stiftstidende" $^{16}/_{9}$ 1956.

*1 stk. i 1. halvdel af sept. 1956 i Askeby på Vestmøn, død i bistade hos vognmand Johs. Johansen, Damme pr. Askeby. Coll. Johansen.

1 stk. i sept. 1956 i Ringkøbing omegn af uk. finder. Coll. C. O. Bangsgaard, Rindom Villaby, Ringkøbing. Medd. Knud Juul.

1 stk. i sept. 1956 i Brønderslev af uk. skoleelev. Coll. Wilh. van Deurs, Gentofte.

3 stk. i sept. 1956 ved Hvide Sande ved Ringkøbing. Finder uk. Coll. C. O. Bangsgaard. Medd. Knud Juul.

1 stk. i sept. 1956 ved Aarhus af uk. finder. Coll. Brandt Lassen, Aarhus. Medd. Knud Juul.

1 stk. i sept. 1956 ved Blåvand i Vestjylland af uk. finder. Coll. G. Jeppesen, Gjedved. Medd. Knud Juul.

1 stk. i sept. 1956 ved Horsens af uk. finder. Coll. Høegh-Guldberg, Horsens. Medd. Knud Juul.

1 stk. i sept. 1956 ved Egtved, ca. 20 km nordvest for Kolding af uk. finder. Coll.? Medd. Knud Juul af G. Jeppesen, Gjedved.

3 stk. i sept. 1956 ved Aarhus af uk. findere. Coll. konservator Hedegaard, Aabyhøj. Efter medd. i "Vestkysten" $^{15}/_{9}$ 1956.

1 stk. i sept. 1956 ved Tilst, ca. 5 km nordvest for Aarhus af uk. finder. Coll. Knud Juul.

1 stk. i sept. 1956 ved Højer, ca. 3 km nord for grænsen ved vestkysten, i et vindue i stuehus på Statens forsøgsgård "Hohenvarde" i Ny Frederikskog. Finder uk. Coll. Højer danske kommuneskole. Medd. mig af biavler Andreas Pedersen, Ny Frederikskog pr. Højer.

12 stk. i sept. 1956 i Esbjerg og omegn af uk. findere. Coll. Esbjerg skoler. Medd. mig af P. L. Jørgensen, Kbhvn.

1 stk. i sept. 1956 på Thurø, på et æbletræ i plantagen hos bestyrer Jens Frode Hansen, Drejø Odde, Thurø. Coll. Thurø kommuneskole.

1 stk. i sept. 1956 syd for Oreby (vest for Vordingborg) af seminarielærer Henry Holm. Coll.? Medd. Knud Juul af Anfred Pedersen, Violvej 6, Vordingborg.

2 stk. i sept. 1956 ved Skævinge (ca. 10 km vest for Hillerød) af uk. findere. Coll? Medd. mig af førstelærer Hansen, Skævinge skole.

1 stk. i sept. 1956 i Sorø af uk. skoleelev. Coll. fotograf G. Jørgensen, Sorø.

1 stk. i sept. 1956 i København i Gyldenløvesgade af uk. skoleelev. Coll. St. Jørgens Gymnasium, Kbhvn. Medd. mig af P. L. Jørgensen, Kbhvn.

5 stk. i sept. 1956 i Sorø og omegn af uk. skoleelever. Coll. Sorø skoler. Medd. P. K. Nielsen, Slagelse, af lærer E. Schrøder, Sorø.

Udaterede fund i oktober 1956:

1 stk. ca. 1. oktober 1956 i Darum sogn ved Bramminge i Vestjylland af uk. finder i en gård i et køkken. Ikke indsamlet. Medd. mig af fhv. mejeribestyrer J. J. Jensen, Ribevej 23, Bramminge.

1 stk. 3.—4. oktober 1956 i Houslund sogn (ca. 12 km nordvest for Åbenrå) af elev ved Houslund skole. Coll. Houslund skole. Medd. Knud Juul af lærer E. Bundgaard, Løjt Kirkeby skole.

1 stk. medio oktober 1956 ved Højkol (ca. 4 km vest for Gl. Ry) af landpostbud Eriksen på vejen, formentlig overkørt af en bil. Coll. slagtersvend Carlo Agerskov. Efter medd. i "Silkeborg Avis" $^{23}/_{10}$ 1956.

1 stk. i oktober 1956 i Præstø havn af seminarieelev Preben Henriksen. Coll.? Medd. Knud Juul af Anfred Pedersen, Violvej 6, Vordingborg.

Udaterede fund i efteråret 1956:

*1 stk. i efteråret 1956, død i Ullerup-Visby-Heltborg kommune (ved Hurup i sydvestl. Thy). Finder uk. Coll. Heltborg skole. Medd. mig af lærer H. Frøkjær Andersen, Heltborg skole.

1 stk. i efteråret 1956 på fiskekutter ud for Grenå. Coll. Børgensen, Grenå. Medd. mig af Th. Meltofte Hansen, Bredstrup ved Grenå.

1 stk. i efteråret 1956 midt i Grenå by af uk. pige. Coll. Grenå Vester skole. Medd. mig af Th. Meltofte Hansen, Bredstrup ved Grenå.

1 stk. i efteråret 1956 i omegnen af Haslev af uk. finder. Dyret stærkt defekt, bortkastet. Medd. mig af malermester Tage Jensen, Ulse.

Listen indeholder, som det ses, oplysninger om såvel fangne som blot iagttagne eksemplarer. Den sikre datering for adskillige af bistade-fundene kan måske undre, men det må erindres, at de fleste biavlere kan huske, hvilken dato de begyndte efterårsfodringen af deres bier (notaer for indkøb af sukker til fodringen). Til gengæld er det jo ikke sikkert, at dyrene er krøbet ind i bistadet på netop den dato, hvor de blev fundet, og det gælder især de eksemplarer, der er fundet døde i bistaderne. Men også de "frie" eksemplarer har kunnet opholde sig flere dage her i landet — evt. tvunget til passivitet af

Tabel I. Fund af *Acherontia atropos* i Danmark i 1956:

	Jylland	Fyn	Sjælland	Loll.-Fa.	Bornh.	Total
maj	—	—	1 (død)	—	—	1
3/7	1	—	—	—	—	1
august.....	2 (1 død)	—	—	—	—	2
16/8	1 (b)	—	—	—	—	1
20/8	1	—	—	—	—	1
27/8	1 (lys)	—	—	—	—	1
28/8	—	—	—	—	1	1
ult. aug.	6 (3 b)	2	1	—	—	9
1/9	1	2	1	—	1	5
2/9	—	—	1 (b)	—	—	1
3/9	—	—	1	—	—	1
4/9	—	1	3	—	3	7
5/9	10	—	2	—	2+1 l.	14+1
6/9	2	—	1	—	1 (b)	4
7/9	4	4 (1 b)	5 (1 b)	—	5	18
8/9	2 (1 b)	—	3	—	—	5
9/9	4	—	2 (1 b)	—	—	6
10/9	6 (1 b)	—	2	—	1	9
11/9	4 (2 b)	1	1	—	2 (1 b)	8
12/9	2	—	—	—	1	3
13/9	—	—	—	—	—	0
14/9	2	1	—	—	—	3
15/9	5 (1 b)	—	3 (2 b)	—	—	8
16/9	4	—	—	—	1	5
17/9	2	1	1	—	—	4
18/9	—	—	—	—	1	1
19/9	1	—	—	—	—	1
20/9	4 (1 b)	—	2	—	—	6
21/9	3	—	—	—	—	3
22/9	1	—	—	—	1 (død)	2
23/9	—	—	—	—	1 (død)	1
24/9	1	—	—	—	1	2
25/9	—	—	1 (b)	1	—	2
26/9	—	—	—	—	—	0
27/9	1	—	—	—	—	1
28/9	1	—	—	—	—	1
29/9	—	—	—	—	—	0
30/9	1 (død b)	—	—	—	1	2
1. uge i sept.	—	—	1	—	—	1
2. uge i sept.	—	—	—	—	—	0
3. uge i sept.	3	—	—	2	—	5
4. uge i sept.	—	—	—	—	—	0
1. halvd. „	1	—	—	1 (1 d. b)	—	2
2. halvd. „	—	—	—	—	—	0
september .	26	1	10	—	—	37
oktober	3	—	1	—	—	4
efteråret ...	3 (1 d. b)	—	1	—	—	4
Ialt i 1956:	109 (13 b)	13 (1 b)	44 (7 b)	4 (1 b)	23 (2 b) 1 l.	193+1

193 imagines — deraf 24 ekspl. i bistader (b) + *1 larve* (l).

ydre forhold — hvorefter de først på særlig gunstige dage er blevet fundet i større tal. Det vil naturligvis kunne forrykke datoerne for de store indvandringsbølger, men det drejer sig næppe om mere end få dage, og i alle tilfælde vil de samme regler gøre sig gældende også for udlandets vedkommende.

Af listen fremgår videre, at begge køn fandtes repræsenteret, men det vil være umuligt at sige noget om forholdet mellem antallet af de to køn.

Tabel I giver en oversigt over fundene af *Acherontia atropos* i Danmark i 1956, fordelt på landsdelene.

Omstående tabel viser altså, at der ialt i Danmark blev fundet 193 imagines og 1 larve.

Tabel II angiver fordelingen af fundene på landsdelene i procenter:

Tabel II.

	Jylland	Fyn	Sjælland	Loll.-Fa.	Bornh.	Total
Fund	56,5 %	6,7 %	22,8 %	2,1 %	11,9 %	100 %
(Areal)....	(69,2 %)	(8,2 %)	(16,5 %)	(4,7 %)	(1,4 %)	100 %

Tallene i paranteserne angiver landsdelenes procentvise andel i det "egentlige" Danmarks areal, og det ses heraf, at procenttallene for fundene nogenlunde følger procenttallene for arealerne. Afvigelserne kan skyldes større eller mindre befolkningstæthed eller en særlig energisk samler (Sjælland: Vallø (Kielstrup)). Bornholm danner dog en undtagelse, idet antallet af fund her er langt større, end areal-tallet "berettiger" til. En forklaring herpå er måske, at dyrene, der er nået til øen efter det lange hop over Østersøen, er blevet mere udmattede end dyrene over det øvrige Danmark. De har krævet en længere hviletid, hvilket på grund af den stadige tilflyvning sydfra har forårsaget en større "tæthed" af dyrene på øen.

Tabel III viser fordelingen af fundene efter den måde, hvorpå de blev gjort:

Tabel III. Fordelingen af fundene af *Acherontia atropos* i Danmark i 1956 efter den måde, hvorpå de blev gjort:

25 ekspl. — 12,95 % — kviksølvdamplamper
24 ekspl. — 12,44 % — i og umiddelbart ved bistader
7 ekspl. — 3,63 % — på tilfældige lysgivere
4 ekspl. — 2,07 % — til havs på fartøjer
133 ekspl. — 68,91 % — på andre tilfældige steder.

Denne tabel viser, at langt over halvdelen af fundene blev gjort på ganske tilfældige steder, mens fundene på HG-lamper samt fundene ved eller i bistader tilsammen kun udgør en fjerdedel af samtlige fund. De 2 sidstnævnte fangstmetoder udgør jo de eneste for samlere tilgængelige muligheder for — med forsæt — at finde ekspl. af *atropos*, også under normale omstændigheder.

Tabel IV giver fordelingen af fundene i 1956 i Danmark efter årstid.

Tabel IV. Fund af *Acherontia atropos* i Danmark i 1956:

	maj	juni	juli	aug.	sept.	okt.	nov.	efterår
antal...	1	—	1	15	168	4	—	4
procent.	½ %	—	½ %	8 %	87 %	2 %	—	2 %

Tabellen viser den voldsomme koncentration af fund i september måned 1956.

Tabel V angiver fordelingen af fundene i september 1956.

Tabel V. Fund af *Acherontia atropos* i Danmark i september 1956:

	1.—7. sept.	8.—15. sept.	16.—22. sept.	23.—30. sept.
daterede:	50 ekspl.	42 ekspl.	22 ekspl.	9 ekspl.
udaterede:	1 ekspl.	0 ekspl.	5 ekspl.	0 ekspl.
udaterede:	2 ekspl.		0 ekspl.	
udaterede:	37 ekspl.			

Tabellen viser, at koncentrationen af fund er størst i første halvdel af september. Af total-tallene fra tabel I

ses det da også, at det største antal fund ligger i ugen fra $^{4}/_{9}$—$^{11}/_{9}$, hvor der blev fundet ialt 71 daterede eksemplarer. Det udgør 42 % af september-fundene og 37 % af det samlede antal fund i 1956.

Det højeste antal fund på een dag var 18 daterede ekspl. De blev fundet den 7. september, og de fordeler sig nogenlunde ligeligt over hele landet. Den næstbedste dag var den 5. september, hvor der blev fundet 14 daterede ekspl. Denne dag lå langt størstedelen — nemlig 10— af findestederne i Jylland. Det synes således, at indflyvningsbølgen har nået Jylland først, hvorefter den i løbet af ganske få dage har nået øerne. Derimod kan der sikkert ikke lægges nogen større vægt på, at maximum for een dag i Jylland blev nået den $^{5}/_{9}$ (10 ekspl.) og på Fyn, Sjælland og Bornholm den $^{7}/_{9}$ (henholdsvis 4, 5 og 5 ekspl.).

Denne indflyvning af *Acherontia atropos* var naturligvis langt fra noget rent lokalt. Dyrene passerede på deres vej fra middelhavsegnene nordpå til Danmark og videre nordpå en række lande, og det vil være naturligt her også at omtale, hvad der blev iagttaget i disse lande. Disse iagttagelser er allerede behandlet med megen omhu af Georg Warnecke. Han har her givet meddelelse om de vesttyske fund af *atropos*, og han ofrer en del omtale på *atropos*'s åbenbare forkærlighed for at søge til bistader.

Vesttyskland.

Juni 1956: 2 ekspl., hvoraf det ene blev fundet i Ötztal i 2000 m's højde. (Ötztal regnes til Alperne (Tyrol), og ekspl. regnes ikke her til fund i Vesttyskland).

Juli 1956: 3 ekspl., hvoraf det ene i bistade.

Aug. 1956: 17 ekspl., hvoraf de 3 fandtes i bistader. Desuden blev der fundet 2 voksne larver, der begge klækkedes.

Sept. 1956: 116 ekspl., hvoraf de 77 var daterede, de 39 udaterede. Den bedste periode var i Vesttyskland tiden $^{2}/_{9}$—$^{10}/_{9}$, hvor der blev fundet 40 daterede ekspl. Af disse blev 4 fundet i eller ved bistader. Desuden blev der fundet 2 larver og 7 pupper, hvoraf i hvert fald den ene klækkedes.

Okt. 1956: 14 ekspl.

Det giver et samlet antal på 151 fund i Vesttyskland i året 1956. Af disse kan dog kun de 147 ekspl. anses for at høre til den her omhandlede efterårs-indflyvning.

Af videre interesse er især et ekspl. — en hun — der den $^{3}/_{9}$ blev fanget på forskningsskibet "Anton Dohrn" på Doggerbanken på positionen 55° 43' nord, 3° 19' øst. Dette fund må ses i forbindelse med indflyvningen i Storbritannien.

Storbritannien.

Her citerer Warnecke: French, R. A.: Migration Records 1956. The Entomologist, 90, 1957, No. 1132, side 229—231.

French skriver, at i 1956 blev der i Storbritannien iagttaget ikke mindre end 381 ekspl. af *Acherontia atropos*. Det hidtil højeste antal fund i et år var 101 ekspl., der blev fundet i 1933. Der bliver i Storbritannien hvert år fundet en del ekspl. af arten, i "dårlige år" dog højst 20 ekspl. (således at *atropos* altså er en langt hyppigere gæst i Storbritannien end i Danmark). French hævder, at man for Englands vedkommende må dele året 1956 i 2 perioder. Den første periode rækker fra juni til og med den 30. august, og den anden periode starter den 2. september.

I juni blev der i England fundet 7 ekspl., i juli 6 og i august 7, hvoraf de 6 inden den $^{14}/_{8}$ og det sidste den $^{30}/_{8}$.

Den 2. september indtraf så en kraftig indvandringsbølge, idet der i Sydøstengland blev iagttaget 33 ekspl. på denne dato, og den kraftige indflyvning vedvarede i

de følgende dage ($^{7}/_{9}$: 21 ekspl., $^{9}/_{9}$: 19 ekspl. og $^{10}/_{9}$: 26 ekspl.). Fordelingen af de den $^{2}/_{9}$ iagttagne ekspl. så således ud: de 30 ekspl. blev fundet i Norfolk på Englands østkyst lige over for Holland. Derud over blev der fundet 1 ekspl. i Hampshire og 1 ekspl. i Surrey — begge i Sydengland — og så 1 ekspl. i Midlothian, der ligger på sydkysten af Firth of Forth i Skotland. Samme nat fløj der 1 ekspl. til fyrskibet "Pharos", der er udstationeret mellem Fife-Ness og Bell-Rock på nordkysten af Firth of Forth. French mener, at dette viser, at indflyvningen i Storbritannien er sket dels fra Holland over Nordsøen til Englands sydøstkyst, dels ude fra Nordsøen til Skotland.

Ialt blev der i september fundet 274 daterede og 61 udaterede ekspl. De daterede ekspl. fordeler sig således: England: 208 ekspl., Skotland: 54 ekspl., Wales: 3 ekspl. og Irland: 9 ekspl. French anfører især, at tallet fra Skotland er bemærkelsesværdigt, da meldinger om fund af vandresommerfugle herfra er sjældne.

I oktober fandtes der ialt 23 ekspl., og i november kun 2 ekspl.

French melder intet om fund af larver eller pupper.

Holland.

Her citerer Warnecke: Lempke, B. J.: Trekvlinders in 1956. Ent. Ber. 17, nr. 10, oktober 1957, side 193—196.

Der blev i 1956 i Holland fundet ikke mindre end 344 ekspl. af *Acherontia atropos*. Dertil kommer fund af 6 larver (5 i sept. 1956 og 1 i begyndelsen af oktober 1956) og 2 pupper — fundet i anden halvdel af september. 344 fund af *atropos* i Holland er bemærkelsesværdigt, selv om fund af *atropos* ikke er nogen større begivenhed dér. Det er anslået, at der gennemsnitligt hvert år i tiden 1940—1955 er iattaget 16 ekspl.

Det første fund af *atropos* blev gjort den $^{28}/_{4}$, og indtil ind i august blev der gjort yderligere få fund, så der

var intet usædvanligt i denne optræden, men den 2. september indtraf en stigning. Denne stigning var imidlertid ikke nær så stærk som tilfældet var i England, idet der i Holland blev fundet: $^{2}/_{9}$: 3 ekspl., $^{3}/_{9}$: 0 ekspl., $^{4}/_{9}$: 9 ekspl., $^{6}/_{9}$: 12 ekspl. med maximum den $^{10}/_{9}$: 23 ekspl. og $^{13}/_{9}$: 25 ekspl. Ialt blev der i september fundet 246 daterede og 69 udaterede ekspl. I oktober faldt tallet til 17 ekspl., og i november blev der kun fundet 1 ekspl. ($^{20}/_{11}$).

Lempke anfører, at det blev iagttaget, at enkelte ekspl. der blev fundet siddende, afgav deres puppevædske, når de blev berørt, og han mener, at det har været de — få — ekspl., der må have været udklækket i Holland, og som har været efterkommere af den tidlige *atropos*-indflyvning samme år.

Belgien.

Der foreligger ingen meddelelser om fund af *Acherontia atropos* i Belgien i året 1956.

Frankrig.

French oplyser, at der ikke foreligger oplysninger om særlig mange fund af *atropos* i 1956 i Frankrig. Det synes, som om *atropos* er trukket uden om Frankrig. Der foreligger kun melding om eet fund, nemlig 1 ekspl. i Elsass, men der findes ingen datering af dette fund.

Østtyskland.

Se M. Koch 1958 side 6—9.

Af denne artikel fremgår det, at der også i Østtyskland i 1956 blev gjort flere fund af *atropos*. Der blev ialt fundet 13 ekspl., hvoraf de 12 blev fundet i september (uden nærmere datering) og 1 ekspl. i oktober 1956 (ligeledes uden datering). Af disse 13 ekspl. blev de 2 fundet i Østsachsen i sept., mens der blev fundet ialt 6 ekspl. i Zehdenick og Kreuzbruch (begge nord for Ber-

lin), og 5 ekspl. blev fundet ved Wolgast og Usedom ved Østersøen.

Det anføres, at når der ikke blev fundet flere ekspl. i DDR, skyldes det den omstændighed, at "trækket har været vestligt". Om trækretningen mener forfatteren, at den har været nordlig og nordøstlig.

Alpe-området.

I *Nordtyrol* fandt der også en stor indflyvning sted, anfører Warnecke. Den begyndte den 2. september 1956 og tog til i styrke med maximum i den første trediedel af september. På dette tidspunkt var der kun yderst få og spredte fund i det tilgrænsende Syd- og Midttyskland, mens en fortætning blev iagttaget i Nordtyskland.

I *Norditalien* blev der ved Gardasøen ved Riva lokket med lys allerede fra den $^{7}/_{9}$ 1956, men den første *atropos* viste sig først den $^{12}/_{9}$, og masseflyvningen satte først rigtig ind den $^{15}/_{9}$.

I *Schweiz* blev der ved Grimmelhospiz ifølge Imhoff (Mitt. Ent. Ges. Basel, n. F. 7, 1957 side 12—14) iagttaget over 100 ekspl. af *atropos* på lys den $^{11}/_{9}$ 1956.

Finland.

Ingen konkrete meddelelser, men der skal være taget flere ekspl. af *atropos* i 1956 end andre år. *Atropos* er normalt ikke hyppig indvandrer her.

Sverige.

Warnecke citerer meddelelser fra dr. Fr. Nordström, Stockholm. I 1956 blev der iagttaget ca. 50 eksemplarer af *atropos*.

Den $^{4}/_{9}$ 1956 blev der fundet 2 ekspl., $^{6-10}/_{9}$: 16 ekspl.. $^{11-20}/_{9}$: 21 ekspl. og $^{21-29}/_{9}$: 7 ekspl. Uden datering: 2 ekspl.

Fundene geografisk fordelt: Skåne: 7 ekspl., Småland: 7 ekspl., Öland: 7 ekspl., Gotland: 2 ekspl., Östergötland:

2 ekspl., Västergötland: 2 ekspl., Bohuslän: 7 ekspl., Värmland: 5 ekspl., Dalarne: 6 ekspl., Hälsingland: 1 ekspl., Medelpad: 1 ekspl. og Norra Västerbotten (65° n. br.): 1 ekspl.

Norge.

Se Holger Holgersen 1956, side 145—149.

Holgersen oplyser, at der er gjort ialt 44 fund af *atropos* i Norge i 1956. Der blev fundet 2 ekspl. i juni og 3 ekspl. i juli. Disse fund hidrører fra den tidlige indflyvning sydfra. Det "store træk" indfandt sig i slutningen af august og især i september. Der blev fundet 8 ekspl. i august, ialt 29 i september. Derud over blev der fundet 2 ekspl. i oktober.

Det nordligste fund i 1956 i Norge blev gjort i Mo i Rana tæt ved polarcirklen på ukendt dato. Der er dog tidligere år fundet *atropos* helt oppe i den norske Finmark. Flere år findes den slet ikke i Norge.

Den første dato for efterårs-indflyvningen var den 2. september. De fleste fund blev gjort i egnene omkring Norges syd- og vestkyst, hvilket er ganske naturligt, da befolkningstætheden er størst dér. Invasionen synes ikke at have bredt sig så langt nord på i Norge i 1956, som det har været tilfældet i tidligere år.

Andre vandrersommerfugle i 1956.

Det er bemærkelsesværdigt, at det ikke alene var *Acherontia atropos,* der vandrede nordpå i efteråret 1956. Også den kendte vandrer *Herse convolvuli* L., der som bekendt er af omtrent samme størrelse som *atropos,* viste sig i Storbritannien i større antal end nogensinde tidligere. Der blev optalt ialt 151 ekspl., og det interessante er, at deraf blev de 133 ekspl. iagttaget i september, hvor de oven i købet begyndte at vise sig samme dato, som *atropos* ankom i større tal, nemlig den 2. september.

Det mærkelige ved denne pludselige masseoptræden

i England er, at der ikke blev iagttaget nogen større optræden end normalt i hverken Holland eller Tyskland — specielt ikke i Nordtyskland, hvor der slet ingen iagttagelser fandt sted. Derimod foreligger der (M. Koch 1958 side 11—12) meddelelse om, at der i Midt- og Sydtyskland fandtes flere ekspl. end normalt. Den første iagttagelse blev gjort den $^{6}/_{5}$ 1956 i Unterfranken, Lippe. I omegnen af Kassel blev der fanget 8 ekspl. mellem den $^{18}/_{8}$ og $^{17}/_{9}$. Der blev endvidere fundet 4 ekspl. i slutningen af september i Zwickau.

Dr. Garthe har oplyst, at *convolvuli* ikke var sjælden på lys i Bamberg helt til midten af oktober 1956.

I Holland forekom der ialt kun 20 fund i 1956 mod 21 fund af *convolvuli* i 1955.

I Østtyskland blev der ifølge meddelelser fra dr. E. Urbahn kun fanget 1 ekspl. i 1956.

Her i Danmark blev der ifølge de mig foreliggende oplysninger fundet ialt 3 ekspl. af *Herse convolvuli* i 1956: 1 ekspl. i Nordjylland, 1 ekspl. på Nordfyn og 1 ekspl. på Midtsjælland. Denne forekomst kan ikke på nogen måde betegnes som unormal. *Convolvuli* findes regelmæssigt hos os, ofte endda i adskilligt flere ekspl. end 3. Den store indflyvning i England må altså have fulgt en meget vestlig kurs, men der foreligger ikke oplysninger om masseoptræden i Frankrig eller Belgien.

En anden vandrer, dog langt sjældnere end de 2 foregående, nemlig den til de såkaldte "micros" hørende *Margaronia (Glyphodes) unionalis* Hb., der er ret udbredt i Sydeuropa, fandtes i Storbritanien i meget større tal end hidtil — også på omtrent samme tidspunkt som de foregående arter, nemlig fra den $^{3}/_{9}$ 1956. Fra denne dato til den $^{23}/_{10}$ blev der iagttaget ialt 108 ekspl. med maximum den $^{9}/_{9}$ og $^{10}/_{9}$.

Jeg kender ikke tallene fra Holland, men fra Tyskland oplyser G. Warnecke, at der blev fundet 2 ekspl.

Tabel VI. *Acherontia atropos* i Europa i 1956.

Måned:	Danmark	Norge	Sverige	Vesttyskl.	Østtyskl.	Storbritannien	Holland	Alpeområdet
april.....	—	—	—	—	—	—	1 ($^{28}/_{4}$)	—
maj	1	—	—	—	—	1 ($^{13}/_{5}$)	—	1
juni	—	2	—	1	—	7	4	13
juli.....	1	3	—	3	—	6	1 ($^{20}/_{7}$)	—
august.....	15	8	—	17	—	7	5	2
september .	168	29	48	116	12	335	315	legio
deraf:								Schweiz: Grimmelhospiz: $^{11}/_{9}$: over 100
$^{1-10}/_{9}$	70	4	18	40	?	120	90	
a) $^{1-5}/_{9}$	(28)	(2)	(?)	(18)	(?)	(47)	(17)	
b) $^{6-10}/_{9}$....	(42)	(2)	(?)	(22)	(?)	(73)	(73)	
$^{11-20}/_{9}$	39	5	21	19	?	111	123	Italien: Riva v.Gardasøen: $^{7-11}/_{9}$: 0 $^{12}/_{9}$: 1 $^{15}/_{9}$: legio
$^{21-30}/_{9}$	14	3	7	18	?	43	33	
september ÷ datering .	45	17	2	39	12	61	69	—
oktober	4	2	—	14	1	23	17	2
november..	—	—	—	—	—	2	1	—
"efterår"...	4	—	—	—	—	—	—	—
total.....	193	44	48	151	13	381	344	legio
deraf efterårsindflyvn..	191	39	48	147	13	360	333	legio
tidlige indflyvn....	2	5	—	4	—	21	11	?
larver	1	?	?	2	?	?	6	?
pupper	—	?	?	7	?	?	2	?
	Under alle omstændigheder kun yderst få fund af larver og pupper.							
Fund af: *Herse convolvuli* L...	3	—	?	>13	1	151 (sept.: 133)	20	?
Fund af: *Margaronia* (*Glyphodes*) *unionalis* Hb	—	—	—	2	—	108	?	?

Det ene blev fundet den $^{6}/_{9}$ — det var en hun — i Garding ved Eiderstedt på vestkysten af Slesvig (Jeschke). Det andet blev fundet ved Bad Blankenburg i Thüringen den $^{25}/_{9}$ på lys af dr. H. Steuer.

Denne art, der indtil nu er fundet her i landet i hvert fald i 7 ekspl. (3 på Bornholm, 2 på Sjælland, 1 på Bogø, 1 på Falster) blev tilsyneladende ikke fundet her i Danmark i 1956, og det må antages, at trækket har haft en så vestlig retning, at der intet unormalt har været med hensyn til denne art i Danmark.

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Tabel VI viser en oversigt over de i Europa i 1956 iagttagne *Acherontia atropos* L., imagines, larver og pupper samt over *Herse convolvuli* L. og *Margaronia unionalis* Hb.

Specifikationen af september måned 1956 viser, at den store indflyvning næsten overalt satte ind omkring den 2. september. Derefter steg antallet jævnt i løbet af få dage, således at maximum blev nået i perioden $^{6-10}/_{9}$ i Danmark, Vesttyskland og England, mens maximum tilsyneladende først blev nået i Holland, Sverige og Norge et par dage senere, nemlig i perioden $^{11-20}/_{9}$. Man kan dog ikke bygge noget helt sikkert på disse tal, da de ret store tal for fund uden datering i september i virkeligheden kan tænkes at vise et andet maximum. Derimod er det mærkeligt, at området "Alperne" har en normal indflyvning på 13 ekspl. i juni, kun 2 ekspl. i august, hvorefter der den 2. september i Nordtyrol begynder en større indflyvning, hvis maximum bliver nået i første trediedel af september, på et tidspunkt, hvor bølgen allerede har passeret det tilstødende Tyskland. Og sydligere — ved Gardasøen i Italien — bliver den første *atropos* først iagttaget den $^{12}/_{9}$ til trods for, at der har været lyslokket allerede fra den $^{7}/_{9}$. Her nås maximum først den $^{15}/_{9}$. I Schweiz nås maximum som tidligere nævnt den $^{11}/_{9}$.

Dertil kommer, at B. J. Lempke fra Holland har med-

delt, at han har modtaget oplysning om, at Caron lyslokkede ved Palermo på Sicilien i tiden mellem den 31. august og den 13. september. I denne periode så han fra 5—12 ekspl. hver aften på sit lys, idet tallet var jævnt stigende henimod den sidste dag, da han holdt op. Det kan således siges, at maximum ved Palermo i hvert fald ikke blev nået før tidligst $^{12—13}/_{9}$, muligt først senere.

Holger Holgersen anfører i sin artikel om *atropos*, at vejret uden tvivl har spillet en stor rolle ved denne massevandring. Han nævner, at der i tiden mellem den $^{27}/_{8}$ og $^{30}/_{8}$ 1956 gik et lavtrykscentrum over Nordsøen fra det sydvestlige England til Skagerak. Vindene omkring dette lavtrykscentrum, i forbindelse med stort set sydlige vinde over kontinentet syd derfor, kan have begunstiget en sommerfuglevandring mod nord. Fra 31. august 1956 og 3 uger frem var det stort set pænt vejr over det meste af Mellem- og Sydeuropa, med 1-2 højtryksområder og lette, skiftende vinde rundt omkring. Det er netop, hvad Holgersen som ornitolog ville kalde for et udmærket "trækvejr". Såfremt indvandringen har fundet sted gennem Mellemeuropa til Skandinavien igennem denne periode, har den altså været begunstiget af vejret. Holgersen skriver til slut: "Anticyklonisk vejr udløser og befordrer fugletræk, og det er ikke urimeligt at antage, at det kan virke på samme måde, også når det gælder sommerfugle".

Warnecke citerer i sin artikel professor dr. Seilkopf (Seewetteramt des Deutschen Wetterdienstes in Hamburg). Han skriver, at dr. Seilkopf er af den mening, at "sådanne sommerfugle når Norden med varmluftkiler fra deres oprindelsessted. Således vil det — i hvert fald i reglen — også være. Gennem denne antagelse forklares for det første, at sommerfuglene optræder ganske pludseligt, men dernæst — og ikke mindst — kan det indtil nu ikke særlig klart forståelige fænomen forklares, at sommerfuglene også dukker op på vore breddegrader, selv

når der hersker dårligt vejr her, idet de brede varmluftkiler støder dybt ind i koldfronten — uvejrsområdet — hvor kilen så først bliver nedbrudt".

Denne hypotese giver efter min mening en forklaring på, at *atropos*'ernes indvandringsbølge nåede det nordlige Europa: England-Skotland-Danmark på tilsyneladende samme dato ($^2/_9$ 1956), mens den kom lidt senere — bortset fra enkelte ekspl. — til Holland-Norge-Sverige, et par dage senere til Midteuropa og endnu senere til Sydeuropa. Dyrene er lettet fra deres oprindelsessted — formentlig i Nordafrika, hvorefter de af en nordgående, varm luftstrøm i ret stor højde er ført nordefter med temmelig stor fart. Da varmluftkilen er blevet nedbrudt ved Nordsøen, er dyrene tvunget nedefter, hvorefter den pludseligt optrædende masseindvandring er indtrådt i områderne nord derfor. Samtidigt er de efterfølgende dyr i samme kile også tvunget nedefter på det sted, hvortil de var nået, og derpå optræder indvandringsbølgen noget sydligere og tilsvarende senere. Disse dyr fortsætter så deres vandring mod nord, hvilket er grunden til, at indvandringen fortsætter, omend noget svækket.

Fra oprindelsesstedet er samtidigt med den første "luftbårne" indvandringsbølge andre dyr vandret mod nord, men på sædvanlig måde, nede ved jorden. Disse dyr når først frem til Alperne omkring midten af september, på et tidspunkt, hvor dyrene fra den "luftbårne" afdeling allerede er rømmet mod nord i de tilstødende landområder.

Det er naturligvis kun en hypotese, men den forklarer efter min mening den kendsgerning, at en kolossal mængde *atropos*'er pludseligt kan optræde i det nordlige Europa, uden at de i nævneværdig grad er blevet iagttaget under deres vandring mod nord i egnene syd derfor, hvorover den sandsynlige trækrute har gået.

— — —

Det siger sig selv, at de i denne artikel anførte tal langt fra kan være nøjagtige, og de dækker så langt fra

det antal dyr, der i den pågældende periode har været i luften over Europa, men de giver dog — synes jeg — nogle retningslinier. Muligheden for at finde *atropos'*er er nogenlunde ligeligt fordelt på hele befolkningen, hvilket ikke var tilfældet med en sommerfugl som *Celerio lineata* f. *livornica,* hvor et fund af et ekspl. krævede den sammenfaldende tilstedeværelse samtidigt af en sommerfugl og en samler. Til gengæld gav det sidstnævnte forhold en langt mere nøjagtig datering end i tilfældene med *Acherontia atropos.*

Måtte dette anspore samlerne til — såfremt et nyt tilfælde af massevandring skulle indtræffe i fremtiden — hos de evt. tilfældige findere at fremskaffe så nøjagtige oplysninger omkring fund som muligt. Sådanne oplysninger vil være af uvurderlig betydning for udforskningen af dyrenes vandringer, men de siger naturligvis intet som helst om årsagerne til disse vandringer, et problem, der er mindst lige så interessant.

Summary.

The moth *Acherontia atropos* L. is wellknown in Denmark. We find it now and then, but not every year, and most times only a few specimens are noticed. Until now it only appeared in greater numbers in 1908, 1918 and 1935.

The number of specimens noticed in any of these years was, however, greatly surpassed in 1956 with no less than 193 moths recorded. 191 may be considered as belonging to the mass-occurrence noticed in most of Western Europe in the autumn of 1956. The list enumerates every specimen found, with or without dates, both captured and seen.

Among the 191 specimens found during August and September 1956 in Denmark only 34 or 17,8 % were captured by collectors, while the rest — 157 or 82,2 % — were found by accidental persons. 24 specimens — 12,44 % — were found in or in the immediate vicinity of beehives, a wellknown finding-place for *atropos.*

Table I gives a survey of the Danish records from 1956, specifying the number of moths recorded in each of the different parts of the country.

Table II shows the percentage in the different parts; it appears that the number of captures approximately follows the areas.

Table III shows the places in which the specimens were found: 12,95 % at mercury-vapour lamps (HG-lamper), 12,44 % in or in the vicinity of beehives, 3,63 % at different sources of light, 2,07 % on ships on the sea and in the rest, 68,91 % in other places of more or less accidental character.

Table IV shows the seasonal distribution of specimens and table V specifies the records from September 1956.

Table VI gives a survey of records from most of the western parts of Central and Northern Europe, seasonally distributed and further specified for the month of September. Besides, the table shows captures made at the same time of the two notoriously migrating species: *Herse convolvuli* L. and *Margaronia* (*Glyphodes*) *unionalis* Hb.

The strange fact that the moths apparently appear first in the North and the maximum number caught may be said to "wander" towards the South seems to confirm the hypotesis of Prof. Seilkopf, Hamburg, that migrating butterflies sometimes are carried by warm air currents in greater heights from their source places. When such a wedge of warm air meets a cold "air-front", the wedge is dissolved, and the moths are forced down. Maybe this can explain why the moths suddenly can appear in the North in masses without being noticed on their way over Middle Europe. In the same time a normal migration takes place following the surface in the same direction as the surge first mentioned, but it will reach the North some time later.

Litteratur.

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Anmeldelser og mindre Meddelelser.

T. W. Langer: **Nordens Dagsommerfugle i Farver.** Munksgårds Forlag A/S. København. Pris Kr. 125.—.

I sandhed et pragtværk: format som Kraks vejviser, tykkelse som Seitz's tredie textbind (der jo omtaler 2.800 palæarktiske "ugler"), trykt på fornemt papir, udstyret med et væld af farvetavler i otte!-farve-tryk, til en pris, som ikke mange almindelige samlere kan binde an med — og al den luxus som ramme om en behandling af de blot 135 nordiske dagsommerfuglearter.

Stilles i fremtiden spørgsmålet, hvorledes et sådant værk har kunnet se dagens lys, så giver bogens (to) forord intet svar. Spørgsmålet er dog rimeligt, og forklaringen er den, at forf., da han som heldig præmievinder i et fjernsyns-"show" (betegnelsen "show" er hans egen) havde offentlighedens projektør rettet mod sig, benyttede lejligheden til at meddele, at han havde liggende et manuskript om Danmarks dagsommerfugle, som ventede på en udgiver. Det forlag, som nu har formidlet udgivelsen, greb chancen. Bogen måtte trykkes uden tilskud fra videnskabelige fonds, altså på ren kommerciel basis, og det blev ikke den bog, forf. oprindeligt havde tænkt sig. For at forstørre markedet måtte både Sveriges, Norges og Finlands områder med, bogen skulde endvidere være stor og flot illustreret, de dyre farvetryk skulde udnyttes to gange, på den måde at forf. omgående skulde give sig til at udarbejde en anden, mere "populær" bog med samme farvetavler, og endelig var det nødvendigt, at det hele var i handelen, inden det kunne befrygtes, at tiden havde blegnet forf.s just erhvervede folkeyndest. Hårde vilkår, men dog acceptable for forf., som fortjener en uforbeholden kompliment for at have klaret denne kraftpræstation. Hårdt må det have været for en biblioteksmand at kapere, at bogen blev udgivet tidløst, uden mulighed for at konstatere noget trykkeår, et forhold, som kendes fra visse engelske bøger, og som man måske forestiller sig som en slags sikring mod forældelse.

Resultatet er blevet, som forlaget har ønsket, en dyr og fornem bog, velegnet som flot gave til "naturvenner", vel værd at eje for en bogelsker. Alt, som tjener nysnævnte formål, har vist sig i skønneste orden. Her på dette sted skal kun nogle enkelte punkter, som har relation til danske arters systematiske og faunistiske forhold, berøres.

Man åbner altid med en vis beklemthed en ny bog om dagsommerfugle: hvormange af de latinske navne kan man mon identifi-

cere? Hedder f. ex. bredpanden *Augiades sylvanus* stadig "*Ochlodes venatus*"? Den gør det faktisk, men man får dog (p. 45) at vide, at man må "være forberedt på, at arten, når nærmere undersøgelser er blevet foretaget, igen skal til at skifte navn". Altså en stakket frist. At forf. i forordet (p. 10) med henblik på nomenklaturen tilmod roser sig af, at han "har i intet tilfælde hoppet over, hvor gærdet er lavest, d. v. s. anvendt navne, blot fordi de har været benyttet tidligere i skandinaviske bøger", tjener ikke til beroligelse. Det skal derfor strax pointeres, at nomenklaturen stort set ikke er værre, end den tilsyneladende "skal" være indenfor dagsommerfuglene. Gene volder som sædvanligt den efter anm.s mening aldeles overflødige (og aldrig ordentligt begrundede) opsplitning af blåfuglene i talrige småslægter. Bogen opdeler yderligere familierne i underfamilier, af hvilke nogle har aparte navne, men da der normalt ikke gives mindste motivering for opdelingerne, kan man med god samvittighed se helt bort herfra. Dog gøres et sted (p. 62) på så overraskende vis rede for forskellen mellem underfamilierne *Dismorphiinae* og *Pierinae*, at det fortjener at citeres. Om *Dismorphiinae* hedder det ordret: "egenarten fremgår både af strukturen og af den kemiske sammensætning af skællenes hvide farvestof. Mens det nemlig har vist sig, at dette hos underfamilien *Pierinae* består af et urinsyrederivat leucopterin ($C_{19}H_{19}O_{11}N_{15}$), som . . . . . forekommer hos alle arter i underfamilien, men endnu ikke er påvist uden for den, findes der hos *Dismorphiinae* og iøvrigt også hos adskillige andre grupper uden for Pieriderne stoffer af en helt anden kemisk struktur, de såkaldte flavoner. Underkaster man *Leptidea sinapis* L. en kemisk prøvelse, viser det sig, at farvestoffet er af flavon-karakter. Hvor vi hos *Pierinae* har gule farver, er der ikke, som man skulde tro, tale om flavoner, men om xanthopterin ($C_{19}H_{19}O_7N_{15}$), en lidt mindre iltet form af leucopterin." Selvom man naturligvis ikke undgår at imponeres over et sådant opbud af analytisk kemi i systematikkens tjeneste, er man alligevel forf. taknemlig for, at han afstår fra på tilsvarende måde at motivere andre underfamiliers "egenart".

Bogen bærer klart præg af oprindeligt kun at være skrevet med den danske fauna for øje, men denne slagside er jo kun til fordel for danske lepidopterologer.

Fornyligt citeredes i Flora & Fauna (1958 p. 18) en udtalelse af en engelsk entomolog, som "holdt på, at bare man havde eet eksemplar af en aberration, skulle man give den et navn — så vidste man altid, hvad man talte om — bl. a. på auktionerne!" Forf. af heromtalte bog lever ikke helt op til dette princip, og han creerer ikke selv i bogen nye aberrationsnavne, men alligevel opremser han

ganske flittigt en urimelig mængde komplet ligegyldige "*forma*"-navne. Alene for *Epinephele* (her kaldet *Maniola*) *jurtina* nævnes (p. 285) over 30 sådanne navne efter følgende recept: "f. ♀ *alba* Black: forvingepletten hvid; f. ♀ *pallens* Th.-M.: pletten gulhvid; f. ♀ *semiintermedia* Lpk.: plettens øverste halvdel gulbrun, nederste halvdel hvid; f. ♀ *intermedia* Black: pletten gulbrun; f. ♀ *antirufa* Lpk.: pletten rødlig; f. ♀ *huenei* Krul.: pletten lille og brunt bestøvet . . . . " osv., osv. Da der for et stort antal arter (ihvertfald mindst 15) også anføres latinske "*forma*"-navne for "dværge", hvorved forstås individer, som har sultet i larvestadiet, er det berettiget at forlange besked på, hvor meget mindre end gennemsnittet (eller vel snarere end typeexemplaret) et individ skal være for at udmærkes med et latinsk "dværgnavn". Forf. besvarer faktisk spørgsmålet for arten *Vanessa* (her *Inachis*) *io*, hvor nedre grænse for vingefanget angives til 45 mm, inden man "taler om dværgformen f. *iodes* Ochs.". Mærkeligt nok har man ikke i tilnærmelsesvis samme udstrækning kastet sig over at udspekulere latinske navne for de individer, som har været heldigere stillet som larver, og derfor er blevet større end normalt, men det må vel komme. Retfærdigvis må det dog fremhæves, at forf. tager positiv afstand fra navngivning af monstrøsiteter, som alene er karakteriseret ved et unormalt forløb af vingeribberne eller ved afvigelser i vingefaconen. Ja, han siger endog (p. 55) om de 11 navne af den slags, han anfører: "Ulykkeligvis er også sådanne abnormiteter blevet benævnt i stort tal".

Forf.s vurdering af de lokaliteter, han har fundet i literaturen, er højst ujævn. De indsamlede findesteder for *Melitaea aurinia* gengives (p. 181) uden kommentar og bibringer læseren det indtryk, at denne art må være at finde mange steder på Sjælland, medens den triste virkelighed er, at der vel allerede er gået langt over et kvart århundrede, siden det sidste sjællandske exemplar blev fanget. Omvendt udøver forf. megen kritik overfor de i literaturen angivne lokaliteter for en art som *Coenonympha hero*, hvor det således (p. 266) hedder: "Strøm opgiver den i 1874 fra Fredensborg og Stenholt vang i Nordsjælland, og de lokaliteter høres der intet om senere, sikkert fordi der har foreligget forvexling med *C. tullia*." Det er en alvorlig beskyldning at rette mod en mand som Strøm, at han skulde forvexle to så vidt forskellige arter, og påstanden er da også helt ud i det blå. For det første er det nu slet ikke Strøm, men Bang-Haas, der har opgivet den fra Fredensborg, for det andet var den på den tid ikke sjælden i skovene på Fredensborgkanten. (Anm. har endnu siddende i sin samling et af disse exemplarer (Sørup Hegn, coll. Fencker)). Om samme art, der er interessant ved i Danmark aldrig at være taget udenfor Sjælland, skrev Hoffmeyer-

Knudsen i den kendte 1938-Fortegnelse: "Et Ekspl. i den Wedell Wedellborgske Samling paa Nath. Mus. i Aarhus er etiketteret Fanø(!)". Det fremgik ikke, om udråbstegnet skulde udtrykke glæde over at besidde et ex. "etiketteret" fra Jylland, eller om det snarere var ment som et spørgsmålstegn, og forf. af nærværende bog havde nu haft en god lejlighed til at skabe klarhed over problemet. Han tager også sagen op, men desværre lykkes det ham fra sin skrivebordsstol yderligere at tilsløre forholdet. Først siges (p. 266), at Fanø er "så omtrent den sidste lokalitet, man kunne vente for *hero*, der jo er så udpræget et skovdyr. Rent umiddelbart gætter man på en fejletikettering — blot ændring til Fænø ville have gjort sagen mere sandsynlig", men derpå får man at vide, at "mange udenlandske håndbøger opgiver *Elymus arenarius* eller dog *Elymus*-arter som foderplante, og marehalm er der nok af på Fanø." Så sluttes der af med en bemærkning om, at da larven synes at være "i almindelighed så godt som ukendt, kan *Elymus*-opgivelsen meget let være forkert." Og herefter er man altså lige vidt.

Anm. nærer imidlertid ikke mindste tvivl om, at det meget omtalte exemplar er taget på Sjælland, nærmere betegnet ved Fakse, en i tidligere tid velkendt lokalitet for arten (se Bang-Haas' Fortegnelse). Denne opfattelse støttes af den kendsgerning, at der i den danske samling på Zoologisk Museum i København i mangfoldige år har siddet et exemplar, på hvis etiket tydeligt er kalligraferet "1865 Faxø", en stavemåde, man i ældre tid brugte for Fakse. Tager man så i betragtning, at lokalitetsetiketten på Wedell-Wedellsborgs exemplar næppe er orginal, men omskrevet af Wedell-Wedellsborg, hvilket man dengang brugte (og desværre af og til stadig bruger) for at få sine "egne", ensartede etiketter på dyrene, er sandsynligheden overmåde stor, for at forklaringen simpelthen er den, at Wedell-Wedellsborg har læst fejl af Faxø og Fanø, da han skrev sin lokalitetsetiket, og at man således helt kan se bort fra at spekulere mere på marehalm.

Pladsen her tillader ikke at fremdrage flere enkeltheder, hvilket ellers nok kunde have været ønskeligt. Sammenfattende må siges, at den flotte bog desværre ikke er blevet den afrunding af Hoffmeyers trilogi om de øvrige storsommerfugle, som man stadig har håbet på, engang måtte komme.

Og der er stadig brug for en à jour-ført udgave af Kløckers for sin tid aldeles fortræffelige lille billige dagsommerfuglebind i serien Danmarks Fauna (1908). Denne series første billebind er udkommet i revideret udgave, og hvis det samme kunde ske med det første sommerfuglebind, vilde vi få netop den bog, som flertallet af almindelige danske samlere savner.

Niels L. Wolff.

Aculeate hymenopterer ny for den danske fauna.

Af K. Fæster

Vespa omissa Bisch. (*ingrica* Birula). 1 ♂ Stensbæk Plantage $^{19}/_{7}$ 1948, Worm-Hansen leg.

Ancistrocerus scoticus Curt. Talrige eks.

Ancistrocerus ichneumonideus Ratz. (*thomsoni* Blüthgen olim). 1 ♀ Stensbæk Plantage $^{22}/_{7}$ 1948, Worm-Hansen leg.

Nomada mutabilis Mor. 1 ♀ Møen, Schiødte leg., Beaumont det.

Nomada cinnabarina Mor. 1 ♀ Kongsøre $^{25}/_{7}$ 1942, Fæster leg.

Halictus fratellus Pérez. 1 ♂ Nysted $^{11}/_{9}$ 1916, Laur. Jørgensen leg., 1 ♂ Ryget $^{13}/_{8}$ 1917, Kryger leg.

Halictus brevicornis Schenck. 1 ♂ Ellingelyng $^{2}/_{7}$ 1950, Carolsfeld-Krausé leg.

Halictus tarsatus Schenck. 1 ♂ Ellingelyng $^{2}/_{7}$ 1950, Carolsfeld-Krausé leg., Blüthgen det.

Trennung der *Sphecodes*-arten *pellucidus* Smith und *divisus* Kirby (Hym., Apidae)

von K. Fæster

Pellucidus. Der Schrägwulst, der am Seitenteil des Pronotum sich zum Vorderrand des Sclerites erstreckt, ist am Ende scharf gekielt und erreicht den Vorderrand, wo der Kiel eckig nach unten gebogen ist und sich in der scharfen Kante des Sclerites fortsetzt. Unmittelbar oberhalb dieser Stelle ist der Vorderrand schwach eingekerbt.

Divisus. Der Schrägwulst ist nicht gekielt und erreicht nicht ganz den Vorderrand des Sclerites, sondern ist von diesem durch einen ganz schmalen, in der Regel etwas rinnenartigen, Streifen getrennt. Der Rand des Sclerites ist oberhalb dieser Stelle ganz gerade.

Dieses kleine Merkmal, das immer deutlich ist und sowohl bei Weibchen wie bei Männchen vorhanden, gestattet eine absolut sichere Bestimmung dieser sonst oft kaum unterscheidbaren Arten.

A crane-fly larva (*Tipula juncea* Meigen) living in blown sand.

By Axel M. Hemmingsen.
Strødam Biological Laboratory, Strødam, Hillerød.

Most tipulid eggs shrivel if not kept moist, and few tipulid larvae live in dry localities. For instance, Rogers (1933, p. 23) found that out of 18 types of inland locality in northern Florida, the two driest were not inhabited by any stage of any species. However, the palaearctic *Tipula juncea* Meigen oviposits in sometimes apparently rather dry sandy soils, for instance even blown sand, by insertion of the entire abdomen into the sand, so that the eggs are laid at a distance below the surface, which is likely to ensure a sufficiently high relative moisture even though the absolute content of moisture may be low (Hemmingsen, 1952, p. 370—385, notably p. 379—380; also 1956, p. 270—275).

Still, in captivity the species prefers wet sand for oviposition (Hemmingsen, 1952, p. 430); and Savchenko (1956, p. 140) describes as its biotopes moist sandy soils at meadows and ponds in woods, and shrubberies along rivers and lakes beaches. Where I have found the species and where I have seen it oviposit in nature the sand would, however, generally be rather dry at least in the surface (dune heath and fire-breaks in dune forest in Western Jutland and North Sealand).

It seems likely that other species of the *Tipula juncea*-group are adapted to similar dry biotopes, for the shovel-shaped cerci characteristic of the group are evidently adapted to deep ovipository borings, and at least one of the species, *Tipula pribilofensis* Alexander is reported from sand dunes ("Tolstoj dunes") in the Pribilof Islands (Alexander, 1923).

In a previous paper (Hemmingsen, 1956, p. 248) a survey of the geographical distribution of the *T. juncea*-group was attempted. It should be supplemented with *T. platyglossa* Alexander 1936 and *T. timptonensis* Savchenko 1956 from palaearctic Asia.

In a survey in the Ukrainian language of the palaearctic species of the group Savchenko (1956) has proposed for it the subgeneric name *Odonatisca* (from the superficial resemblance of female *T. juncea* to small *Odonata*). He reduces *T. juncea, T. mystica* Alexander 1924, and *T. platyglossa* to being three geographical subspecies of one species, *T. juncea,* and thinks that *T. longicauda* Matsumura is a synonym of *T. mystica.* While Lackschewitz (1936, p. 298) reports *T. juncea* no further east than European Russia, Savchenko quotes it *(T. j. juncea)* as occurring not only in the whole of Europe, except in the extreme north and perhaps in the south, but also in S. W. Siberia to the Altai and east to S. perhaps also N. Yakutia. South of the easternmost part of its range it is replaced by *T. j. platyglossa* in the Baikal area, west to Krasnoyarsk, north almost to Yakutia, east to the Amur region; and south of the Sayan, in at least part of Mongolia. In the Far East the third subspecies, *T. j. mystica* is known from the Sovjet Coastal Provinces, Sakhalin and Hokkaido, but may perhaps extend somewhat further south.

The larvae of the group are unknown (Savchenko, 1956, p. 132). The pupa of *T. juncea* was described, on the basis of both sexes, by Theowald (1957, p. 279).

The posterior end of larvae of *Tipulinae* is usually truncated in the shape of a spiracular disc bearing the two spiracles and surrounded by a number of fleshy lobes usually 6 arranged in dorsal, lateral, and ventral pairs and often adapted to suspension from a water surface film. In species living in free water the lobes may be provided with strikingly long hairs, which especially

ensure the attachment to the water surface film. I have seen this particularly pronounced in the (first instar) larva of *Tipula saginata* Bergroth which oviposits in moss on stones in the midst of streams (Skäralid and Klöva Hallar, Scania, in May-June). Yet, the lobes are present also in

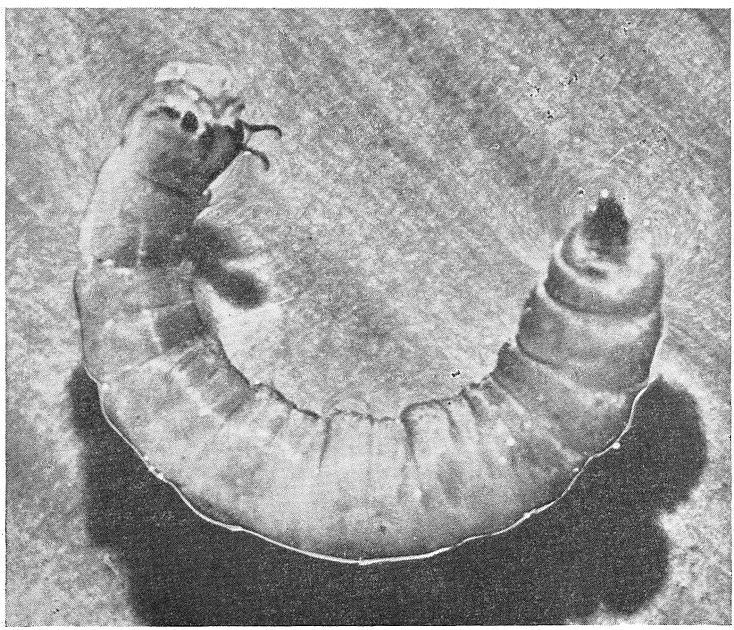


Fig. 1. Larva photographed in water. Length 22—29 mm according to degree of stretching.

a number of species that live in less saturated substrates such as forest soil or wood. In some of the larvae living in decayed wood they are rudimentary.

It seemed of interest, therefore, to know to what extent such lobes were developed in a tipulid larva living in a substrate such as blown sand where it would not have to place its spiracular disc against any water surface film, and where there may be expected to be some

danger of desiccation even though the sand may usually be rather moist except near the surface.

Thorough and repeated searching about mid-May by digging and sifting sand in a locality where imagines of *Tipula juncea* were known to have occurred from the end of May to about the beginning of August in the preceding years (fire breaks of the dune forest of Tisvilde Hegn in North Sealand), yielded only (18. V. 1954) one nearly full-grown tipulid larva and one tipulid pupa at a depth of about 15—20 cm. They are illustrated in figs. 1—3. The pupa was *Tipula juncea* Meigen, as kindly identified by Dr. Br. Theowald, Amsterdam. The larva during movement in water measured about 26 mm in length and 3.6 mm in diameter. It was yellowish white. A dense cover of longitudinally directed dark hairs produced in certain lights a brilliant lustre. There were also single thin bristles toward the sides; and above, small black points irregularly ar-

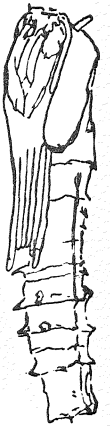


Fig. 2. Pupa. Length 18.5 mm.

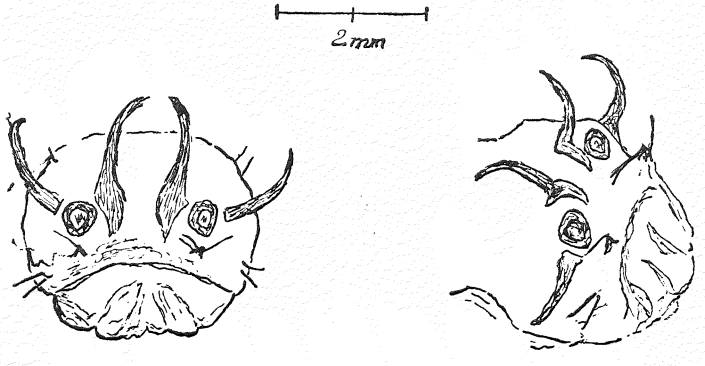


Fig. 3. Spiracular disc of the larva shown in Fig. 1.

ranged. The head capsule was dark. No intestinal content could be discerned.

The very characteristic spiracular disc on the larval skin still attached to the pupa when it was found, indicated that the pupa was of the same species as the larva, the spiracular disc of which is shown in fig. 3. It will be seen that the dorsal and lateral lobes of the spiracular disc are not fleshy as in most tipulids but are heavily sclerotized as long anteriorly curved horns. Unfortunately the larva perished in my absence during an attempt at hatching.

That the larva in question actually belonged to the species *Tipula juncea,* was checked by rearing larvae hatched from eggs laid by *T. juncea* females. Following a method kindly demonstrated to me by Professor Hans Bauer and Miss Liselotte Richter, Wilhelmshaven, on my visit there in 1953, the larvae were fed on moistened *Urtica* leaf powder as obtainable from a drug store (*Herbae Urticae*). The larvae emerged from the eggs after 10—14 days, but they developed very slowly. Larvae preserved at various body sizes could be arranged in three groups according to body size, size of the head capsule and type of spiracular disc (see table and figs. 4—7).

The head capsules and the spiracular discs have practically one appearance within all larvae of 2.7—7 mm body length (fig. 5 and 7 a-b), and a somewhat different appearance within those of 7—9 and 26 mm body length (fig. 6, 7 a-c, and 3). Remarkably enough the bifurcate horny appendages of the spiracular disc of the first two size groups (fig. 7 a and b) are smallest in the larger of these two groups. Of the spiracular discs in the 6 larvae in the 3rd size group, 2 are as pictured in fig. 7 c, while two are as shown in fig. 7 d; and two as in

Fig. 4. Preserved larvae of *Tipula juncea* Meigen reared on *Urtica* leaves. Body lengths: a: 2.7—4.5 mm; b: 5—7 mm; c: 7—9 mm. Within each of the stages a, b and c the left larva presents a dorsal view; the middle larva, a lateral view; and the right larva, a ventral view.

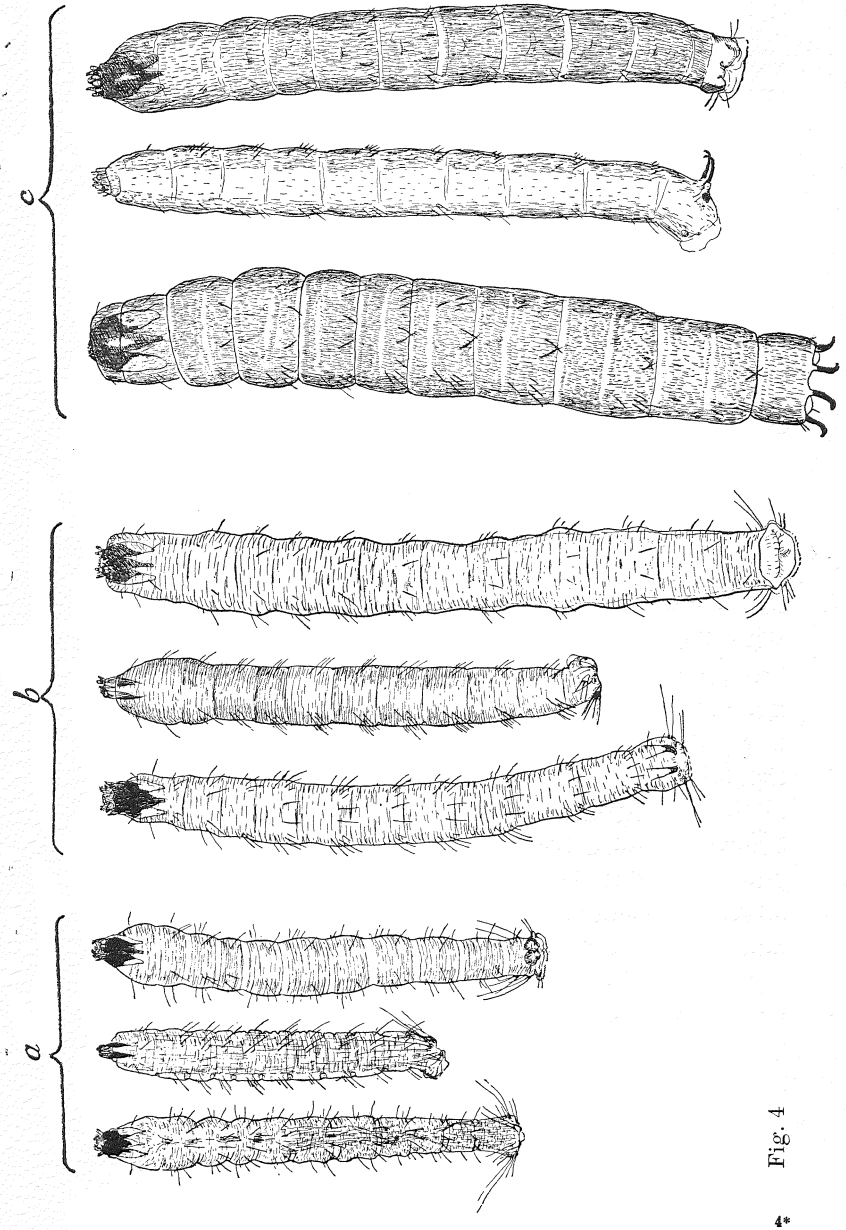


Fig. 4

Table.

Available larval stages of *Tipula juncea* Meigen.

Length of larvae in mm	Head capsule breadth in mm		Number of larvae	Fig. No.	
	Majority of larvae	Mean		Whole larvae	Spiracular disc
2.7—4.5	0.22—0.28	0.25	25	4 a	7 a
5—7	0.31—0.37	0.36	27	4 b	7 b
7—9	0.38—0.63	0.50	6	4 c	7 c-e
26	1.31		1—(2*)	1	3

*) Larval skin attached to pupa shows head capsule and spiracular disc.

fig. 7 e. Fig. 7 e represents a larva preserved in November from eggs laid the same summer: June-July 1955. It will be seen that the spiracular disc in fig. 7 e is very much like the one in fig. 3 of the larvae found in nature with the exception that the rudimentary ventral lobes are placed more laterally (as also in fig. 7 d) than in fig. 3 apparently joining the lateral pair of setae seen in fig. 3. Now, in fig. 7 c though the dorsal and still more the lateral horny lobes are very poorly developed, the rudimentary ventral lobes are actually placed as in fig. 3 below the spiracles with some hairs in a more lateral position. There is thus very much to indicate that the larva represented in figs. 1 and 3 was actually *Tipula juncea.*

Within the third size group there is rather a wide variation in breadth of head capsule (see table), and the difference between the three types of spiracular discs (figs. 7 c, d and e) within the same group is perhaps correlated with differences in head capsule breadths. For the purpose of discussion we shall, however, at least provisionally consider the third size group as one entity.

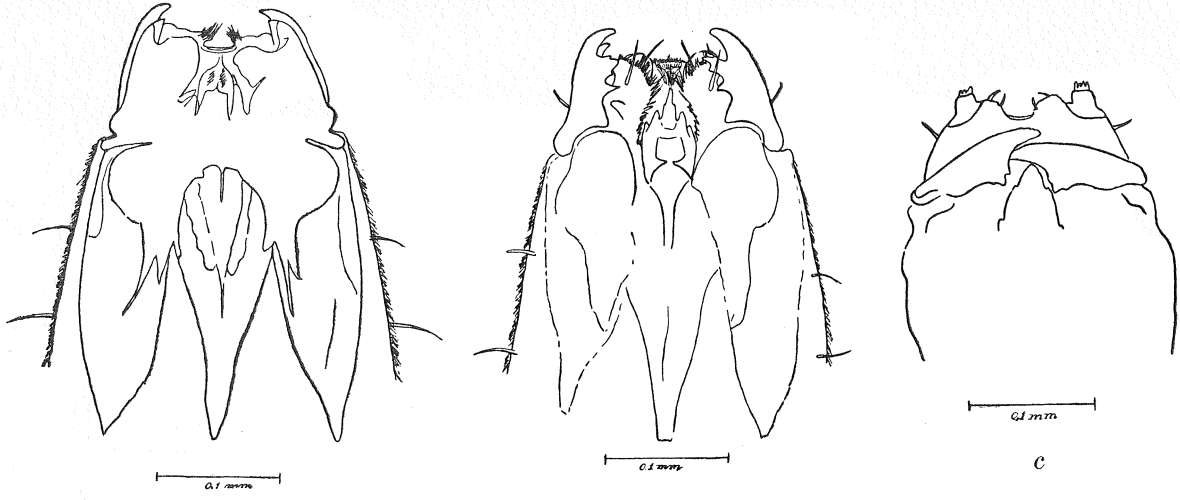


Fig. 5. Head capsules of the smallest size group of *Tipula juncea* larvae (2.7—4.5 mm body length). Cleared in euparal (a and b) or canada balsam (c).

a. dorsal, b. ventral views of same larva; c. ventral view of another larva with adducted mandibles, so that the antennae are visible.

It is stated as a general rule that there are 4 larval instars in *Tipula* (Hennig, 1950; Brauns, 1954). If this applies also to *T. juncea,* the question arises whether the four instars might be represented by the four horizontal lines in the table; by figs. 4a, b, c and fig. 1 for the whole

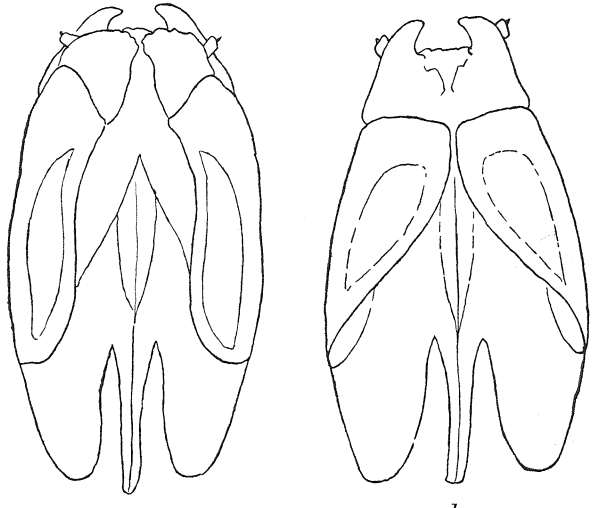


Fig. 6. Head capsules of full-grown larva. a. dorsal, b. ventral view. Schematic drawing based on head capsules from remnants of full-grown larva, on larval skin attached to pupa, and on stage c. Should perhaps have been a little broader relative to its length. Normal breadth about 1.3 mm.

larvae, and by figs. 7a, b, c-e, and fig. 3 for the spiracular discs.

According to Dyar (1890) the insect head-width follows a regular geometrical progression in successive instars (Dyar's law; cf. Imms, 1957, p. 230). Figures given by De Jong (1925, p. 26, 30, 42 and 45) for *Tipula oleracea* "L. 1758", *T. paludosa* Mg., *Pales maculata* Mg. and *T. vernalis* Mg., and by Sellke (1936, table on p. 508) for *Tipula paludosa* Meigen and *Tipula czizeki* De Jong show

that the "law" applies also to the 4 larval stages in these tipulids. It will be seen from the table, however, that in *T. juncea* the increase in mean breadth of the head capsule from one size group to the next agrees with Dyar's law only from group 1 to 2, and from 2 to 3, whereas the difference between the size groups 3 and 4 in the

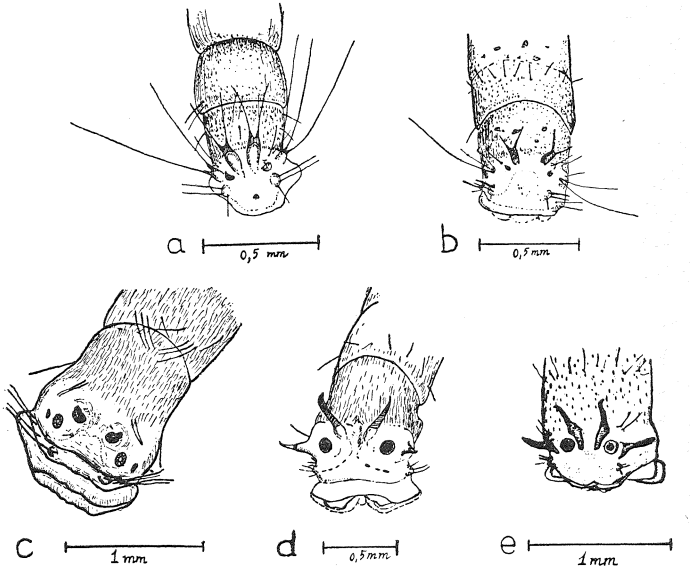


Fig. 7. Spiracular discs of young larvae of *Tipula juncea* Meigen reared on *Urtica* powder. Body lengths: a: 2.7—4.5 mm; b: 5—7 mm; c, d and e: 7—9 mm.

table would require two other instars between them to conform with Dyar's law. In this connection it is irrelevant that the ratio of width of the insect head capsule in one instar to that in the preceding instar may not be really constant but slightly changing throughout development (cf. Bliss and Beard, 1954, and Imms, 1957; both with references).

Compared with the body lengths at the 4 larval stages of the other *Tipula* species just mentioned growth in the

3 first size groups of the larvae under consideration is much retarded. The three types of spiracular discs (figs. 7c-e) within the third size group may possibly represent different degrees of retardation within one instar. It seems therefore possible that the head capsule breadths of the 3 first stages, reared on *Urtica* powder, have attained much smaller sizes than they do under natural conditions on a possibly more adequate diet; rather than that 2 instars should be missing.

Sclerotization of the dorsal and lateral lobes of the spiracular disc as four curved horns as in the larvae of *T. juncea* is found also in the larvae of *Tipula (Lunatipula) livida* v. d. Wulp (Savchenko, 1954, fig. 19 on p. 625; Chiswell, 1955; Theowald, 1957, p. 257—259), the related Canarian *T. (L.) lesnei* Pierre (Hemmingsen, published 1958), and possibly *T. (Lunatipula) recticornis* Schummel (Theowald, 1957, p. 258—260), as well as an unknown North American species (Alexander, 1920, p. 1016, and plate XCVI, fig. 535). *T. livida, T. lesnei* and *T. recticornis* all belong to the *Tipula livida*-group within the subgenus *Lunatipula*. The statement by Beling, (1878, p. 34—35) as repeated by Czizek (1913, p. 160—161) and others, that four such horns occur in the larva of *Tipula selene* Meigen, is due to confusion with *T. livida* (Chiswell, 1955, p. 127; Theowald and Mannheims, 1956, p. 252). The horned larvae described by Beling as *T. selene*, but which were *T. livida*, were found in black wood mould on decayed beech wood and in vegetable mould underneath beech leaves. Savchenko found the larvae of *T. livida* at the base of trees in dry broad-leaved and mixed woods. Chiswell (1954, 1955) found them in the surface of beech forest soil under loose, damp moss and in the top inch or so of moist leaf mould and soil in woods. And Theowald found them in the layer of dead leaves ("Streuschicht") under birch bushes. The larvae of *T. lesnei* live in soil which is often in danger

of being dried up (Hemmingsen, published 1958). The larvae supposed by Theowald to be of *T. recticornis* and according to him described by Savchenko as *T. fascipennis,* were found in the layer of dead leaves in but little moist woods and under bushes (Savchenko). The North American larva mentioned was found beneath a stone in a field.

Near approaches to the structure of the larvae of *T. juncea, T. livida, T. lesnei* and the presumed *T. recticornis* are to be seen in other species of the subgenus *Lunatipula,* such as *T. brevispina* Pierre and *T. selene* Meigen, in which the apical half of each dorsal lobe of the spiracular disc is entirely sclerotized and hook-like (Chiswell, 1956, p. 424; also his figs. 70—71). Chiswell (1956, p. 454 and 457) found the larva of *T. brevispina* in moist woodland soil or under bark or in debris on decaying logs and stumps; and that of *T. selene,* in debris inside the hollow trunk of a willow. Dr. B. Mannheims, Bonn (*in litt.*) has bred *T. selene* from a larva from decayed beech wood; and Theowald (1957, p. 257) found larvae of this species in decayed wood and moss at the base of a dead birch. Even in the larvae of *T. (Vestiplex) scripta* Meigen, *T. (L.) lunata* L., *T. (L.) cava* Riedel, and *T. fascipennis* Meigen the tips of the anteriorly curved conical dorsal lobes are sclerotized (Savchenko, 1954, figs. 13 and 17; Chiswell, 1956, p. 452 and 454, and figs. 68 and 71; Theowald, 1957, p. 249—256). The larvae of *T. scripta* and *T. lunata* live in moist soil and leaf mould in woods or under hedges; and those of *T. cava* and *T. fascipennis* have been found for instance in old cow-dung and under grass.

Also a North American species, *Tipula (Lunatipula) australis* Doane has horn-like structures in the position of the dorsal pair of lobes, the lateral lobes being also strongly sclerotized on their posterior (or ventral) surface. Fourth instar larvae of this species were taken in

Douglas county, Kansas, 15 miles south of Lawrence in February, March and April in loose, organic, sandy soil, fairly damp, at the base of a sandstone cliff in a ravine. Under these conditions there would be occasions when the soil would be quite wet, but in general it was only damp. Also in some other North American (unknown) species the lobes are at least partly horn-like and heavily sclerotized. The data on the horned larvae of *T. australis* and other North American species just mentioned have not been published, but were kindly placed at my disposal by Dr. G. W. Byers, Lawrence, Kansas (*in litt.*).

The larvae under consideration in which sclerotized tips or horns have developed in stead of fleshy lobes thus live in terrestrial not saturated substrates where they do not ordinarily need support from a water surface film, and though a number of larvae living e. g. in unsaturated forest soil or wood have lobes and not horns, the possibility is obvious that there may be a correlation between sclerification of lobes into horns and susceptibility of biotope to desiccation or at least more terrestrial not saturated substrates.

It should be noted, however, that the larva of *T. juncea* when placed in water lifts the spiracular disc to the surface after some time.

Apart from *T. (Vestiplex) scripta* and *T. (Odonatisca) juncea,* all the other 9 above-mentioned known species with 2 or 4 more or less sclerotized horns are of the subgenus *Lunatipula,* and as mentioned *T. livida, T. lesnei* and *T. recticornis* are of the *T. livida*-group. It seems possible that the occurrence of such appendages is primarily characteristic of certain taxonomic groups (constitutional preadaptation, cf. Huxley, 1945, p. 449 seq.), secondarily serving as selected adaptations. It would be interesting to know whether also in other species of the *T. juncea*-group (subgenus *Odonatisca* Savchenko 1954) and of the *T. livida*-group (within the subgenus *Luna-*

tipula), all 4 dorsal and lateral spiracular lobes are sclerotized horns.

The idea that sclerotization of the lobes of the spiracular disc into horns is associated with lower degrees of humidity of the larval substrates such as non-saturation or susceptibility to desiccation, is supported by the wide variation in the size, shape, pigmentation and sclerotization of the lobes within the *Tipulinae*; for this variation is fairly closely correlated with the nature of the larval environment (Savchenko, 1954; Chiswell, 1956). Thus, according to Chiswell (1956, p. 411) "as a general rule, the lobes of aquatic or semi-aquatic species (those which live in saturated or very wet soil and moss) are all moderately long with flattened posterior surfaces, whereas in more terrestrial species (those which live in moist but not saturated soil or in decaying wood) the dorsal and ventral lobes are considerably shorter than the lateral ones and, although the ventral lobes are usually flattened, the dorsal and lateral lobes are conical. In some of the species that tunnel in decaying wood, the lobes of the disc are not shorter than those of many soil-living forms, but in others all the lobes are very short. In the aquatic and semiaquatic species there is usually a brown or pale brown stripe on one or both margins of each lobe, with darker patches at the base and tip of each ventral lobe. The more terrestrial species show a greater variation in the sizes, shape, and position of the pigmented areas, which are often heavily sclerotized and dark brown or black."

Theowald (1957, p. 205) does not deny the correlation in question, but illustrates with examples that it must not be too categorically asserted. Excepting larvae with long, hairy lobes which are known to him only from water, Theowald considers it unjustified to ascribe a function to the structure of the lobes, which may merely indicate in which environments the larvae preferably develop.

At the same time there is a considerable reduction in the length of the anal papillae in the more terrestrial species (Savchenko, 1954; Chiswell, 1956, p. 413; Brindle, 1957). In accordance with this at least all the known palaearctic, presumably also the known nearctic, tipuline larvae with 2 or 4 horny lobes including *T. juncea* (figs. 1, 3, 4, and 7) have short anal papillae.

Theowald (1957, p. 206) calls attention to the possibility that the anal papillae may be salt (chloride) absorbing organs of osmoregulation as in *Culicidae* and *Tendipedidae* (= *Chironomidae*) rather than gills, but gives examples to show that the correlation between development of these structures and humidity of the substrate is not absolute.

Considering all the evidence here discussed, there seems actually to be much to suggest that the sclerotization of the dorsal and lateral lobes of the spiracular disc as also the shortness of the anal papillae in the last instar larva of *T. juncea* are in some way ascribable to the non-saturation and susceptibility to desiccation of its sandy biotope. The absence of a water surface film explains why the lobes are not flat, soft and provided with marginal hairs as in aquatic and semi-aquatic species. The possibility that the sclerification of the lobes may be a more direct adaptation to dryness is a different problem.

While it may seem likely *a priori* that a certain degree of impermeability to water may be conferred by sclerotization (cf. also Kalmus, 1941; Lafon, 1943), there are actually also instances of soft-skinned insects being resistant to desiccation (clothes moth larvae according to Mellanby, 1934), and a superficial layer of grease or wax rather than sclerification is known to be responsible for the impermeability to water in the cuticle of many insects (cf. Wigglesworth, 1950, p. 27—28; Richards, 1951, p. 299 seq.; Edney, 1957, p. 10 seq.).

To this comes that the surface of the spiracular lobes is only a very small fraction of the body surface. It seems that any impermeability conferred to them by sclerotization cannot contribute materially to the water economy of the larva. It would perhaps be worth while considering the possibility that not only the anal papillae but also the spiracular lobes may have some function, osmoregulatory or otherwise, correlated with the degree of humidity of the substrate independently of water permeability.

Among known European tipulid larvae those of *T. livida* and possibly of *T. recticornis* are the only ones which like that of *T. juncea* have both the dorsal and the lateral spiracular lobes sclerotized into horns. In all three species the dark horns are anteriorly curved, but in *T. livida* and the presumed *T. recticornis* the lateral ones are curved downwards; in *T. juncea,* upwards. In *T. livida* and the presumed *T. recticornis* the bases of the anterior horns do not reach down between the two spiracles, whereas in *T. juncea* they do. These bases are sclerotized in *T. livida* and *T. juncea* but not in the presumed *T. recticornis*. The tiny ventral lobes are fleshy in *T. livida* and the presumed *T. recticornis,* black and sclerotized in *T. juncea*. The Canarian *T. lesnei,* which has black horns, is like the other two *Lunatipula* species, *T. livida* and the presumed *T. recticornis,* as regards the characters above mentioned as common to these two species, except that its ventral lobes are provided with a dark spot on their upper surface. The head capsule of *T. juncea* as pictured in fig. 5 differs distinctly from that of *T. livida* as pictured by Chiswell (1955).

Acknowledgements.

My thanks are due to Mr. J. Sjolte Christensen, Mr. Ole Dybkjær and Mr. Kay W. Petersen for assistance in drawing figures, to Dr. G. W. Byers, Lawrence, Kansas, U.S.A., for going through the manuscript and to the Carlsberg Foundation for a grant in support of my studies on the biology of tipulids.

Summary.

Three stages of larvae reared from eggs of *Tipula juncea* Meigen and a full-grown larva and a pupa found in nature, and which are no doubt of the same species, are pictured and discussed as well as head capsules and spiracular discs of various stages. As in *Tipula (Lunatipula) livida* v. d. Wulp, *Tipula* (*Lunatipula*) *lesnei* Pierre and presumably *Tipula* (*Lunatipula*) *recticornis* Schummel, the dorsal and lateral lobes of the spiracular disc of the 4th instar larva of *T. juncea* are heavily sclerotized as long anteriorly curved horns. Reasons are given for believing this to be correlated with the relative dryness of its sandy biotopes.

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Three new species of *Limoniinae* from the Canary Islands.

By
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Through the kindness of Dr. Axel M. Hemmingsen I have had the opportunity of studying a collection of *Limoniinae* made by him in the Canary Islands (cf. the following paper by Hemmingsen, Mannheims and Nielsen). Among the material there were three species new to science. Below I give a description of the species.

All holotype and allotype specimens are to be later preserved in the Zoological Museum in Copenhagen.

I wish to express my best thanks to the artist Mr. Henning Anthon and to Mr. J. Lützen for the excellent drawings of the hypopygia and to Mr. H. V. Christensen for the wing photograph.

Phyllolabis hemmingseni n. sp.

♂ Head dark grey with long black hairs and a narrow black dorsal longitudinal line. Rostrum black, grey-dusted. Palpi black. Antennae black, first segment of scape of antenna dusted with grey. Flagellar segments oval, towards the tip somewhat pear-shaped, each flagellar segment densely covered with short white hairs and with a few bristles at the base of each segment. Praescutum blackish brown, grey-dusted, in the front somewhat shining black, but there is no well-defined stripe. Pleurae blackish brown, grey-dusted, pteropleura with a few strong light brown hairs. Scutellum light brown with light brown hairs. Postnotum brownish, grey-dusted. Halteres light brown with dark knob. Abdomen light brown with light brown hairs. Eighth and ninth abdo-

minal segments black. Coxae light brown, front coxae blackisk-brown in front and at the base.

Femur and tibiae dark brown, tarsi brownish black, metatarsus somewhat lighter at the base. Wings (fig. 1) light tinged and with light brown veins. Wing length 9—10 mm. Stigma present but inconspicuous. Base of the

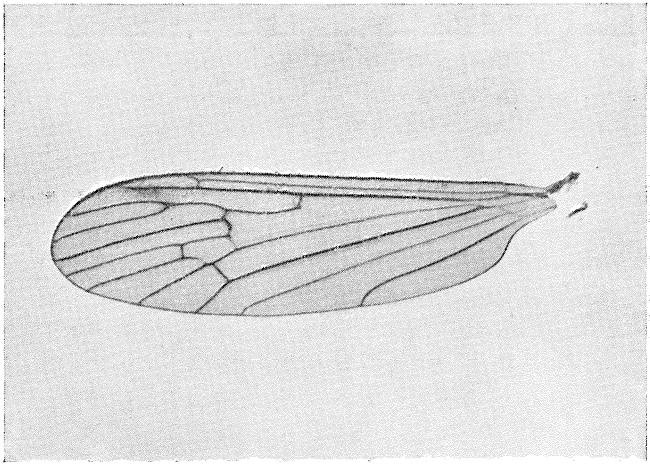


Fig. 1. Wing of *Phyllolabis hemmingseni* n. sp.
H. V. Christensen phot.

fork of R_2 and R_3 and the cross veins faintly clouded, or without clouds. Rs sometimes spurred. Cell 1st M_2 closed.

♀ and ♂ are alike. Cerci light brown, pointed.

Hypopygium (fig. 2) very complex. Ninth tergite without prolongations.

Lackschewitz 1940 (Annalen Naturhist. Mus. Wien, 1939, p. 95) gives a key to the three hitherto known European species of the genus *Phyllolabis*. *Ph. hemmingseni* and *Ph. macrura* Siebke seem most alike, but the hypopygia are very different. In *Ph. macrura* the ninth tergite has two parallel-sided projections in the middle. These are not present in *Ph. hemmingseni*.

♂ holotype, Acequia de Marrero in Barranco de la Higuera, Gran Canaria, 18. III. 1957. In coll. Peder Nielsen.

♀ allotype, Barranco de la Lechucilla to Barranco de los Viñátigos, 25. III. 1957. In coll. Peder Nielsen.

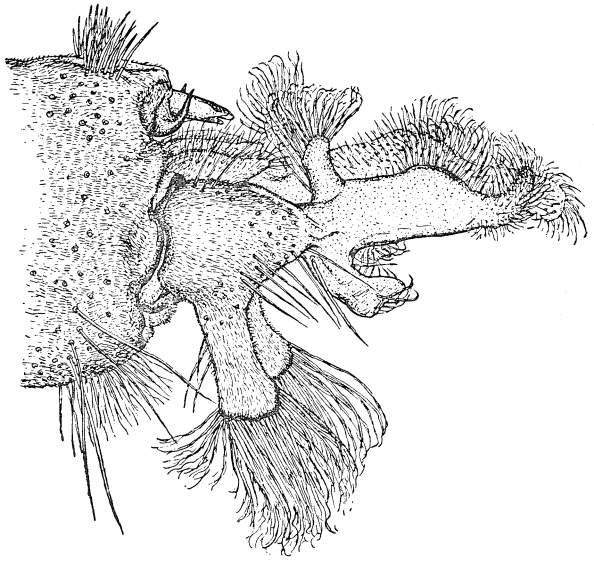


Fig. 2. Hypopygium of *Phyllolabis hemmingseni* n. sp. Henning Anthon del.

Paratypes, 1 ♀ and 1 ♂, Barranquillo de Atalaya, 28. II. 1957, 3 ♀♀, 2 ♂♂, Barranco de la Lechucilla to Barranco de los Viñátigos, 25. III. 1957. In collections Hemmingsen, Peder Nielsen, and Museum Koenig, Bonn.

Gonomyia (Gonomyia) lunulata n. sp.

♂ Head black, greyish-pruinose. Rostrum and palpi blackish brown. Antennae black with long brownish hairs. Praescutum dark yellowish brown with a broad median

line and dark side lines. Scutellum light brown, grey-dusted. Postnotum dark brown with light brown borders, grey-dusted. Abdomen dark brown with yellowish brown margins on tergites, venter light yellowish. Halteres dark brown with light yellowish base. Pleurae yellowish brown, grey-dusted, with a faint darkening from the front to the wing-base. Coxae yellow. Legs dark brown.

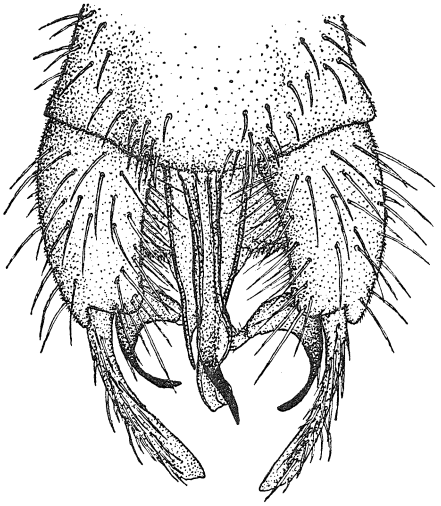


Fig. 3. Hypopygium of *Gonomyia (Gonomyia) lunulata* n. sp. Henning Anthon del.

Wings clear with a faint stigma. Sc ends opposite to the base of Rs. Cell 1st M_2 twice as long as broad. Wing length 5 mm.

Hypopygium (fig. 3). Ninth tergite with a somewhat trapeziform thickening in the middle and with a fringe of hairs at the posterior margin. Outer style long, pale and without any blackening at the inner side of the tip; inner style with a long, black, curved, tooth, and a curved prolongation. Together the teeth are lunate-shaped.

1 ♂ holotype. El Pozo at Barranco de la Herradura

about one km north-west of Los Sauces, La Palma, 8. VI. 1957. In coll. Peder Nielsen.

The species seems to be related to *Gonomyia copulata* Becker 1908 (Mitteilungen Zool. Mus. Berlin. IV, 1908—

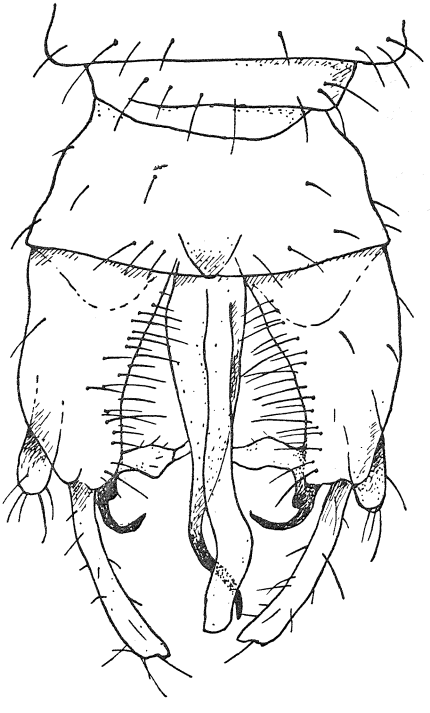


Fig. 4. Hypopygium of *Gonomyia (Gonomyia) minae* n. sp. Jørgen Lützen del.

10, p. 83 as *Dicranomyia copulata*). Unfortunately Becker has not given a figure of the hypopygium.

Gonomyia (Gonomyia) minae n. sp.

♂ Head light greyish pruinose. Rostrum yellow, palpi black. Antennae blackish. Neck and pronotum pale yellow and with a dark median longitudinal line. Praescu-

tum dull dark brownish and yellow at the sides, scutellum dull yellowish. Postnotum blackish brown pruinose. Abdomen blackish brown above except for the yellow side borders, venter brown with yellow lateral margins. Halteres dark blackish brown with light yellow base. Pleurae yellow with a brownish patch in the middle and on lower part of sternopleura. Coxae yellow with brown patch. Legs dark brown to blackish brown.

Wings clear with faint stigma. Sc ends beyond the base of Rs. Cell 1st M_2 about twice as long as broad in the apical part. The position of m-cu varies somewhat. It may be placed just at the base of 1st M_2 or more distally. Wing length 6 mm.

Hypopygium (fig. 4). Ninth tergite with a somewhat V-shaped emargination; outer style long, pale, without any blackening at the inner side of the tip, the inner side of the tip somewhat pointed. Inner style with a large black, curved tooth and with a very small hook at the base of the tooth and a pale, blade-shaped projection. Aedeagus with a long black curved hook.

♀ resembles the male. The cerci are long curved upward and pointed.

1 ♂ holotype and 1 ♀ allotype (coll. Peder Nielsen), and 1 ♀ paratype (coll. Hemmingsen), Barranco de la Mina, Gran Canaria, 28. III. 1957.

G.(G.) minae and *G.(G.) tenella* Meigen are very much alike but the hypopygia are very different.

My best thanks are due to Dr. G. W. Byers, Lawrence, Kansas, U. S. A., for going through the manuscript.

Notes on crane-flies *(Tipulidae)* collected by Dr. Axel M. Hemmingsen in the Canary Islands.

By Axel M. Hemmingsen, B. Mannheims, and Peder Nielsen.

1. Introduction.

An annotated list of *Tipulinae* and *Limoniinae* from the Canary Islands was published by Lackschewitz on p. 5—8 in Frey's paper of 1936, which also (on p. 2) contains references to earlier authors.

Of the species listed in the present paper three (*Phyllolabis hemmingseni, Gonomyia (Gonomyia) lunulata* and *Gonomyia (Gonomyia) minae*) were described as new to science in the preceding paper by Peder Nielsen. Perhaps an *Austrolimnophila* sp. is also new. Apart from these, judging from Lackschewitz (1936), *Austrolimnophila ochracea* Meigen and an *Erioptera* sp. are new to the Canary Islands; *Limonia (Dicranomyia) canariensis* Becker, new to Lanzarote; and *Limonia (Dicranomyia) hamata* Becker, new to Gran Canaria.

The adaptations to the dry climate of Gran Canaria of *Tipula (Lunatipula) lesnei* Pierre, considered a dubious species by Lackschewitz (1936), were studied in a special paper by Hemmingsen (1958b).

2. Biological remarks.

By **Axel M. Hemmingsen.**
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I stayed in the Canary Islands 6/XII 1956—19/VI 1957. I was in Tenerife 6/XII—6/II, 2/VI and 12/VI; in Gran Canaria 12/II—19/V, 1/VI and 13/VI—19/VI; in Lanzarote 21—28/V and 31/V; in Fuerteventura 28—31/V; and in La Palma 3—11/VI.

Further details of localities visited may be found in two other publications (Hemmingsen, 1958a and b). Especial attention was directed to humid spots, of which many did not carry visible water at the time.

From Tenerife, to which after 6/II I paid only two short visits, I have only a specimen of *Limonia (Dicranomyia) chorea* Meigen collected 12/VI in Barranco del Rio, situated at Camino de las Carboneras (a village), twenty minutes' walk from Cruz del Carmen in the Mercedes Forest. This is one of the few barrancos in the islands which carry water all the year round.

The area of observation in Gran Canaria has been described in detail and mapped in a special paper on the biology of *Tipula (Lunatipula) lesnei* Pierre (Hemmingsen 1958b).

In La Palma, which I visited 3/VI—11/VI, numerous flies were seen flying in the rain and spray from the waterfall at Los Tiles (10/VI), and here 8 ♀♀ and 2 ♂♂ of *L. (D.) canariensis* Becker, 1 ♀ of *L. (D.) hamata* Becker, and 1 ♀ of *Austrolimnophila ochracea* Meigen were collected. Flies of the first two species afterwards laid pink eggs in wet cotton. At a place called El Pozo at Barranco de la Herradura (6/VI), where water was seeping down the steep, rocky road side about one km north-west of Los Sauces, 6 ♀♀ and 10 ♂♂ of *L. (D.) canariensis*, 1 ♀ of *Limonia (Geranomyia) maculipennis* Macq. and 1 ♂ of *Gonomyia (Gonomyia) lunulata* Nielsen were taken, the latter new to science. At two minor moist side creeks tributary to Barranco de las Angustias, one of the few barrancos that carry water rather copiously all the year around 2 ♀♀ of *L. (D.) chorea* were taken (4/VI).

I had not expected to find any tipulids in the two eastern arid islands and actually found none in Fuerteventura (28—31/V), though I searched thoroughly 5 barrancos at Betancuria said to carry some water; which however turned out to be extremely scarce there at the

time. More water was carried by Barranco de la Torre (= B. de Antigua, south of Puerto del Rosario, earlier called Puerto de Cabras), but though there were other insects, e. g. many anisopterid and zygopterid dragonflies, there were no tipulids. In Lanzarote, however, 1 ♂ of *L. (D.) canariensis* was collected at Arrecife (30/V), and (26/V) 12 ♀♀ and 8 ♂♂ at a hygropetric biotope, where water came out of a gallery at Chafaris in the valley of Temisa near Haría. Here also numerous larvae, possibly of the same species, lived hygropetrically in frail cases on the water-soaked, steep rock wall (fig. 1).

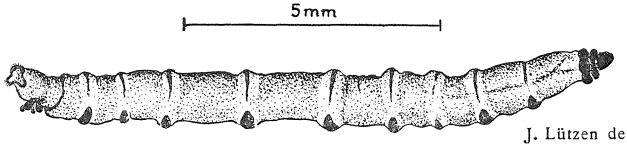


Fig. 1. Hygropetric larva, possibly of *Limonia (Dicranomyia) canariensis* Becker. Chafaris in the valley of Temisa near Haría in Lanzarote. From preserved material.

The bobbing movements so often seen in *L. (D.) chorea* elsewhere, e. g. in Denmark (cf. Hemmingsen, 1952, p. 410) was observed several times in both sexes of this species in the Canary Islands, and a little bobbing was also noted in the female of *L. (D.) hamata* at Los Tiles.

Swarming was observed in *L. (D.) chorea* in the evening 27/II in Barranquillo de Atalaya.

Copulation was observed in several pairs of *Tipula lesnei* (see Hemmingsen, 1958b) and in *L. (D.) hamata* 28/II in Barranquillo de Atalaya. The cerci stood out freely in both species.

Females of the following species placed over wet cotton gave off eggs: *L. (D.) canariensis* (pink), *L. (D.) hamata* (pink), *Austrolimnophila sp.* (light), *Phyllolabis hemmingseni* Nielsen (yellow) and *Erioptera (Trimicra) pilipes*.

3. Tipulinae.

By **B. Mannheims.**
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Tipula (Tipula) mediterranea Lacksch. Gran Canaria: Barranquillo de Atalaya 500—600 m 28/II (1 ♀) and 10/III (1 ♂); Barranquillo de Fuente Fria II, 1600 m 14/V (1 ♂). Only very few other individuals seen in these localities and none elsewhere.

Tipula (Lunatipula) lesnei Pierre. Gran Canaria: Barranco de Bandama, 500—600 m, 10/III—8/IV (11 ♀♀, 101 ♂♂ of which 5 ♀♀ and 6 ♂♂ hatched 15/III—7/IV from 10 larvae and 6 pupae collected 13/III. Besides: 2 not fully hatched ♂♂. Out of a total of 27 pupae, including pupal skins found in the surface of the soil, 11 were females; 14, males; and 2 (defective) of uncertain sex); Barranquillo de Atalaya, 500—600 m, 12/IV (4 ♂♂); Barranco de Merdejo (= B. de Pino Santo), ca. 500 m, 23/III (1 ♀, 8 ♂♂); Acequia de Marrero, 730 m, 18/III (9 ♂♂) and 4/V (1 ♂); Barranco de la Lechucilla—Barranco de los Viñátigos, 1000—1300 m, 25/III (12 ♂♂); Barranco de los Gatos, 1400 m, 15/V (4 ♂♂); Barranquillo de Fuente Fria I, 1600 m, 25/IV (5 ♂♂); Barranquillo de Fuente Fria II, 1600 m, 14/V (15 ♂♂); Montañon Negro, 1500 m, 26/IV (1 ♂); Cruz de los Llanos, 1800 m, 9/V (1 ♂). Without locality, March (2 ♂♂).

I have checked the type specimens of *Tipula lesnei* in the Muséum National d'Histoire Naturelle, Paris. Beside the specimens labelled by Pierre and designated as cotypes I have seen further one female and one male without labels of determination or designation as cotypes, but labelled: "Museum Paris, Grande Canarie, P. Lesne, 5. 2. 1903". Possibly this pair had been retained in the private collection of Lesne and later transferred to the Museum.

Tipula (Oreomyza) rufina Meigen. Gran Canaria: 1 ♀ hatched later in 1957 from a larva taken in spring in the ground rather high in the western slope of Barranco de Bandama.

4. Limoniinae.

By **Peder Nielsen.**
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Species not previously recorded from the Canary Islands, and islands not recorded as localities in Lackschewitz' survey in Frey's paper of 1936 are marked *.

A. Data grouped according to species.

Limonia (Dicranomyia) canariensis Becker. Endemic species. Gran Canaria: Barranco de Bandama, 10/III (1 ♂) and 14/III (1 ♂); Barranquillo de Atalaya or Barranco de Bandama, March (1 ♂); Acequia de Marrero in Barranco de la Higuera, 18/III (1 ♀); Barranco de los Gatos, 14/VI (2 ♀♀). La Palma: Los Tiles, 10/VI (8 ♀♀, 2 ♂♂); El Pozo near Los Sauces, 6/VI (6 ♀♀, 10 ♂♂). Lanzarote*: Arrecife 30/V (1 ♂); Chafaris, 26/V (12 ♀♀, 18 ♂♂).

Limonia (Dicranomyia) chorea Meigen. Tenerife: Barranco del Rio, 12/VI (1 ♀). Gran Canaria: Valle Angostura, beg. Febr. (1 ♀); Barranquillo de Atalaya, 27/II (4 ♂♂); Barranco de Bandama, 12/III (3 ♂♂); Barranco de los Laureles, 20/III (1 ♀); Acequia de Marrero, 18/III (2 ♂♂); Barranco de la Lechucilla, 25/III (1 ♂). La Palma: Barranco de las Angustias, 4/VI (2 ♀♀).

Limonia (Dicranomyia) hamata Becker. Gran Canaria*: The barranco at Hotel Los Frailes, Tafira Alta, 23/II (1 ♂); Barranquillo de Atalaya, 28/II (3 ♀♀, 9 ♂♂) and 10/III (1 ♀, 3 ♂♂); Barranco de Bandama, 11 & 14/III (3 ♂♂); Barranco de los Laureles, 20/III (1 ♀, 1 ♂); Acequia de Marrero, 18/III (5 ♀♀, 21 ♂♂); Barranco de la Lechucilla, 25/III (17 ♀♀, 53 ♂♂); Barranco de la Mina, 28/III (1 ♀, 6 ♂♂). La Palma: Los Tiles, 10/VI (1 ♀).

Limonia (Geranomyia) maculipennis Macq. Endemic species. La Palma: El Pozo near Los Sauces, 6/VI (1 ♀).

**Austrolimnophila ochracea* Meigen. La Palma: Los Tiles, 10/VI (1 ♀).

**Austrolimnophila sp.* Gran Canaria: Barranco de la Lechucilla, 25/III (1 ♀).

**Phyllolabis hemmingseni* Peder Nielsen. Endemic species? Gran Canaria: Barranquillo de Atalaya, 28/II (1 ♀, 1 ♂); Acequia de Marrero, 18/III (1 ♂); Barranco de la Lechucilla—Barranco de los Viñátigos, 25/III (3 ♀♀, 2 ♂♂).

**Gonomyia (Gonomyia) lunulata* Peder Nielsen. Endemic species? La Palma: El Pozo near Los Sauces, 6/VI (1 ♂).

**Gonomyia* (*Gonomyia*) *minae* Peder Nielsen. Endemic species? Gran Canaria: Barranco de la Mina, 28/III (2 ♀♀, 1 ♂).

**Erioptera sp.* Gran Canaria: Barranco de la Mina, 28/III (3 ♀♀).

Erioptera (*Trimicra*) *pilipes* Fabr. f. *andalusiaca* Strobl. Gran Canaria: Creek at Barranco de los Dragonales, 22/II (1 ♀); Barranco Alonso, 3/III (1 ♀).

B. Data grouped according to localities.

Lanzarote. Arrecife: *L.* (*D.*) *canariensis* (1 ♂). Chafaris: *L.* (*D.*) *canariensis* (12 ♀♀, 18 ♂♂).

La Palma. Los Tiles: *L.* (*D.*) *canariensis* (8 ♀♀, 2 ♂♂), *L.* (*D.*) *hamata* (1 ♀), *Austrolimnophila ochracea* (1 ♀). El Pozo at Barranco de la Herradura 1 km north-west of Los Sauces: *L.* (*D.*) *canariensis* (6 ♀♀, 10 ♂♂), *L.* (*G.*) *maculipennis* (1 ♀), *G.* (*G.*) *lunulata* (1 ♂). Barranco de las Angustias: *L.* (*D.*) *chorea* (2 ♀♀).

Tenerife. Barranco del Rio: *L.* (*D.*) *chorea* (1 ♀).

Gran Canaria. Valle Angostura: *L.* (*D.*) *chorea* (1 ♀). Barranco de los Dragonales: *Erioptera* (*Trimicra*) *pilipes* Fabr. f. *andalusiaca* Strobl (1 ♀). Barranco Alonso: *Erioptera* (*Trimicra*) *pilipes* Fabr. s. *andalusiaca* Strobl (1 ♀). Near Hotel Los Frailes, Tafira Alta: *L.* (*D.*) *hamata* (1 ♂). Barranquillo de Atalaya, 500—600 m: *L.* (*D.*) *chorea* (4 ♂♂),

L. (*D.*) *hamata* (4 ♀♀, 12 ♂♂), *Phyllolabis hemmingseni* (1 ♀, 1 ♂). Barranco de Bandama, 500—600 m: *L.* (*D.*) *canariensis* (2 ♂♂), *L.* (*D.*) *chorea* (3 ♂♂), *L.* (*D.*) *hamata* (3♂♂). Barranquillo de Atalaya or Barranco de Bandama: *L.* (*D.*) *canariensis* (1 ♂). Barranco de los Laureles: *L.* (*D.*) *chorea* (1 ♀), *L.* (*D.*) *hamata* (1 ♀, 1 ♂). Acequia de Marrero, 700—800 m: *L.* (*D.*) *canariensis* (1 ♀), *L.* (*D.*) *chorea* (2 ♂♂), *L.* (*D.*) *hamata* (5 ♀♀, 21 ♂♂), *Phyllolabis hemmingseni* (1 ♂). Barranco de la Lechucilla: *L.* (*D.*) *chorea* (1 ♂), *L.* (*D.*) *hamata* (17 ♀♀, 53 ♂♂), *Austrolimnophila* sp. (1 ♀). Barranco de los Viñátigos, 1000—1300 m: *Phyllolabis hemmingseni* (3 ♀♀, 2 ♂♂). Barranco de la Mina: *L.* (*D.*) *hamata* (1 ♀, 6 ♂♂), *G.* (*G.*) *minae* (2 ♀♀, 1 ♂), *Erioptera sp.* (3 ♀♀). Barranco de los Gatos, 1400 m: *L.* (*D.*) *canariensis* (2 ♀♀).

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A Revision of the Danish Species of *Hybomitra* End. *(Dipt., Tabanidae).*

With Description of Five New Species.

By

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Introduction.

Since Lundbeck's paper on the Danish tabanids in "Diptera Danica", part I (1907) nothing has been written on these flies in Denmark. In January 1957 I began an examination of the total Danish material of *Tabanus* s. lat., among which was also Lundbeck's material. In the years from 1907 till now several papers on North- and Westeuropean tabanids have been published, e. g. Verrall (1909), Kröber (1925 and 1932). Goffe (1931), Oldroyd

(1939) and Kauri (1951 and 1954). Besides these works I have used the papers of Olsoufiev (1937) and Leclercq (1952 and 1957), and of course various older papers.

It was very soon evident that there were extensive deviations in the various authors' views on several species. Therefore it was necessary to borrow material of the different authors' species from various collections. I am very indebted to the following persons for valuable help: Dr. Max Beier, Naturhistorisches Museum, Vienna, Austria; Mr. J. E. Collin, Newmarket, Suffolk, England; Dr. Elli Franz, Museum "Senckenberg", Frankfurt a/M, Germany; Dr. K. W. Harde, Staatl. Mus. für Naturkunde, Stuttgart, Germany; Prof. Dr. W. Hennig, Deutsch. Ent. Inst., Berlin, Germany; fil. lic. Hans Kauri, Zool. Institutionen, Lund, Sweden; Dr. Fr. Kühlhorn, Zool. Staatsammlung, München, Germany; Dr. M. Leclercq, Beyne-Heusay (Lg.), Belgium; Dr. B. Mannheims, Zool. Museum Alex. Koenig, Bonn, Germany; Dr. H. Oldroyd, British Museum, London, England; Cand. mag. Schjøtz-Christensen, Naturhist. Museum, Aarhus, Denmark; Prof., Dr. H. Weidner, Zool. Museum, Hamburg, Germany.

Finally I wish to thank Dr. S. L. Tuxen, Zool. Museum, Copenhagen, for his never failing interest in my investigations and for the permission to work at the Zool. Museum of Copenhagen.

The results of my comparative studies are given in table 1. Only the most important synonymies are mentioned in the table, further information is given in the "Discussion" of every species. It was necessary to describe five new species, which are the following: *H. collini, schineri, lundbecki, tuxeni* and *staegeri.*

In a following paper the Danish species of *Therioplectes, Atylotus* and *Tabanus* s. str. will be dealt with.

In the treatment of every species there are six sec-

tions: Identification, Description, Discussion, Occurrence in Denmark, Distribution, and Biology. In the first section is given a summary for the distinction of the closely related species. For the same reason also the "Description" is rather comprehensive, since all details are of importance. The following characters are used: Pubescense of eyes, size of facets in the male, in the female the width of frontal stripe, form of frontal callus, length of hairs on vertex, colour of frontal triangle, colour of 1st and 2nd antennal joint, in the male also length of the hairs on upper side of 1st antennal joint, shape and colour of 3rd antennal joint, width of antennal bow, shape, colour and pubescense of palpi, colour of notopleural callus, colour of halteres, extension and pubescense of sidemarkings on abdomen dorsally and ventrally, width of middle stripe of abdomen and dark coloration of 1st and 2nd sternite.

Collin (1940, p. 178) has shown that the shape of 8th sternite and anal-lamellae is a valuable help for the distinctions between the *Hybomitra*-females of the *bimaculata*-group, see fig. 2. As a rule the 8th sternite and anal-lamellae are hidden in the abdominal tip, but they can easily be seen when a part of the hind margin of 7th sternite and tergite is removed by means of a pin.

In the section "Discussion" I have dealt with my opinion on the connections between the various authors' species. A summary of these results is given in the table 1.

In all species the Danish localities, where the species in question has been collected, are mentioned, in more seldom species also further dates. In some species I have drawn maps on the distribution in Denmark. Because the intensity of collecting has been very different in the various regions of the country, and as the collections as a whole are too scattered, it is still to early too give definitive statements on the distribution of the *Hybomitra*-species in Denmark. Several of the species seem to show

Table 1. *Survey over the synonymous relations between the Danish species and the species of various European authors.*

	Lundbeck (1907)	Kröber (1925 and 1932)	Oldroyd (1939)	Kauri (1951 and 1954)
1. *H. micans* Meig.	not known	*micans* Meig. (Not seen)	*micans* Meig. (Not seen)	not known
2. *H. lurida* Fall.	*luridus* Fall.	*luridus* Fall. (Not seen)	*luridus* Fall. (Not seen)	*luridus* Fall. (Not seen)
3. *H. collini* n. sp.	*tropicus* Pz. partim	*tropicus* Pz. partim *montanus* Meig. mel. form pt.	*tropicus* L. partim (Only the Worcester-specimen)	*tropicus* Pz.
4. *H. bimaculata* Macq.	*tropicus* Pz. partim	*tropicus* Pz. partim	*bisignatus* Jaen. partim (Light form)	?
5. *H. bisignata* Jaen.	*tropicus* Pz. partim	*tropicus* var. *bisignatus* Jaen. (Not seen)	*bisignatus* Jaen. partim (Dark form)	?
6. *H. solstitialis* Meig.	not known	?	*solstitialis* Meig.	?
7. *H. schineri* n. sp.	*solstitialis* Schin. partim	*solstitialis* Schin. partim *tropicus* Pz. partim *montanus* Meig. var. partim	not known, see p. 115	*solstitialis* Schin. partim
8. *H. distinguenda* Verr.	*solstitialis* Schin. partim *mühlfeldi* Brau. partim	*distinguendus* Verr. (Not seen) *tropicus* Pz. partim *solstitialis* Schin. partim *montanus* Meig. partim	*distinguendus* Verr.	*distinguendus* Verr.
9. *H. mühlfeldi* Brau.	*solstitialis* Schin. partim *mühlfeldi* Brau. partim	*solstitialis* Schin. partim *tropicus* Pz. partim	*tropicus* L. partim (All ÷ the Worcester-specimen)	*solstitialis* Schin. partim
10. *H. lundbecki* n. sp.	*montanus* Meig. partim	*montanus* Meig. partim *fulvicornis* Meig. partim	not known, see p. 133	*fulvicornis* Meig.
11. *H. tuxeni* n. sp.	*montanus* Meig. partim	*montanus* Meig. partim *fulvicornis* Meig. partim	not known, see p. 137	?
12. *H. m. montana* Meig.	*montanus* Meig. partim	*montanus* Meig. partim	*montanus* Meig. (Not seen)	*montanus* Meig.
13. *H. m. flaviceps* Zett.	not known	?	?	*montanus flaviceps* Zett.
14. *H. staegeri* n. sp.	*mühlfeldi* Brau. partim	*mühlfeldi* Brau. ?	?	?

interesting distribution-patterns. A southern species is *micans* Meig. *H. lurida* Fall., *solstitialis* Meig., *m. montana* Meig. and *montana flaviceps* Zett. have a distinctly western distribution, almost exclusively in Jutland. A more eastern distribution-pattern, e. g. in the islands, shows

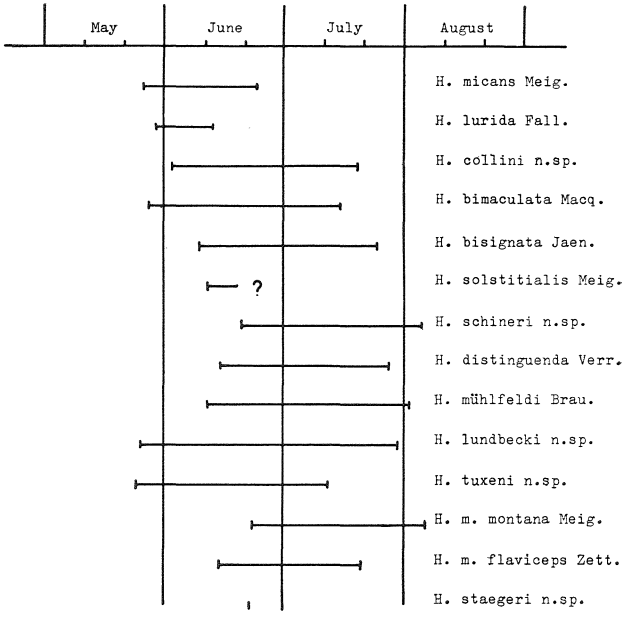


Fig. 1: The seasonal distribution of the Danish *Hybomitra*-species.

schineri n. sp., *mühlfeldi* Brau. and *tuxeni* n. sp., all of which are very sparse in Jutland. The other species are either sparse or show a more or less even distribution all over the country. In the synopsis further remarks on the distribution are given.

Regarding the distribution in other countries there are difficulties in several species, because various names are used for the same species and various species have the same name. Before revisions have been undertaken

in the various countries only little may be said with certainty on the total distribution. In this paper I have mentioned details on the distribution in Sweden, Germany and England, and at the same time I have considered the synonymous differences. The total distribution is reproduced after a table in Leclercq (1957), in a few cases I have also used Olsoufiev (1937).

The sections on the "Biology" are the weakest parts, because the informations are very scattered. Best known is the flying-period of imagines. In fig. 1 is given a survey over the seasonal distribution of the Danish *Hybomitra*-species. *H. micans* Meig. and *lurida* Fall. are both early species. The species of the *bimaculata*-group (*collini* to *mühlfeldi*) have all flying-periods of remarkably equal length, viz. about $1^1/_2$ month. In the *montana*-group *lundbecki* n. sp. and *tuxeni* n. sp. both have a flying-period, which is placed several weeks earlier than that of *m. montana* Meig.

Key to the Danish subgenera of *Tabanus* s. lat.

(After Leclercq 1952, p. 43).

1. Eyes unhaired. Lower frontal callus distinct. Middle frontal callus also distinct, sometimes free, but more often downwards connected with the lower callus. *Tabanus* s. str. L.
—. Eyes short and sparsely haired. Vertex only sligthly produced, never forming a shining ocellar callus, more or less divided by a longitudinal groove. Lower frontal callus distinct ..... *Therioplectes* Zeller
—. Eyes distinctly haired with longer or shorter hairs. Vertex with a distinct shining ocellar callus. Lower frontal callus distinct, as a rule also a middle frontal callus ..... *Hybomitra* Enderlein
—. Eyes more or less haired. Vertex plain. Lower and middle frontal callus very small or quite wanting ..... *Atylotus* Osten-Sacken

Hybomitra Enderlein, 1922

Includes a number of the most common Danish species of middle size, 12—18 mm. The eyes are always

distinctly haired. Lower frontal callus well developed of varying form. As a rule also a middle frontal callus is present. On vertex a distinct and shining black or brown ocellar callus. Abdomen as a rule with brown sidemarkings on the first tergites.

Key to the Danish species:

♀♀.

1. Legs entirely black. Frontal triangle shining black (fig. 5 d). Abdomen black with three rows of grey spots..... ..... 1. *micans* Meig. (p. 89).
— Legs not entirely black, tibiae more or less brownish... 2.
2. Frontal triangle shining black (fig. 6 c). Frontal stripe broad (fig. 6 c). Abdomen shining black, on the first tergites often yellowish brown sidemarkings ..... 2. *lurida* Fall. (p. 91).
— Frontal triangle grey dusted (may partly be rubbed off).. 3.
3. Halteres yellowish white. Frontal stripe broad. Lower frontal callus broader than high, shining brown (fig. 23 c). Abdomen dorsally with yellow sidemarkings on 1st—4th tergite; the middle stripe narrow, about $^1/_8$ of the width of third tergite..... 14. *staegeri* n. sp. (p. 145).
— Halteres brownish or blackish, at least at the base..... 4.
4. Frontal stripe narrow, 4—6 times higher than broad below (fig. 7 c, 10 c, 11 c, 13 c, 14 c). Lower frontal callus higher than broad and transversely wrinckled, not plain (fig. 7 c, 10 c, 11 c, 13 c, 14 c). Palpi more or less thickened at the base, with long hairs on the under side (fig. 7 b, 10 b, 11 b, 13 b, 14 b). The antennal bow of equal width (fig. 7 c, 10 c, 11 c, 13 c, 14 c). 2nd sternite as a rule without a large, dark quadratic spot (*bimaculata*-group)..... 5.
— Frontal stripe broader, 3—4 times higher than broad below (fig. 16 c, 18 c, 21 c). Lower frontal callus often broader than high and plain, not transversely wrinckled (fig. 16 c, 18 c, 21 c). Palpi more slender (fig. 16 b, 18 b, 21 b), with shorter hairs on under side. The antennal bow broader towards the middle line (fig. 16 c, 18 c, 21 c). 2nd sternite with a large, dark, quadratic spot (*montana*-group)..... 11.
5. Sidemarkings on not more than the three first tergites, or if small sidemarkings also on 4th tergite, then the two basal antennal joints distinctly grey dusted..... 6.
— Sidemarkings on the first four tergites, or if only on the three first then at the same time the basal antennal joints reddish brown and notopleural calli brown..... 10.

6. Notopleural calli brown. Yellowish brown sidemarkings on the three first tergites. Middle stripe of $^1/_3$ or a little less than $^1/_3$ the width of the tergites. 8th sternite and anal-lamellae of type 3 (fig. 2)..... 9. *mühlfeldi* Brau. (p. 119).
— Notopleural calli black. 8th sternite and anal lamellae of type 1 (fig. 2)..... 7.
7. Sidemarkings on the three first tergites ..... 8.
— Sidemarkings on at most the two first tergites ..... 9.

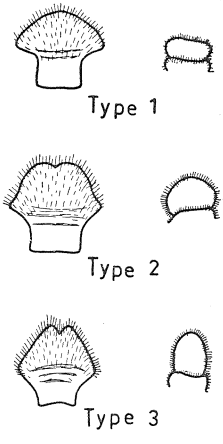


Fig. 2: Shape of 8th sternite (left row) seen ventrally and the right anal-lamel (right row) seen dorsally in the *Hybomitra*-species of the *bimaculata*-group. To type 1 belong *H. collini* n. sp., *bimaculata* Macq., *bisignata* Jaen., *solstitialis* Meig. and *schineri* n. sp. To type 2 belongs *distinguenda* Verr. and to type 3 *mühlfeldi* Brau.

8. The two basal antennal joints greyish black. Abdomen with broad, black middle stripe, which occupies more than $^1/_3$ the width of the tergites. Sidemarkings dark yellowish brown and not sharply divided from the middle stripe. Pleurae with mainly dark greyish and black pubescence ..... 3. *collini* n. sp. (p. 94).
— The two basal antennal joints lighter, always grey dusted, but the brown ground coloration can be seen. Abdomen with more narrow, black middle stripe, which occupies less than $^1/_3$ the width of the tergites. Sidemarkings light (partly whitish) yellowish brown and sharply divided from the middle stripe. Pleurae with light grey pubescence.. ..... 6. *solstitialis* Meig. (p. 106).
9. Abdomen dorsally with reddish brown or yellowish brown sidemarkings on the first two tergites. Reddish brown or yellowish brown coloration on the under side to a varying degree ..... 4. *bimaculata* Macq. (p. 101).

— Abdomen dorsally uniformly black with grey spots, sometimes there are small reddish brown sidemarkings at the hind margin of 1st and/or the fore margin of 2nd tergite. Under side uniformly grey, sometimes a weak brown tinge on the sides of 2nd—3rd sternite.. 5. *bisignata* Jaen. (p. 104).

10. The two basal antennal joints brown. 2nd tergite always with many black hairs on the sidemarkings. Genitalia of type 1 (fig. 2)..... 7. *schineri* n. sp. (p. 109).

— The two basal antennal joints greyish black. 2nd tergite without black hairs on the sides. Genitalia of type 2 (fig. 2) ..... 8. *distinguenda* Verr. (p. 115).

11. 3rd antennal joint broad and reddish brown (fig. 16 a). Notopleural calli black..... 10. *lundbecki* n. sp. (p. 127).

— 3rd antennal joint more narrow and mainly black, only basally more or less brownish (fig. 18 a, 21 a). Notopleural calli brown..... ..... 12.

12. 3rd antennal joint rather narrow, more or less brownish at the base (fig. 18 a). Abdominal pubescense golden-yellow. Larger species..... 11. *tuxeni* n. sp. (p. 133).

— 3rd antennal joint narrow, only little brownish at the base (fig. 21 a). Abdominal pubescense grey. Smaller species.. 13.

13. Abdomen dorsally with distinct yellowish brown sidemarkings on the first three or four tergites. Under side with distinct yellowish brown coloration on the sides of the first sternites..... 12. *m. montana* Meig. (p. 139).

— Abdomen dorsally without yellowish brown sidemarkings or these very small. Under side mainly uniformly greyish black, sometimes a faint tinge of yellowish brown coloration on the sides of 2nd and 3rd sternite..... ..... 13. *montana flaviceps* Zett. (p. 144).

♂♂.

1. Legs entirely black. Fore tarsi with long, erect hairs (fig. 5 a)..... 1. *micans* Meig. (p. 89).

— Legs not entirely black, tibiae more or less brownish. Fore tarsi without such hairs..... 2.

2. Eye-seam shallow, only $1^1/_2$ times higher than height of frontal triangle. Palpi strongly thickened. A shining black species..... 2. *lurida* Fall. (p. 91).

— Eye-seam twice as high as height of the frontal triangle 3.

3. Halteres yellowish white. Under side with dark middle spot on 2nd sternite and eye-facets in the upper two thirds of the eyes about 2—3 times larger than those in the lower

third (after Olsoufiev 1937, p. 379). 14. *staegeri* n. sp. (p. 145).

— Halteres brownish or black, at least at the base..... 4.

4. Palpi more or less thickened (fig. 3 c). On vertex a tuft of longer hairs (fig. 3 a). Hairs on upper side of 1st antennal joint longer than 1st and 2nd joint together (fig. 3 b). The antennal bow of equal width (fig. 3 a) (*bimaculata*-group) ..... 5.

— Palpi more slender (fig. 4 c). On vertex none or some few shorter hairs (fig. 4 a). Hairs on upper side of 1st antennal joint shorter than 1st and 2nd joint together (fig. 4 b). Antennal bow broader towards the middle line (fig. 4 a) (*montana*-group) ..... 11.

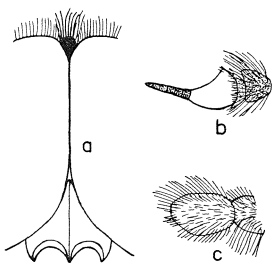


Fig. 3

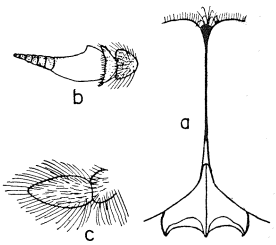


Fig. 4

Fig. 3: *H. collini* n. sp. (male) a: Eye-seam and frontal triangle, b: Antenna and c: Palp.

Fig. 4: *H. lundbecki* n. sp. (male) a: Eye-seam and frontal triangle, b: Antenna and c: Palp.

5. Eye-facets of almost equal size, the middle facets only little larger than lower facets. Notopleural calli black. Brown sidemarkings on 1st—3rd tergite. Middle stripe on upper side of abdomen comparatively broad, on 3rd tergite $^1/_5$—$^1/_3$ the width of the tergite ..... 6.

— Eye-facets in the middle parts of the eyes considerably enlarged. Brown sidemarkings as a rule on 1st—4th tergite, or if only on 1st—3rd tergite, then the notopleural calli brownish. Notopleural calli black or brown. Middle stripe on upper side of abdomen comparatively narrow, on 3rd tergite about $^1/_8$ the width of the tergite..... 9.

6. Thorax, especially the pleurae, with pale greyish pubescence. Middle stripe on abdomen rather narrow, about $^1/_5$

of the width of 3rd tergite. Brown sidemarkings on upper side very light, without greyish shadows.....
..... 6. *solstitialis* Meig. (p. 106).

— Thorax with dark grey and black pubescense. Middle stripe broader, $^1/_4$—$^1/_3$ the width of 3rd tergite. The brown sidemarkings on upper side with grey shadows ..... 7.

7. At the base of 2nd sternite a flat, more or less rounded dark spot (fig. 9 a). 1st and 2nd sternite with mainly whitish hairs ..... 3. *collini* n. sp. (p. 94).

— At the base of 2nd sternite a larger, more or less triangular dark spot (fig. 9 b and c) ..... 8.

8. At the base of 2nd sternite a flat triangular spot, the tip of which is placed at the middle of the sternite (fig. 9 b). Some whitish hairs on the sides of the first sternites...
..... 4. *bimaculata* Macq. (p. 101).

— At the base of 2nd sternite a larger, dark spot, the tip of which is placed at the hind margin of the sternite (fig. 9 c). The first sternites with mainly black hairs.....
..... 5. *bisignata* Jaen. (p. 104).

9. The middle facets strongly enlarged and sharply divided from the lower and smaller facets. 1st and 2nd antennal joint brownish..... 7. *schineri* n. sp. (p. 109).

— The middle facets less strongly enlarged and gradually smaller downwards. 1st and 2nd antennal joint grey or greyish black ..... 10.

10. Abdominal middle stripe with broad, low, whitish grey middle triangles. Along the hind margin of 1st tergite a broad border of golden hairs. At the base of 2nd sternite a flat, rounded spot..... 8. *distinguenda* Verr. (p. 115).

— Abdominal middle stripe with narrow, high, grey middle triangles. Along the hind margin of 1st tergite a narrow border of golden hairs or none at all. At the base of 2nd sternite a triangular or pentangular spot.....
..... 9. *mühlfeldi* Brau. (p. 119).

11. 3rd antennal joint mainly reddish brown and with a distinct dorsal tooth. Notopleural calli black.....
.....10. *lundbecki* n. sp. (p. 127).

— 3rd antennal joint mainly blackish and with an indistinct dorsal tooth. Notopleural calli brown.....
.....11. *tuxeni* n. sp. (p. 133),
12. *m. montana* Meig. (p. 139),
and 13. *montana flaviceps* Zett. (p. 144).

1. *Hybomitra micans* Meigen, 1820.

Identification.

This species may easily be identified. In the female this species and the following one, *lurida* Fall., are the only Danish species with shining black frontal triangle and from *lurida* and all other Danish species it may be distinguished by its black legs. Besides the male has long, erect hairs on the fore tarsi.

Description.

♀: The head seems broad and shallow owing to its very broad frontal stripe, which is $2^1/_2$—3 times as high

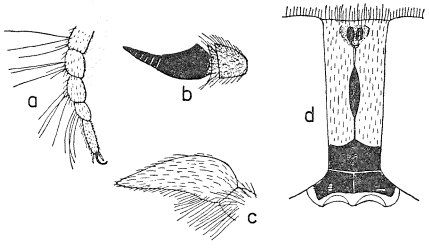


Fig. 5: *H. micans* Meig. a: Fore tarsus in the male, b: Antenna, c: Palp and d: Frontal stripe, b—d in the female.

as broad below and greyish dusted. Lower frontal callus broad and shallow, shining black. It is by means of a narrow, black line connected with the middle frontal callus, which again upwards continues as a narrow line to the upper frontal callus (= the ocellar callus). The palpi are slender and blackish, often grey dusted and with rather long hairs at the base. The antennae black, 1st and 2nd joint grey dusted and 3rd joint with a small, obtuse tooth on the dorsal side. Frontal triangle black.

Thorax black, mesonotum with five indistinct, grey stripes. The wings greyish with dark brownish veins. Legs black.

Abdomen is dorsally black, but seen from behind bluish grey. 2nd tergite with two grey spots on the sides. On 2nd—5th tergite a bundle of white hairs in the middle

of the hind borders of the segments. The under side with bluish grey dust.

♂: May easily be identified by its very long, erect hairs on the fore tarsi. The palpi are long-ovale, black or dark-brown. Antennae black, 1st and 2nd joint with long, close-set hairs. Otherwise as in female.

Length: 13—17 mm.

Occurrence in Denmark.

The species has not earlier been recorded from Denmark. Hitherto it has only been met with in Stensbæk plantation at Gram in the southern Jutland, where J. G. Worm-Hansen in June 1949 caught 9 females. A male was taken by the same collector on May the 25th 1952 at the same place. The species occurs probably in several places in the southernmost part of the country.

Distribution.

The species is not mentioned from Sweden by Kauri (1954) in his work on the Swedish tabanids. Germany: "Ist im ganzen Gebiet von April bis August häufig" (Kröber 1932, p. 73). In Schleswig-Holstein the species is known from 11 localities NE and 6 localities S of the Elbe (Kröber 1930, p. 30). In Britain *micans* is not common, but is, however, known from several places from the south coast to Inverness in Scotland (Goffe 1931, p. 91). The species is also known from Holland, Belgium, France, Austria, Czecho-Slovakia, Switzerland, Greece, Bulgaria, and U. S. S. R. (Leclercq 1957). *H. micans* seems therefore to be a southern species with its northern limit through southern Denmark and Scotland.

Biology.

Kröber (1932, p. 73) states, that the species can be met with along roads with flowering hedges. In the early morning both males and females can be seen on flowers, especially of *Heracleum*. According to some notes from England (Kloet 1941, p. 202 and Hamm 1941, p. 285) *mi-*

cans is several times taken on honey dew (from aphids), and furthermore it has also been seen drinking on damp soil and at small streams.

The flying-period is April—August (Kröber 1932, p. 73). According to Goffe (1931, p. 31) it is a very early species: May—June. Oldroyd (1939, p. 90) proposes, that the infrequency of the species is due to its early occurrence, because in spring and the beginning of the summer there is only very few hot days, which are the only days, when tabanids are caught. The Danish material dates as follows: 25th May (1 male), 7th June (7 females), 17th June (1 female), 18th June (1 female), 20th June (1 female) and 23rd June (1 female).

2. *Hybomitra lurida* Fallen, 1817.

Identification.

Like *micans* the female has a black, shining frontal triangle, but may easily be distinguished from it by not having the legs completely black. In addition there is often yellowish red sidemarkings on the first tergites. The male is distinguished from all other Danish *Hybomitra*-species by its very short eye-seam, which is only $1^1/_2$ times as high as the height of the frontal triangle (in other species at least 2 times as high as the frontal triangle).

Description.

♀: A small, dark species with broad and short frontal stripe, which is 3—$3^1/_2$ times as high as broad below. The frontal triangle shining black or brownish black. Lower frontal callus triangular-semicircular, the middle frontal callus is surrounded by a black, haired area. On the vertex (behind the ocellar callus) a tuft of long, black hairs. The eyes with brown hairs. Antennae black, 1st and 2nd joint greyish dusted. The 3rd joint reddish brown at the base, with a distinct tooth dorsally. The palpi short and thickened at the base with a short, blunt point, its anterior edge forming a sector of a circle, the posterior edge an almost straight line. The colour is very pale brown with black and white hairs.

Thorax and abdomen very shining, mostly black. 2nd—3rd tergite often with reddish brown sidemarkings. In addition there may be grey sidemarkings on 3rd and 4th or 3rd—6th tergite by means of which 2 rows of grey spots are formed. The underside is black, but a reddish yellow coloration on 2nd to 4th sternite may be seen in several cases. Femora black and light grey dusted. Tibiae dark brown, tarsi blackish.

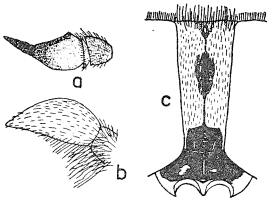


Fig. 6: *H. lurida* Fall. (female). a: Antenna, b: Palp and c: Frontal stripe.

♂: Easily recognized by its short eye-seam, which is only $1^1/_2$ times as high as the height of the frontal triangle. All eye-facets of the same size. Palpi strongly thickened, grey with yellowish brown point. First antennal joint grey, with long, black hairs. Third joint reddish brown.

Thorax and abdomen shining black, 1st to 3rd tergite with reddish brown sidemarkings. The underside reddish yellow with broad, light seams behind. The second sternite with a dark marking in the middle, the two last segments completely black.

Length: 12—15 mm.

Occurrence in Denmark.

In the collections of the Zool. Mus. in Copenhagen there are 11 females (of these 4 without dates from Staegers collection) and 1 male (from Staegers collection). Localities in Jutland: ♀ Silkeborg 29th May 1904 (Axel Petersen), ♀ Frijsenborg July 1884 (Løvendal), ♀ Stensbæk plantation at Gram 12th June 1949 (Worm-Hansen). In Zealand the species has only been met with twice: 2 ♀♀ in Mus. Westermann labelled Zealand August 1831 and a ♀ from Dyrehaven at Copenhagen 19th June 1923 (Lundbeck).

According to this sparse material *H. lurida* seems to

be a species with greater frequency in Jutland than on the islands, especially when the greater intensity of collecting on the islands is taken into consideration. The explanation is perhaps, that the species is connected with the most humid areas.

Distribution.

Sweden: Rather commonly distributed all over the country from Scania to Lapland (Kauri 1954, p. 241). Seems to be connected with hilly and wooded regions (Ringdahl 1951, p. 119). Germany: Known from the southern Bayern till North-Germany. Occurs locally, but presumably it is often overlooked (Kröber 1932, p. 77). Very scarce in Schleswig-Holstein, but often confused with *tropicus* (Kröber 1930, p. 30). *H. lurida* is known only from one locality in England, while it is rather abundant in Scotland (Oldroyd 1939, p. 91). Though according to Leclercq (1957) the species also occurs in Holland, Belgium, France, Austria and U. S. S. R., it seems to be a typical northern species.

Biology.

According to Ringdahl (1943, p. 170) the earliest *Hybomitra*-species, thus it occurs in the southern Sweden from 21st May to 11th July. Kröber (1932, p. 77) states the flying-period as May—August. From Schleswig-Holstein is given a date as early as 29th April (Kröber 1930, p. 30). The Danish takings (only 3 with exact dates) originate from 29th May to 19th June. On the biology of *H. lurida* only little is known. Kröber (1932, p. 77) states that the species can be seen on pasturing cattle. One of the Danish specimens has been caught by our Simuliid-expert Axel Petersen, and this fact indicates, that Kröber's remarks are also valid as to Danish conditions. In Scotland both sexes have been seen sitting on a sandy road in May (Oldroyd 1939, p. 91).

Bimaculata-group.

3. *Hybomitra collini* sp. nov.

Syn.: partim *tropicus* auct. nec L.

Identification.

The females of this and the following six species may be distinguished from the two preceding species by their grey frontal triangle and from the *montana*-group (*lundbecki* n. sp.. *tuxeni* n. sp., *m. montana* Meig., *montana flaviceps* Zett.) by the following characters: 1) frontal stripe narrow, 4—6 (not 3—4) times higher than broad below, 2) lower frontal callus higher than broad and transversely wrinkled (not shining plain), 3) palpi more or less thickened at the base, with long hairs on the under side, 4) the antennal bow of equal width and 5) 2nd sternite as a rule without a dark, quadratic spot. The shape of the 8th sternite and the anal-lamellae (of type 1, see fig. 2) distinguish it from *distinguenda* Verr. (of type 2, see fig. 2) and *mühlfeldi* Brau. (of type 3, see fig. 2). *H. schineri* n. sp. has the two first antennal joints mostly brown, the notopleural callus brown and abdominal sidemarkings on the 4th tergite, whereas *collini* n. sp. has the basal antennal joints greyish black, the notopleural callus black aud sidemarkings only on 1st—3rd tergite. In *solstitialis* Meig. the yellowish brown sidemarkings on 1st—3rd tergite are very pale and the middle stripe hardly $^1/_3$ the width of the tergites and sharply contrasted from the sidemarkings, whereas *collini* n. sp. has the sidemarkings darker, the black middle stripe broader than $^1/_3$ the width of the tergites and not so sharply contrasted from the sidemarkings as in *solstitialis* Meig. In *bimaculata* Macq. there are sidemarkings on the two first tergites and in *bisignata* Jaen. the under side is greyish black, whereas *collini* n. sp. has sidemarkings on the three first segments and the under side always with distinct reddish brown coloration.

The male *H. collini* n. sp. may be distinguished from *micans* Meig. and *lurida* Fall. respectively by the absence of long, erect hairs on the front tarsi and by the length of the eye-seam, which in *collini* n. sp. is more than twice as high as the frontal triangle. From the species in the *montana*-group, *collini* n. sp. and the following six species may be distinguished by: 1) longer hairs on vertex, 2) palpi more thickened at the base, 3) the hairs on upper side of 1st antennal joint longer than 1st and 2nd joint together. In *schineri* n. sp. and *distinguenda* Verr. the eye-facets are strongly enlarged, whereas *collini* n. sp. has the eye-facets of almost equal size. It may most easily be confused with *solstitialis* Meig. and

mühlfeldi Brau. together with *bimaculata* Macq. and *bisignata* Jaen. On p. 102 is given a table by means of which *collini* n. sp. may be distinguished from the two latter species. From the two former species, *collini* n. sp. may be distinguished by its broad, black, abdominal middle stripe (not less than $^1/_4$ the width of the segments at the base of 3rd tergite), whereas *solstitialis* Meig. and *mühlfeldi* Brau. have the middle stripe greyish black or greyish brown and more narrow (in *mühlfeldi* Brau. not more than $^1/_6$ the width of the segments, in *solstitialis* Meig. a little broader). In *mühlfeldi* Brau. the notopleural callus is brown, not black. In *solstitialis* Meig. the pleurae have whitish grey hairs, in *collini* n. sp. the hairs are black and greyish black.

Description.

♀: The frontal stripe yellowish grey to silvery grey dusted, 4—5 times as high as broad below and gradually narrowed downwards. Lower frontal callus brownish black to black, with transverse wrinkles and well separated from the eye-margin. The shape is rectangular, higher than broad, but the upper margin often rounded. Upwards it continues as a narrow, black line. The ocellar callus oval, shining brown. The degree of hairing is somewhat variable, as a rule there is a lot of stiff, downwards directed, black hairs, which are decreasing in length towards the base of the frontal stripe. On the vertex a tuft of black hairs. The frontal triangle with yellowish grey to silvery grey dust. On the eyes a dense covering of greyish brown hairs.

1st and 2nd antennal joint grey dusted, with black and some pale hairs. The 3rd joint somewhat broad and with a distinct tooth on the dorsal side. The colour is reddish brown to yellowish brown, the upper margin and the style darker. The palpi thickened at the base and then abruptly attenuated into a fine, straight point. The colour yellowish brown, more or less grey dusted and with short, black hairs.

Thorax greyish black to black, mesonotum with 3—5 indistinct grey stripes. The notopleural callus black. The halteres brownish black. The wings grey with brown veins.

Abdomen dorsally with a broad, black middle stripe on the first three tergites, the sides of which are yellowish brown to reddish brown. The middle stripe occupies at least $^1/_3$ the width of the tergites. The last tergites completely black. All tergites with a pale middle triangle of various extensions. The under side somewhat varying, but always with reddish brown or yellowish brown coloration on the basal sternites (including the 4th). Dark markings always present, but they vary in extension from a small triangle or a greater, rectangular spot at the base of the 2nd sternite to a black middle stripe of varying width. The last sternites (5th—7th) are black. 8. sternite and the anal-lamellae of type 1 (see fig. 2).

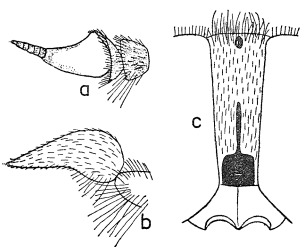


Fig. 7: *H. collini* n. sp. (female, holotype), a: Antenna, b: Palp and c: Frontal stripe.

Femora black, but grey dusted, tibiae and tarsi brown, fore tibiae only basally.

♂: The eye-facets of almost equal size, the middle facets only a little greater than the external facets. The eye-seam twice as long as the height of the frontal triangle (fig. 3a). The eyes densely covered with greyish brown hairs. The ocellar tubercle shining brown, behind it a tuft of black hairs (fig. 3a). 1st and 2nd antennal joint greyish black with long, black hairs. 3rd antennal joint not so broad as in the female, but still with a distinct, acute angled tooth (fig. 3b). The palpi thickened, their colour greyish brown (not greyish black), sometimes lighter brownish, with black and white hairs (fig. 3c). The dark abdominal stripe on the first three tergites is more narrow than in the female. The stripe is formed like an hour-glass and is most narrow at the base of 3rd tergite, where the width is about $^1/_4$ the width of the tergite. On the under side 1st sternite is brownish

black, more or less grey dusted. 2nd to 4th sternite yellowish, sometimes also a narrow yellow area along the front margin of the 5th sternite. At the base of 2nd sternite a flat, rounded, dark spot, the height of which is only $^1/_4$ the length of the sternite (fig. 9a). Sometimes also a narrow, blurred dark middle stripe. The hairs on 1st—3rd sternite chiefly soft and pale, but some black, stiff hairs can be seen in the middle of the sternites, especially on the third. Otherwise as in the female.

Length: 14—17 mm.

Type-material.

Holotype: ♀ taken on 3rd July 1958 at Bagsværd NW of Copenhagen (author collected).

No allotype is selected.

The type in Zool. Museum of Copenhagen.

Discussion.

I have given the name *collini* n. sp. to the species, which by Brauer (1880, p. 146) is mentioned as *tropicus* Meig. = *tropicus* Panz. Meigen (1820, p. 57) names the species *tropicus* L.

An examination of the 4 specimens under the name *tropicus* in the Linnean Collection in London has been undertaken by Mr. J. E. Collin, Newmarket, and has given the following results: "There are only two of the four specimens in the Linnean Collection which need be seriously studied, because one bears a label showing that it was from the East Indies, and cannot therefore be one of the original syntypic series, and this also applies to another, much larger specimen of the restricted genus *Tabanus*, because the only detailed description (that in Fauna Suecica, and quoted in Systema Naturae of 1758) states that the species was of "magnitudo Bombylii", and this particular specimen is much larger than the other two. These two therefore constitute all that remains of the original syntypic series of *Tabanus tropicus*, and one

of them bears a label in the handwriting of Linnaeus of "9. *tropicus*". Neither of these two specimens can be the "*tropicus*" described by Brauer because the notopleural callus is yellowish, not dark as in Brauer's *tropicus*, while the shape of the frontal callus is not the same" (Collin in litt. 3rd July 1958). — "The type of *tropicus* answers in all visible characters with a form of *montanus* Meig." (Collin in litt. 15th October 1958) (see fig. 19). Zetterstedt (1842, p. 111), Loew (1858, p. 586) and Schiner (1862, p. 31) have identified their *tropicus* in accordance with the Linnean species. In 1880 Brauer, in all probability on the basis of specimens of *tropicus* L. sensu Meig. from Winthem's Collection (not seen by Loew and Schiner), introduces his *tropicus* according to the species, misidentified by Panzer and Meigen as *tropicus* L., and since then the opinion of Brauer has been followed by most Continental authors, though other species are intermixed with their *tropicus*. It is a part of this *tropicus*, I here have given the name: *collini* n. sp.

7 females and 1 male from Sweden sent me as *tropicus* Panz. have shown, that Kauri's (1954, p. 242) *tropicus* is identical with *collini* n. sp. Lundbeck's (1907, p. 114) *tropicus* Panz. is a species mixed of *collini* n. sp. and *mühlfeldi* Brau. A minority of Kröber's *tropicus* Panz. is *collini* n. sp. according to material from various German collections (see p. 79). A single female with the determination *montanus* Meig. (Kröber det. 1921) was a *collini* n. sp. In order to get in agreement with the British nomenclature I have been in connection with Mr. J. E. Collin, and the following is the result of our correspondence and exchange of specimens. In Britain the following use of the name *tropicus* has been practised:

Verrall 1909, p. 355: *tropicus* Meig.
Goffe 1931, p. 93 : *tropicus* L., partim Panzer.
Oldroyd 1939, p. 96 : *tropicus* L.

Mr. Collin states (in litt. 21st December 1957) that only

one of the specimens mentioned as *tropicus* by the above named authors belongs to *tropicus* Brau. (= *collini* n. sp.). It is the specimen from Worcester 3rd July 1869 (see Verrall 1909, p. 359 and Oldroyd 1939, p. 96). In 1939 Oldroyd separated Verrall's and Goffe's *tropicus* into two species: *tropicus* L. and *bisignatus* Jaen. In the former is included the Worcester-specimen, but the rest of Oldroyd's *tropicus* L. is neither the Linnean species nor *tropicus* Brau. (= *collini* n. sp.), but is the species mentioned in the present paper as *mühlfeldi* Brau. (nec Olsoufiev et al.). The two species (*collini* n. sp. and *mühlfeldi* Brau.) may easily be distinguished by the form of the 8th sternite and the anal-lamellae, in *collini* n. sp. of type 1 (see fig. 2) and in *mühlfeldi* Brau. of type 3 (see fig. 2). Also *bisignatus* Jaen. sensu Oldroyd (in the present paper identical with *bimaculata* Macq. + *bisignata* Jaen.) has the 8th sternite and the anal-lamellae formed as in fig. 2, type 1.

From the above mentioned facts it can be seen that the *tropicus*-name has been used for several species. It will be very inappropriate to remove the *tropicus*-name to the Linnean species, which probably belongs to the species mentioned below as *tuxeni* n. sp. I therefore propose the name *tropicus* L. to be deleted.

I have named my species after Mr. J. E. Collin, Newmarket. The problems about *tropicus* would not have been cleared up without his help.

Occurrence in Denmark.

H. collini n. sp. is a rather common species in Denmark. The collection of Zool. Mus. of Copenhagen contains 29 ♀♀ and 11 ♂♂ and in Naturhistorisk Museum in Aarhus there is 8 ♀♀ and 1 ♂. My own collection consists of 10 ♀♀, all taken in the area about Hareskoven—Jonstrup NW of Copenhagen.

It is known from all provinces: Jutland: Dollerup at Viborg, Silkeborg, Sinding, Mausing and Funder (all at Silkeborg), Hansted skov N of Horsens, Stensbæk planta-

tion at Gram, Sønderborg, Kjelstrup, — Funen: Middelfart, — Zealand: Boserup at Roskilde, Tisvilde, Asserbo,

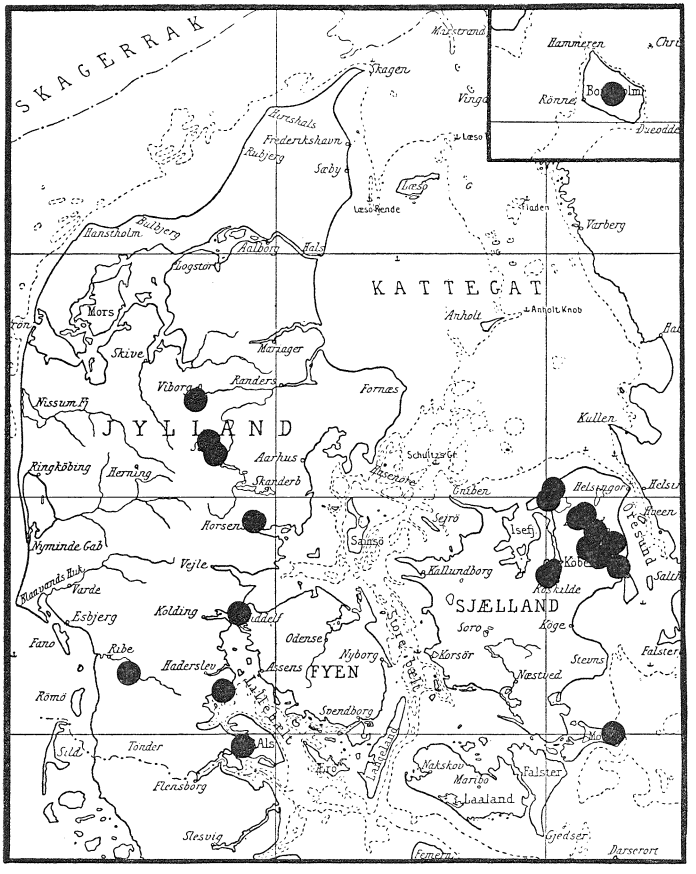


Fig. 8: The distribution of *H. collini* n. sp. in Denmark.

Hillerød, Stenholtsvang, Kattehale Mose*) at Allerød, Frerslev hegn**), Ryget at Værløse, Sortemose at Farum, Jonstrup, Frederiksdal, Bagsværd, Søllerød, Rudehegn, Geel

*) Mose = bog
**) Hegn and skov = wood

skov, Utterslev Mose, — Møen: Liselund, — and Bornholm: Almindingen.

The species seems to be connected with wooded regions.

Distribution.

A common species in Sweden (Kauri 1954, p. 242). 7 ♀♀ and 1 ♂ of Kauri's *tropicus* Panz. was identical with the Danish *collini* n. sp. In Britain only one specimen is known (Collin in litt. 21st December 1957), namely the specimen from Worcester July 1869 (Verrall 1909, p. 359 and Oldroyd 1939, p. 96). Before a revision has been undertaken, its further distribution can not be given.

Biology.

The Danish material has been collected from 3rd June to 18th July. 17 specimens are from 1st and 18 specimens from 2nd half of June, 12 specimens from 1st half of July and a single specimen from 18th July. The flying period is June and 1st half of July.

4. *Hybomitra bimaculata* Macquart, 1826.

Syn.: partim *tropicus* auctt. nec L.

Identification.

The female may be distinguished from the other *Hybomitra*-species by means of the summary given in the "Identification" under *H. collini* n. sp. (see p. 94). From *collini* n. sp. and *bisignata* Jaen. it may be distinguished by means of the tables below.

Description.

♀: An intermediate species between *H. collini* n. sp. and the following species: *H. bisignata* Jaen. It may be distinguished from these by means of the extension of the reddish brown or yellowish brown coloration on the abdomen.

	H. collini n. sp.	*H. bimaculata* Macq.	*H. bisignata* Jaen.
Upper side of abdomen	Reddish brown or yellowish brown sidemarkings on the first three tergites.	Reddish brown or yellowish brown sidemarkings on the first two tergites.	Reddish brown or yellowish brown sidemarkings often wanting, sometimes still small markings at the hind margin of 1st and/or the fore margin of 2nd tergite.
Under side of abdomen	Reddish brown or yellowish brown coloration of various extension. (See "Description" in *H. collini*).		Grey coloured, but sometimes a faint brown coloration on the sides of 2nd and 3rd sternite.

♂: It is difficult to distinguish the males of the three species. My material is only small and until further collectings have been done, nothing about the association between the sexes of the three species can be said with certainty. The table below is an attempt to distinguish the males of the three species:

	H. collini n. sp.	*H. bimaculata* Macq.	*H. bisignata* Jaen.
Colour of palpi	As a rule greyish brown, sometimes darker.	Greyish brown	Greyish black
Colour of 1st–5th sternite	1st sternite brownish black, 2nd–4th yellow with a flat, rounded, dark spot at the base of 2nd sternite. Often a narrow, yellow fore margin of 5th sternite (fig. 9 a)	1st sternite brownish black. 2nd–4th sternite yellowish brown with a dark triangular spot at the base of 2nd sternite. Its vertex in the middle of the sternite. (fig. 9 b)	1st sternite greyish black. 2nd–4th yellowish brown with an equilateral triangular spot on the 2nd sternite. Its vertex in the hind margin of the sternite. 4th sternite with dark hind margin. (fig. 9 c)
Colour and length of hairs on 1st–3rd sternite	Always many soft and rather long, pale hairs, here and there mixed with a few black hairs, especially on the 3rd sternite.	In the middle of the sternite a good many short, black hairs, but on 1st and the sides of 2nd and 3rd sternite mixed with some white hairs.	Rather long, black hairs on all three sternites. Only single pale hairs.
Form and extension of middle stripe on 1st–3rd tergite	Formed as an hourglass, most narrow at the base of 3rd tergite, where it is $1/4$ the width of the tergite.	Middle stripe with parallel borders, occupying $1/3$ the width of tergites.	Like the preceding species.

Discussion.

H. bimaculata Macq. is by most authors (see Kröber 1925, p. 72) interpreted as synonym to *tropicus* Panz. Oldroyd's (1939, p. 91) *bisignatus* Jaen. is partly my *bimaculata* Macq. The species was described by Macquart in 1826, and Meigen (1838, p. 59) gives a translation of Macquart's description. I do not know whether the type is still in existence. There is no reference to it in "Cata-

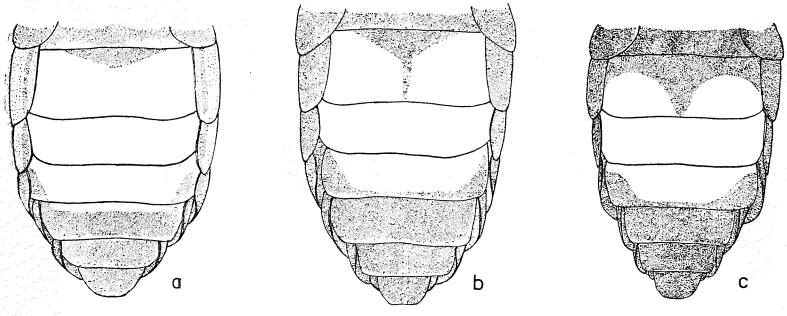


Fig. 9: Abdominal under side of the males of a: *H. collini* n. sp., b: *H. bimaculata* Macq. and c: *H. bisignata* Jaen.

logue de Musee d'Histoire Nat. de la Ville de Lille" (1850), where "Animaux invertèbres" were listed by Macquart, and it is most probably lost. I have in this paper tried to separate it as a distinct form (possible a subspecies of *collini* n. sp.), because together with *bisignata* Jaen. in Britain it seems to replace the Continental *collini* n. sp. One female of *tropicus* Pz. (Kröber det. 1921) from Deutsch. Ent. Inst. in Berlin was a *bimaculata* Macq.

Occurrence in Denmark.

An uncommon species. 13 ♀♀ and 1 ♂ was found in the collection of Zool. Mus., Copenhagen, and from Aarhus naturhist. Museum I received 6 ♀♀ and 1 ♂. The following localities can be given: Jutland: Silkeborg, Mausing at Silkeborg, Stensbæk plantation at Gram, Hørup in the island Als, — Zealand: Alindelille fredskov,

Tisvilde, Hillerød, Stenholtsvang, Stasevang N. of Hørsholm, Søllerød, Rudehegn, Dyrehaven, Hareskov, Ryget skov at Værløse, and Køge.

Distribution.

About the distribution only little can be said with certainty, but the species occurs in Britain (Collin in litt. 6th May 1957), and I have two British females from Mr. Collin in my collection, which in all details agree with Danish specimens. It occurs also in North-France (Meigen 1838, p. 59), but is mentioned as rare, and I have seen a female without dates from Deutsch. Ent. Inst. in Berlin.

Biology.

The most early date is 27th May, latest 14th July. The specimens disperse with 1 in May, 8 in 1st and 6 in 2nd half of June, and 5 in 1st half of July. After this sparse material *H. bimaculata* seems to be more early than *collini* (see fig. 1).

5. ***Hybomitra bisignata* Jaennicke, 1866.**

Syn.: partim *tropicus* auctt. nec L.

Identification.

The female has a close resemblance to *H. micans* Meig., but may easily be distinguished by its grey (not shining black) frontal triangle. From the other species it may be distinguished by means of the summary under "Identification" in *collini* n. sp. and from this one by means of the table under *bimaculata* Macq. The male has always reddish brown sidemarkings on 1st—3rd tergite, in *micans* Meig. these are wanting. Otherwise as in the female.

Description.

♀: May be distinguished from the two preceding species by the dorsal side of abdomen, which is black with 3 rows of grey spots, the middle row with triangular spots. The spots result from a combination of bluish grey dust and pale hairs. As a rule reddish brown or yellowish brown sidemarkings are wanting, sometimes indistinct reddish markings may be seen at the hind margin of 1st and/or the fore margin of 2nd tergite. The under

side dull greyish, sometimes still a faint shadow of reddish coloration on the sides of 2nd and 3rd tergite.

♂: See the table under *bimaculata* Macq.

Discussion.

The species was described by Jaennicke (1866, p. 74). from the neighbourhood of Paris. Like the preceding species it has been considered synonymous to or a variety of *tropicus* (in various senses). In England *bisignata* Jaen. was mixed with *collini* n. sp., *bimaculata* Macq. and *mühlfeldi* Brau. to *tropicus* Meig. sensu Verrall and *tropicus* L. partim Panz. sensu Goffe. Oldroyd (1939, p. 91 and 96) separated the *tropicus* of Verrall and Goffe into two species: *bisignatus* Jaen. and *tropicus* L. Oldroyd's *bisignatus* Jaen. consists of my two species: *bimaculata* Macq. and *bisignata* Jaen.. while his *tropicus* L. is a compound of *collini* n. sp. (the Worcester-specimen) and *mühlfeldi* Brau. Because *bisignata* Jaen. is one of the most common species in England and only occurs sparsely on the Continent, and the reverse is the case with regard to *collini* n. sp., it seems obvious to separate them as two species.

Occurrence in Denmark.

An uncommon species. Only 7 specimens are known; Jutland: Stensbæk plantation at Gram ♀ 10th June 1949 (Worm-Hansen), Nørholm at Varde ♂ 23rd July 1956 (B. Degerbøl), — Funen: Veflinge ♀ (H. J. Hansen), — Zealand: Ryget skov at Værløse ♀ 28th June 1952 (Worm-Hansen), Sorte Mose at Farum ♂ 23rd June 1945 (Worm-Hansen), Bagsværd ♀ 30th June 1958 (Lyneb.) and Vestre Kirkegård, Copenhagen ♀ June 1919 (Klöcker). The specimens from Nørholm at Varde and Bagsværd in my own collection, the others in Zool. Mus., Copenhagen.

Distribution.

The species is not mentioned from Sweden by Kauri (1954). Kröber (1932, p. 78) writes, that his *tropicus* var. *bisignatus* Jaen. is as widely distributed as the *tropicus*

Panz., but always found singly. Oldroyd (1939, p. 92) writes from Britain, that it is one of the most common species and widely distributed in the southern and middle counties.

Biology.

My sparse material is collected from 10th June to 23rd July. At Chantilly, not far from Paris, Surcouf (1921, p. 18) found twenty-six larvae in a layer of fallen oak-leaves carpeting the bottom of a shallow pond not more than a few centimetres deep. In June 1930 several pupae were found in a swan's nest at Windsor, England, and both sexes were bred (Oldroyd 1939, p. 92).

6. *Hybomitra solstitialis* Meigen, 1820.

Identification.

The female is closely related to *collini* n. sp., but may be distinguished from it by the following characters: Smaller, the two basal antennal segments distinctly reddish brown and only slightly covered with greyish dust. Thorax with very pale grey hairs, especially on the pleura. The middle stripe on 1st—3rd tergite more narrow (hardly $^1/_3$ the width of the segments) and sharply contrasted to the sidemarkings, which are very pale yellowish brown. From the two following species it may be distinguished by never having yellowish brown sidemarkings on 4th tergite. Most easily to be confused with *mühlfeldi* Brau., but may be distinguished by the form of 8th sternite and anal lamellae (of type 1, see fig. 2), in *mühlfeldi* Brau. of type 3 (see fig. 2).

The male is smaller and more greyish than the male of *collini* n. sp. The eye-facets of almost equal size. Thorax, especially the pleura, with remarkably pale greyish hairs (not dark greyish and black hairs). As in *collini* n. sp. the male of *solstitialis* Meig. has yellowish sidemarkings only on the first three tergites, but the middle stripe is narrower. On the under side the 1st sternite is very pale brownish and 2nd—4th sternite yellowish, the second sternite with a dark spot as in *collini* n. sp. *H. schineri* n. sp. and *distinguenda* Verr. both have the middle eye-facets strongly enlarged and sidemarkings on the first four segments. As a rule also *mühlfeldi* Brau. has sidemarkings on 1st—4th tergite, and both *mühlfeldi* Brau. and *schineri* n. sp. have brown, not black notopleural callus.

Description.

♀: Frontal stripe grey dusted, about 5 times as high as broad at the base, strongly haired with mainly black hairs. Lower frontal callus almost quadratic, upwards connected with the narrow, middle frontal callus. The ocellar callus shining brownish black. On the vertex a tuft of strong, black hairs. The frontal triangle grey. The eyes densely covered with rather long, light brownish hairs. 1st and 2nd antennal joint slightly grey dusted, but the yellowish brown ground coloration can easily be seen. 3rd antennal joint with a distinct tooth, the colour reddish brown, the dorsal margin and the style darkened. The palpi pale, yellowish brown with pale hairs and a few black hairs towards the tip. They are swollen basally and then quickly decreasing into a blunt point.

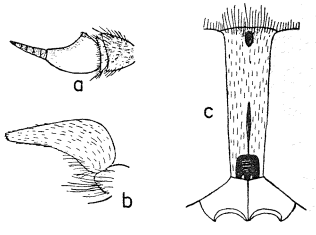


Fig. 10. *H. solstitialis* Meig. (female), a: Antenna, b: Palp and c: Frontal stripe.

Thorax greyish black with pale grey hairs, especially on the pleura. Halteres brownish black, paler on the tip.

Abdomen dorsally with pale, yellowish brown coloration on the sides of the first three segments. The middle stripe black with distinct, whitish middle triangles. The border to the yellowish sidemarkings is sharp, and the middle stripe occupies hardly $^1/_3$ the width of the segments. 4th—7th tergites black with pale hairs along the hind border and whitish middle triangles. Black hairs are always present on the sides of 2nd and 3rd tergites. On the under side 1st and 2nd sternites are pale yellowish brown; 3rd—4th more or less yellowish brown, the remaining ones black. 2nd sternite always without black middle stripe (cfr. *mühlfeldi* Brau.), but with a small, flat spot at the base.

Femora grey, tibiae light brownish, front tibiae distally darker.

♂: The eye-facets of almost equal size, hairs as in the female. 1st and 2nd antennal joint with more grey dust than in the female, but on the second joint the yellowish brown ground coloration may easily be seen. The antennae darker than in the female, and more narrow. The palpi swollen, greyish brown, paler towards the tip. With mainly long, pale hairs, but intermixed with some black hairs towards the tip. Thorax with the notopleural callus black as in the female. Pleura greyish haired. Abdomen with pale yellowish brown sidemarkings on 1st—3rd tergite. The middle stripe most narrow at the base of 3rd tergite, where it is about $^1/_5$ the width of the segment. 2nd—4th sternite pale, yellowish brown, this colour is also represented on the hind part of 1st sternite, at least on its sides. At the base of 2nd sternite a flat, rounded spot, almost as in *collini* n. sp. Otherwise as in the female.

Length: 14—15 mm.

Discussion.

This species is very little known, especially on the Continent, and it is not identical with *solstitialis* Schiner, according to a material consisting of 4 ♀♀ of Schiner's species, which I received from Vienna. Schiner (1862, p. 30) only knows Meigen's description (1820, p. 56), nor has Brauer (1880, p. 120) seen Meigen's specimens and he writes: "Ob *solstitialis* Meig. identisch sei mit Schiner's gleichnamiger Art, kann nicht nachgewiesen werden, da kein Originalexemplar Meigen's vorliegt". Verrall (1909, p. 380) writes: "I do not suppose that the species I have now described is the same as most authors have recorded as *T. solstitialis*, but I am convinced, that it is the same as the (apparently) type specimen of the female in Meigen's collection at Paris". Mr. J. E. Collin has identified the two Danish females according to Verrall's spe-

cies and has sent me an English male, after which I found one Danish male in my material. Because *solstitialis* Meig. differs considerably from Schiner's species, I have given the latter the new name: *schineri* n. sp. (see below). A material of eight Swedish females of *solstitialis* Schin. sensu Kauri (1954, p. 241) consists of two species: One specimen was *schineri* n. sp. (= *solstitialis* Schiner nec Meig.), the others were *mühlfeldi* Brau. and there were none of Meigen's species.

Occurrence in Denmark.

Only three specimens are known, all in Zool. Mus., Copenhagen. The specimens are all taken in Jutland in coastal regions. Dates: Vorsø in Horsens Fjord ♀ 12th June 1932 (S. L. Tuxen), Tipperne in Western Jutland ♀ 16th June 1940 (Søgård Andersen) and Frederikshavn ♂ July 1881 (H. J. Hansen).

Distribution.

Before a revision has been undertaken only little can be said on the distribution of this species. Oldroyd (1939, p. 95) states, that in British Museum there are only two British females, but Goffe (1931, p. 100) mentions a number of localities, all of which are hardly certain.

Biology.

Flying-period: See dates given above. In his key, Oldroyd (1939, p. 89) mentions, that *solstitialis* Meig. is a rather large inland species in opposition to *tropicus* L. (sensu Oldroyd = *mühlfeldi* Brau. nec Kröber et al.), which he mentions as a smaller, coastal species. The three Danish specimens are all from typical coastal regions, so probably Oldroyd has made a mistake.

7. ***Hybomitra schineri* sp. nov.**

Syn.: *solstitialis* Schiner nec Meig.

Identification.

From the six preceding species the female of *schineri* n. sp. may be distinguished by having, as a rule, yellowish brown side-

markings also on 4th tergite, the two first antennal segments yellowish brown and the notopleural callus brown. Also the following species *distinguenda* Verr. has sidemarkings on 4th tergite, but has greyish black antennal segments and only golden hairs on the sides of second tergite, never intermixed with black hairs as in *schineri* n. sp. *H. mühlfeldi* Brau. has only sidemarkings on the first three tergites and like *distinguenda* Verr., the first two antennal segments greyish black dusted. *H. distinguenda* Verr. (of type 2, see fig. 2) and *mühlfeldi* Brau. (of type 3, see fig. 2) have the 8th sternite and the anal lamellae different from *schineri* n. sp., where they are of type 1 (see fig. 2).

The males of the six preceding species have yellowish sidemarkings on only the first three tergites. In the males of *schineri* n. sp. and *distinguenda* Verr., and sometimes also in *mühlfeldi* Brau. there are sidemarkings also on 4th tergite. In *schineri* n. sp. the middle eye-facets are strongly enlarged and rather sharply contrasted to the smaller, lower facets and the basal antennal segments brownish (not greyish black), and the species forms by this a contrast to *distinguenda* Verr. and *mühlfeldi* Brau.

Description.

♀: Frontal stripe yellowish grey dusted, 4—5 times as high as broad below, gently narrowed downwards. Lower frontal callus higher than broad, well separated from the eye-margin. The colour brownish to brownish black, upper margin rounded and the shape nearly an ellipsis, which is cut off below. Upwards by a black line connected with the middle frontal callus. The ocellar callus shining brownish black. Frontal stripe strongly haired with black and pale hairs, most of the former. On the vertex a tuft of black hairs. Frontal triangle greyish or yellowish grey dusted. The eyes with a dense covering of long, pale brown hairs.

1st and 2nd antennal joint reddish yellow or yellowish brown, often a little grey dusted, but the ground colour is always distinctly seen, mainly black haired. 3rd antennal joint with a distinct, dorsal tooth. The colour yellowish brown, upper margin and the style black. The palpi pale brownish or yellowish grey, somewhat swollen basally and ending in a pointed, straight tip and

with fine, white hairs, and besides stiff, black hairs on the outer side.

Thorax greyish black with three indistinct, grey stripes. Notopleural callus more or less brownish, never completely black.

Abdomen dorsally with yellowish brown or reddish brown sidemarkings on the first four tergites. The sidemarkings on fourth tergite not reaching the hind margin, and may in rare cases be wanting. The dark middle stripe is dull greyish black, the width somewhat varying, but never more than $^1/_3$ the width of the segments, on third tergite only $^1/_5$. Often there is a row of small, indistinct, grey middle triangles. The under side yellowish brown on the first four sternites and sometimes also on the fifth, the rest dull black. 1st sternite with a dark, quadratic spot, at the base of 2nd sternite a small, dark spot of varying form, often pentagonal. Abdomen partly with short, soft, golden hairs especially along the hind margin of the segments and on the under side, partly with longer and more stiff, black hairs, especially on the upper side, also on the sides of 2nd tergite. 8th sternite and anal lamellae of type 1 (see fig. 2). Femora greyish black, tibiae yellowish brown, front tibiae greyish brown on the distal half.

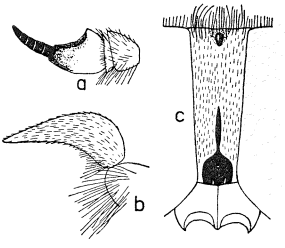


Fig. 11: *H. schineri* n. sp. (female, holotype), a: Antenna, b: Palp and c: Frontal stripe.

♂: Eye-facets on the middle part strongly enlarged, more than in the two following species. The limit between the middle enlarged facets and the lower smaller ones is rather sharp. 1st and 2nd antennal joint reddish brown with only little grey dust. 3rd antennal joint more narrow than in the female, of the same colour. The palpi swollen, brownish and with mainly black hairs. Thorax with brown notopleural calli.

Abdomen dorsally with yellowish brown sidemarkings on the first four segments. The dark, middle stripe very narrow, almost brown, not sharply contrasted to the sidemarkings. The stripe is most narrow on 3rd tergite and may sometimes be interrupted at the hind margins, due to which the middle stripe is dissolved into single spots. Otherwise as in the female.

Length: 15—18 mm.

Type-material.

Holotype: ♀ collected on 7th July 1958 in my garden at Bagsværd NW of Copenhagen (author collected).

No allotype is selected.

The type in Zool. Museum of Copenhagen.

Discussion.

I have given the name *schineri* n. sp. to Schiner's *solstitialis,* because Schiner's species is not identical with *solstitialis* Meig. (see p. 106). Four females of Schiner's *solstitialis,* which I received from Vienna, agree in all details with the Danish specimens. The *solstitialis* Schin. of various authors will partly be identical with *schineri* n. sp., though in many cases other species are intermixed under the name *solstitialis* Schiner. Of a material consisting of eight Swedish females, which I received from Mr. Kauri in Lund as *solstitialis* Schin., only one was Schiner's species, the others were *mühlfeldi* Brau.

In material from various German collections (see p. 79), I have seen 15 specimens (all females) with Kröber's determination: *solstitialis* Schin. (Kröber det. 1920-21). The 15 females belong to five species: only three are Schiner's species = *schineri* n. sp., eight are *mühlfeldi* Brau., one *distinguenda* Verr., two *tuxeni* n. sp. and one *arpadi* Szil. (not Danish). Among 29 females of *montanus* Meig. sensu Kröber and 13 females and 9 males of *tropicus* Panz. sensu Kröber from Deutsch. Ent. Inst. in Berlin two females and one female + two males respectively were *schineri* n. sp. I am afraid that very little reli-

ance can be placed upon Kröber's determinations of many species.

Meigen's *solstitialis* differs from *schineri* n. sp. in several essential points, see the summary under "Identification".

Occurrence in Denmark.

The species is rather common in Denmark. In Zool. Mus., Copenhagen, there are 11 females and 3 males of this species, and in Aarhus Naturhist. Museum there are 3 females. My own collection numbers 23 females all taken in the neighbourhood of Copenhagen in 1957 and 1958. Jutland: Sønderborg ♂ August 1895 (Wüstnei), Sønderborg ♀ June 1895 (Wüstnei), Gråsten ♀ August 1887 (Wüstnei), — Zealand: Jyderup ♀ 12th July 1913 (C. R. Larsen), Skibby in Hornsherred ♀ 23rd June 1890 (C. le Dous), Jægerspris ♀ June-July 1941 (Anthon), Tisvilde ♀ 11th July 1907 (Lundbeck), Ll. Esbønderup ♀ 2nd August 1909 (C. R. Larsen), Hillerød ♂ 1st August 1900 (Godskesen), Tokkekøb hegn ♀ 4th July 1904 (Klöcker), Kattehale at Allerød ♀ 6th July 1932 (Kryger), Rungsted ♀ 12th July 1941 (Tuxen), Rudehegn ♀ 27th July 1894 (C. R. Larsen), Frederiksdal ♀ 4th August 1909 and Jydelejet on Møen ♀ 31st July 1942 (K. Stephensen). Furthermore 1 ♀ and 1 ♂ without dates. My own specimens date as follows: Jonstrup 2 ♀♀ 20th June 1957, ♀ 29th June 1957, 6 ♀♀ 4th July 1957, ♀ 10th July 1957, 3 ♀♀ 1st July 1958, 2 ♀♀ 4th July 1958 and ♀ 9th July 1958, Hareskovby ♀ 7th July 1957, Bagsværd ♀ 6th July 1957, 2 ♀♀ 4th July 1958, ♀ 7th and 11th July 1958.

The species seems to be more common in the eastern part of the country, especially when the greater intensity of collecting in Zealand is taken into consideration. This distribution agrees with the fact that the species has not yet been recorded from Britain (see below).

Distribution.

Before a revision has been undertaken only little can

be said about its distribution, but *solstitialis* Schiner is according to Kauri (1951, p. 105) widely distributed in Sweden (only a part of Kauri's *solstitialis* Schiner is

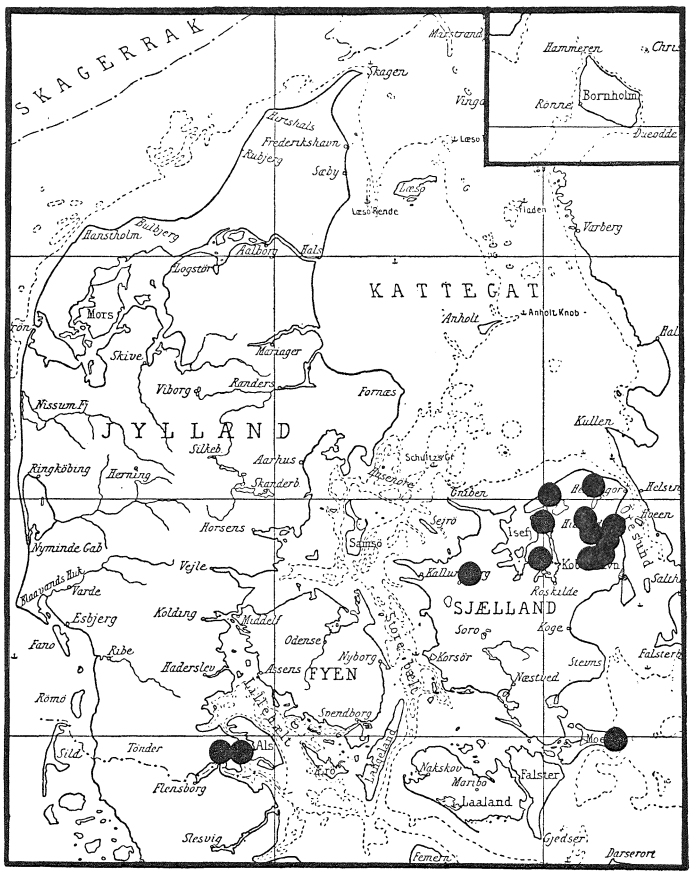


Fig. 12: The distribution of *H. schineri* n. sp. in Denmark.

Schiner's species, see above). Kröber (1932, p. 80) mentions from Germany, that his *solstitialis* Schiner occurs here and there from May to August and is widely spread. In Schleswig-Holstein the species is known from 5 loca-

lities NE and 4 localities S of the Elbe (Kröber 1930, p. 30).[1]) The species is not mentioned in British papers, and *solstitialis* Meig. sensu Verrall, Goffe and Oldroyd is not identical with Schiner's species = *schineri* n. sp. However, Mr. J. E. Collin writes (in litt. 6th May 1957) that he has 3 females of *schineri* n. sp. from England. This indicates, that the species occurs in Britain, though sparse.

Biology.

It seems to be a rather late species. The Danish material is collected from 20th June to 4th August, most of them are taken in the first half of July.

8. *Hybomitra distinguenda* Verrall, 1909.

Identification.

The females of this species and the preceding one (*schineri* n. sp.) are the only Danish *Hybomitra*-species of the *bimaculata*-group, which have yellowish brown sidemarkings on the first four segments. From *schineri* n. sp., *distinguenda* Verr. may be distinguished by its dark grey (not brownish) basal antennal joints, by the absence of blackish hairs on the sides of 2nd tergite and by the shape of 8th sternite and anal lamellae (of type 2, not type 1, see fig. 2). *H. distinguenda* Verr. may be distinguished from *mühlfeldi* Brau. by its more narrow middle stripe on abdomen, and by brownish sidemarkings also on 4th tergite, together with the shape of 8th sternite and anal lamellae (of type 2, not type 3, see fig. 2).

This species, *schineri* n. sp. and *mühlfeldi* Brau. are the only Danish species of the *bimaculata*-group in which the males have yellowish brown sidemarkings on the first four tergites, but *schineri* n. sp. has the basal joints of the antennae brownish (not greyish black) and the facets in the middle part of the eyes more enlarged and more sharply contrasted to the smaller, lower facets than in *distinguenda* Verr. More difficult it is to distinguish *distinguenda* Verr. from *mühlfeldi* Brau., but *distinguenda* Verr. is larger and has black middle stripe with shallow, pale middle triangles, while *mühlfeldi* Brau. has more brownish black middle stripe and as a rule very high greyish middle triangles, so that the middle stripe seems almost grey. Along the hind margin of 1st tergite *distinguenda* Verr.

[1]) Notice: Kröber's *solstitialis* Schiner obviously is a very intermixed species, see remarks under "Discussion".

a broad edge of golden hairs; in *mühlfeldi* Brau. these hairs are absent, or there may be a very narrow edge of golden hairs along a part of the hind margin of 1st tergite. In addition to this *distinguenda* Verr. has on 2nd sternite a flat, rounded spot, the height of which is about $^1/_4$ the segment length. In *mühlfeldi* Brau. this spot is triangular and its height about half the segment length.

Description.

♀: Frontal stripe brownish grey or yellowish grey, about 5—6 times as high as broad below. Lower frontal callus black, separated from the eye-margin. The shape often quadratic, but sometimes a little higher than broad, transversely wrinkled. Upwards it continues as a narrow line to the middle frontal callus, which is narrow spindle-shaped. The ocellar callus is shining, brownish black. The frontal stripe is rather densely haired with pale and black hairs, most of the former. On the vertex a tuft of blackish hairs. The eyes densely haired with short, dark brownish hairs.

1st antennal joint greyish black dusted, with long, fine, pale hairs and shorter and stiffer ones. 3rd antennal joint with a distinct tooth. Its ground colour reddish brown, the distal half often very dark, the style completely black. The palpi swollen basally. The colour is greyish brown, distinctly darker than in the preceding species (*schineri*), ending in a pointed tip, covered with short, black hairs and longer white ones.

Thorax seems more greyish brown than greyish black because of the golden hairs. Three grey, indistinct longitudinal stripes. The notopleural callus various in colour from brown to greyish black, but often the brown colour occupies a smaller part.

Abdomen dorsally with reddish brown or yellowish brown sidemarkings on 1st—4th tergite, the rest black. The middle stripe on 1st—3rd tergite occupies about $^1/_4$—$^1/_5$ the width of the segments. A row of more or less distinct, whitish grey middle triangles are present. The under side yellowish on the first four sternites and often

also on 5th sternite. The 1st sternite has a dark, square spot, and the 2nd sternite a triangular or trapeze-shaped spot. The whole abdomen is covered with golden hairs, and the upper side also has longer and stiffer black hairs. These hairs often missing from the light parts of 1st—4th tergites, and always absent on the sides of 2nd tergite. 8th sternite and anal lamellae of type 2 (fig. 2).

Femora grey, tibiae light brown, front tibiae distally black and also hind tibiae always darkened at the tip.

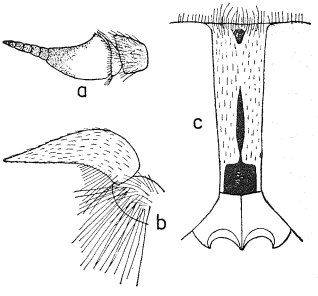


Fig. 13: *H. distinguenda* Verr. (female), a: Antenna, b: Palp and c: Frontal stripe.

♂: Eye-facets considerably enlarged in the middle part of the eyes, the enlarged facets not sharply contrasted to the lower and smaller facets, covered with short, brown hairs. The basal antennal joints always greyish dusted. 3rd joint as in the female, but more narrow. The palpi swollen, mostly at the tip, the part below the tip slightly concave. The colour brownish, grey dusted at the base.

The abdominal middle stripe black and narrow, sometimes interrupted. Sidemarkings on first four tergites. The stripe is narrowest on 3rd tergite, where it is $^1/_8$—$^1/_{10}$ the width of the segment. A row of low, pale middle triangles. 1st sternite partly, 2nd—4th completely yellowish brown, at the base of 2nd sternite a flat, rounded spot, the height of which is not more than $^1/_4$ the length of the sternite. Along the hind margin of the first tergite a broad border of golden hairs, other hairs black. Otherwise as in the female.

Length: 14.5—17 mm.

Discussion.

Verrall (1909, p. 377) writes: "Lundbeck has consider-

ed the males of this species as conspecific with *mühlfeldi* Brau., but has only doubtfully identified the female; he has had Brauer's original type of the male before him and may be correct, but in view of the other closely allied species to which I have referred, I leave my description and name intact". An examination of the specimens, which are considered here as *distinguenda* Verr., shows that Lundbeck can only have seen two females and one male of this species, and thus he had only very little material on which to separate *distinguenda* Verr.

From various German collections I have seen five specimens (three females and two males) of *distinguenda* Verr. with other identifications. Three were named *tropicus* Pz. (Kröb. det. 1921), one *solstitialis* Schin. (Kröb. det. 1921) and one *montanus* Mg. (Kröb. det. 1921).

Occurrence in Denmark.

A rather common species. The collection of Zool.Mus., Copenhagen, numbers 21 ♀♀ and 2 ♂♂, but none was found in the material from Aarhus naturhistoriske Museum. In my own collection there are 2 ♀♀.

Localities in Jutland: Frijsenborg ♂ July 1884 (Løvendal), Nørholm at Varde ♀ 14th July 1915 and ♂ 17th July 1915 (Lundbeck), Funder at Silkeborg ♀ 2nd July 1906 (Esben-Petersen), Grindsted June 1934 (Anker Olesen), Stensbæk plantation at Gram 3 ♀♀ 18th June 1949, ♀ 21st June 1949, ♀ 22nd June 1949, 2 ♀♀ 4th July 1950, 2 ♀ ♀ 14th July 1950 and ♀ 21st July 1950 (Worm-Hansen); — Zealand: Nordstrand at Nykøbing Sj. ♀ 26th July 1942 (Th. Mortensen), Tisvilde ♀ 7th July 1915 (Klöcker), Tyvekrog i Grib skov ♀ 15th June 1898 (Godskesen), Hillerød ♀ ca. 1897 (Godskesen), Frerslev hegn ♀ 4th July 1906 (Lundbeck), Jonstrup ♀ 4th July 1957 (Lyneborg) and Stensved at Vordingborg ♀ 10th July 1912 (H. Weis). Furthermore 2 ♀ ♀ without dates from Mus. Westermann and 1 ♀ without date (Coll. N. P. Jørgensen).

Estimated from this sparse material the species seems to be as common in Jutland as in Zealand.

Distribution.

Sweden: Occurs in South-Sweden and along the east coast to Västerbotten (Kauri 1951, p. 105). Kröber (1932) gives no details on the distribution in Germany, but (1930, p. 30) he writes from Schleswig-Holstein, that *distinguenda* Verr. is known from 4 localities NE and 3 S of the Elbe. In Britain it is one of the most common species and widely distributed from the south coast to Scotland (Goffe 1931, p. 38). Its further distribution is according to Leclercq (1957): Belgium, Central-Europe, Austria, Czecho-Slovakia, Switzerland, Italy and U.S.S.R.

Biology.

The Danish material is collected from 15th June to 26th July and agrees with the statements given for the flying-period in Britain; Oldroyd (1939, p. 95) states that this is from the beginning of June to the end of July. Also in Sweden the flying-period is the second half of June and July (Kauri 1951, p. 105). A woodland species.

9. ***Hybomitra mühlfeldi* Brauer, 1880.**

Syn.: partim *tropicus* auctt. nec L.
„ *solstitialis* auctt. nec L.
nec *mühlfeldi* auctt.

Identification.

From the two preceding species (*schineri* n. sp. and *distinguenda* Verr.) the female of *mühlfeldi* Brau. may be distinguished by having yellowish brown sidemarkings only on the first three (not four) tergites, and from *schineri* n. sp. by having darker, basal antennal joints and from *distinguenda* Verr. by always having many black hairs on the sides of 2nd tergite. In the three species mentioned the 8th sternite and anal lamellae are also of different shape (see fig. 2). The species can not be confused with *micans* Meig. and *lurida* Fall. because of the grey dusted (not shining black) frontal triangle. *H. collini* n. sp., *bimaculata* Macq., *bisignata* Jaen. and *solstitialis* Meig. all have black notopleural calli and the 8th sternite and anal lamellae of type 1 (*schineri* n. sp. also belongs to type 1), while *mühlfeldi* Brau. has brown notopleural callus and

genital apparatus of type 3. *H. solstitialis* Meig. and *collini* n. sp. are very much like *mühlfeldi* Brau., but can always be separated by the above given characters.

Together with the species *schineri* n. sp. and *distinguenda* Verr. the male of *mühlfeldi* Brau. sometimes has sidemarkings also on 4th tergite, and this in connection with distinctly enlarged eye-facets and the narrow, brownish black middle stripe on abdomen distinguishes it from the species 1—6. *H. mühlfeldi* Brau. may be distinguished from *schineri* n. sp. by its grey dusted, basal antennal joints and less strongly enlarged middle eye-facets, which are not sharply contrasted to the smaller, lower facets. The species may be distinguished from *distinguenda* Verr. by the brownish (not blackish) middle stripe, which has high, narrow, grey (not broadly whitish) middle triangles, due to which the middle stripe seems greyish, especially when seen from behind. Along the hind margin of the first tergite in some cases a narrow (never broad) border of golden hairs is present. At the base of 2nd sternite a triangular (not flat and rounded) dark spot.

Description.

♀: Frontal stripe rather narrow, about 5 times as high as broad at the base, yellowish grey dusted and with many, mainly black hairs. Lower frontal callus quadratic, sometimes a little higher than broad. The colour black or brownish black, distinctly transversely wrinkled and not shining. By a narrow line upwards connected with the middle frontal callus, which is narrow spindle-shaped. The ocellar callus oval, shining brownish black. On the vertex many long, black hairs. 1st and 2nd antennal joints more or less grey dusted, in the latter case the reddish ground colour may faintly be seen. 3rd antennal joint broad, the dorsal tooth forming a right angle, the colour always reddish brown, the upper margin and the style darker. The palpi swollen at the base and gently narrowed towards the tip. With short, black hairs from base to tip, besides some pale hairs. The colour greyish brown or light brownish. The hairs on the eyes short and light brownish. Thorax dark greyish with five indistinct, grey stripes. Notopleural callus always partly brown. Halteres brown or black. Femora

grey, tibiae brown, front tibiae black on the apical half.

Abdomen with yellowish brown or reddish brown sidemarkings on the first three tergites, often with greyish shadows. The middle stripe brownish black to black with high, grey middle triangles, which makes that the middle stripe seems almost greyish, especially when seen from behind. The width is not more than $^1/_3$ the width of the segments. 4th—7th tergites with greyish middle triangles and pale hind margins. When seen from behind abdomen seems grey. 1st—4th sternites yellowish brown. Also the basal part of 5th sternite sometimes yellowish brown. 1st sternite with a quadratic spot and in connection with this a flat, pentagonal spot at the base of 2nd sternite. The tip of this spot sometimes continues as a dark, narrow longitudinal stripe. 8th sternite and anal lamellae of type 3 (see fig. 2).

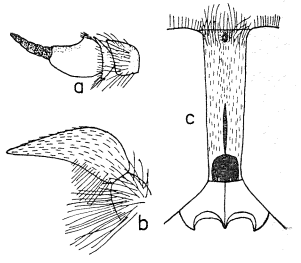


Fig. 14: *H. mühlfeldi* Brau. (female), a: Antenna, b: Palp, and c: Frontal stripe.

♂: Eye-facets of different size, the middle facets considerably larger than the lower facets and not sharply contrasted to these. The hairs on the eyes rather long and light brownish. The ocellar callus shining brownish, with about ten long, black hairs behind. The frontal triangle grey dusted. 1st and 2nd antennal joints grey dusted, the ground colour often visible, especially on 2nd joint. 3rd antennal joint yellowish brown, narrower than in the female, but with a distinct, dorsal tooth. The colour is darker dorsally and on the outer half, the style black. The palpi swollen at the tip, the shape almost as an egg, the region below the tip slightly concave. The colour greyish brown, the hairs mainly pale and long.

Thorax as in the female. Notopleural callus always brownish. Halteres brown. Abdomen with yellowish brown

sidemarkings on the first three tergites. 4th tergite sometimes also with light markings, which do not reach the hind margin. The middle stripe is narrowest on 3rd tergite, where it is not more than $^1/_8$ the width of the segment. The under side of 1st—4th sternites yellowish brown, 5th—7th black. 2nd sternite with an equilateral, dark triangle, the base of which is placed along the fore margin of the sternite, and the tip of which is placed in the middle of the sternite. On 1st sternite either a quadratic spot, the hind margin of which follows the base of the triangle on 2nd sternite, or a trapezoidal spot, the oblique sides of which form a continuation of the sides of the triangle on 2nd sternite. There are no intermediates between the two forms of coloration on 1st and 2nd sternite, and Brauer's type belongs to the second form.

Length: 14—16 mm.

Discussion.

H. mühlfeldi was described by Brauer (1880, p. 149) on the basis of a male, which by H. Megerle von Mühlfeld was sent to Meigen, who in 1820 (p. 53—54) mentioned it as *graecus* Fabr. Meigen's *graecus*, however, was not identical with Fabricius' species, and was therefore redescribed by Brauer (1880, p. 195) as *Miki* with exception of the specimen from Megerle von Mühlfeld, which gave rise to *mühlfeldi*. The type specimen is well-preserved and is found in "Alte Sammlung" in Naturhistorisches Museum in Vienna. It bears an old label: "*graecus*" and a newer one: "*mühlfeldi* Br. — *graecus* Mg. — Alte Sammlung". Owing to the kindness of Dr. Max Beier I was able to borrow the type and a pair of Brauer's females of his species.

In 1907 (p. 118) Lundbeck writes of *mühlfeldi* Brau.: "I was somewhat astonished in finding this species in Denmark on account of its hitherto known geographical range, and I thought I had committed some error in the

determination. By the courtesy of Dr. Handlirsch and the museum in Vienna I was allowed to see Brauer's type specimen, and I saw that my determination was correct." A re-examination of the type and Lundbecks male-specimens has shown, that Lundbeck's determination was correct. On the other hand there has been some uncertainty with regard to the female of this species. I received two females of *mühlfeldi* Brau. from Vienna. One of them comes from Amur and was also determined by Szilady. This female is not identical with the female, here described as the true female to Brauer's *mühlfeldi*. As far as I can see, the Amur-specimen belongs to the *montana*-group, closely allied to *H. staegeri* n. sp. (= *mühlfeldi* auctt. nec Brau.). The frontal stripe is broad, lower frontal callus broad and shining brownish black, the colour of 3rd antennal joint in the basal half yellow, distally brown. The palpi slender, notopleural callus yellow, the venter entirely yellow on 1st—4th sternite and the basal part of 5th sternite. The middle stripe on the dorsal side is very narrow on 3rd tergite (only $^1/_8$ the width of the tergites) and finally there are yellow (not yellowish brown or reddish brown) sidemarkings on the first four tergites.

Nor is the second specimen (from Sendschirli, N-Syria) identical with the true *mühlfeldi*-female, but is similar to *schineri* n. sp., though it is not this species, because the middle stripe is a little narrower, lower frontal callus of a different shape, and 8th sternite and anal lamellae are of type 3 (*mühlfeldi*-type) and not of type 1 as in *schineri* n. sp. Mr. Collin also has seen the specimen from Syria and he writes (in litt. 15th October 1958): "I do not consider that the female "*Mühlfeldi*" from Syria in the Vienna Museum, seen and described by Brauer, is the same as our *mühlfeldi* (= *tropicus* Oldroyd nec Brau.)." The specimen, however, belongs to the *bimaculata*-group. It is indeed doubtful, if Brauer has seen this specimen.

Nor has Lundbeck (1907, p. 117) identified his *mühlfeldi*-female in accordance with the female in the present paper considered as the true female to *mühlfeldi* Brau. On p. 118 Lundbeck writes: "Though the male of this species is not uncommon I am not at all sure with regard to the female. I possess only two specimens, which I refer with some doubt to this species." It has been possible to identify his two females, and the first is a *distinguenda* Verr., the second is the only Danish specimen of my species *staegeri* n. sp. (see p. 145) = *mühlfeldi* auctt. nec Brau. The reason why Lundbeck was unable to find the true female for his rather great material of *mühlfeldi*-males is, that he confused the female with *collini* n. sp., the female to *tropicus* Panz. sensu Lundb. and with *schineri* n. sp. and *distinguenda* Verr., female to *solstitialis* Schiner sensu Lundb. First by means of Collin's paper (1940, p. 178), where he describes the genitalia of his *tropicus* L., *solstitialis* Meig. and *distinguendus* Verr., it was possible to separate the female of *mühlfeldi* Brau. The result was a material of females, which agree in all details with the *mühlfeldi*-males of Brauer and Lundbeck.

The consequence of this discovery is that the British *tropicus* L. sensu Oldroyd (1939, p. 96) is now to be named *mühlfeldi* Brau. An exception is the Worcester-specimen (Oldroyd 1939, p. 96 and Verrall 1909, p. 359), which according to Collin (in litt. 3rd July 1958) is the only British specimen of *collini* n. sp.

Material from various German collections (see p. 79) has shown that many specimens of *solstitialis* Schin. sensu Kröber and *tropicus* Pz. sensu Kröber are *mühlfeldi* Brau. According to Kröber (1958, p. 48) his *mühlfeldi* Brau. in "Die Tierwelt Deutschlands" (1932, p. 78) is a misunderstanding. I have not seen German material of *mühlfeldi* Brau. sensu Kröb. 1932 from any of the German collections mentioned on p. 79.

Also in Sweden *mühlfeldi* Brau. has been confused with other species, especially with *schineri* n. sp. (= *solstitialis* Schiner). Of eight females of *solstitialis* Schiner sensu Kauri, which I received from Lund, only one was *schineri* n. sp., the others being *mühlfeldi* Brau. The species, which is mentioned as *mühlfeldi* Brau. by authors like Olsoufiev (1937, p. 190) and Dinulescu (1958, p. 146) is not Brauer's species, and I have given the *mühlfeldi* of the above mentioned authors (but not of Brauer) the new name: *staegeri* sp. nov. (see p. 145). *H. staegeri* n. sp. (= *mühlfeldi* auctt. nec Brau.) is only little known to me, and I have only one Danish specimen (a female) of this species.

Occurrence in Denmark.

H. mühlfeldi Brau. is a rather common species in Denmark, but seems to have an eastern distribution in our country, even when the stronger intensity of collecting on the islands is taken into consideration. In the collection of Zoologisk Museum of Copenhagen there are 25 females and 9 males and in Aarhus naturhistoriske Museum 11 females and 9 males. My own collection numbers 34 females, all taken in the neighbourhood of Copenhagen at Bagsværd and Jonstrup.

Localities: Jutland: Silkeborg; — Funen: Odense and Veflinge; — Zealand: Kærehave at Ringsted, Svenstrup, Boserup, Tisvilde, Asserbo, Hillerød, Tokkekøb hegn, Ryget skov at Værløse, Jonstrup, Bagsværd, Rudehegn, Geel skov, Søllerød, Dyrehaven, Ermelund, Ordrup mose and Copenhagen.

Distribution.

Because the name *mühlfeldi* Brau. has been applied to several species only little can be said on the distribution. As stated above seven females of this species were among eight Swedish females of *solstitialis* Schin. sensu Kauri, and no doubt the species is widely distributed in Sweden. The species *tropicus* L. sensu Oldroyd

(with exception of the Worcester-specimen = *collini* n. sp.) is identical with my *mühlfeldi* Brau., and Oldroyd (1939, p. 97) gives several localities from Britain, but the species seems not to be as common as in Denmark. In material from various German collections (see p. 79) I have seen in all 22 specimens of this species.

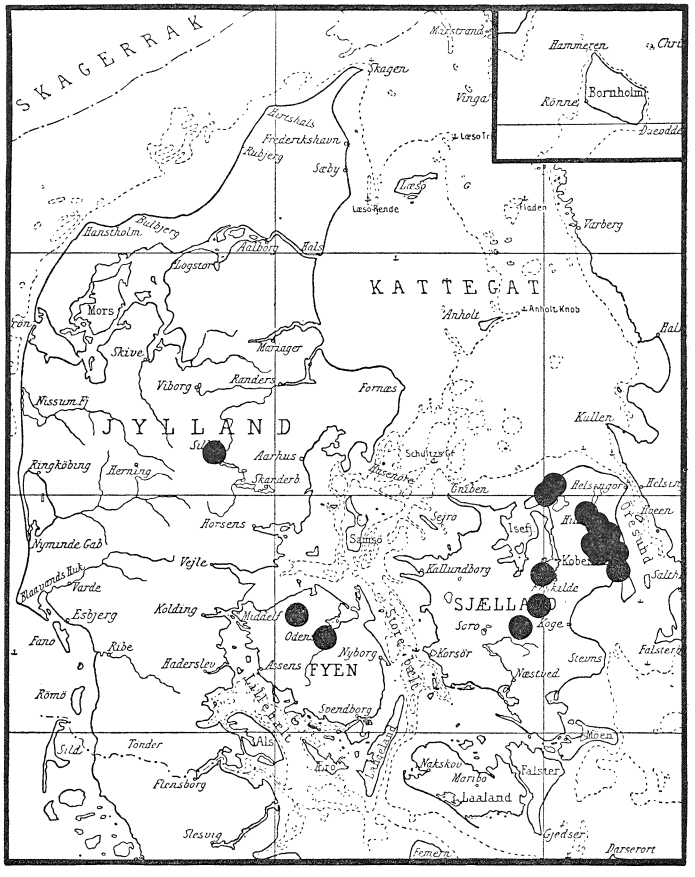


Fig. 15: The distribution of *H. mühlfeldi* Brau. in Denmark.

Biology.

Oldroyd (1939, p. 97) mentions that all the British

records of this species are from coastal regions, and by this he places the species in contrast to *solstitialis* Meig. With few exceptions, however, the Danish records of *mühlfeldi* Brau., are from inland localities, so probably Oldroyd is in error here (see also the remarks under *solstitialis* Meig.). With regard to the flying-period all the Danish specimens were caught in June and July with 12th June and 1st August as the extremes. The climax is in the last half of June and the first half of July. My own specimens were taken in the summers 1957 and 1958 at Bagsværd and Jonstrup about 15 km NW of Copenhagen. It is a region with woods and many small lakes. They were caught on very hot days, when the females swarmed round me and sometimes settled on my clothes. In this way I have, besides the 34 females of *mühlfeldi* Brau., taken 10 females of *H. collini* n. sp., 1 female of *bisignata* Jaen., 22 females of *schineri* n. sp. and two females of *distinguenda* Verr. All the species caught belong to the *bimaculata*-group, and it is notable, that no specimens were taken of the following common species: *lundbecki* n. sp. belonging to the *montana*-group, though it is found in the region in question. This indicates that besides the morphological differences there may be a biological difference between the two groups.

Montana-group.

10. *Hybomitra lundbecki* sp. nov.

Syn.: partim *montanus* auctt. nec Meig.
„ *fulvicornis* auctt. nec Meig.

Identification.

The females of this and the following three species (the *montana*-group) may be distinguished from the species no. 3—9 (forming the *bimaculata*-group) by the following characters: 1) frontal stripe broad, 3—4 (not 4—6) times as high as broad at the base; 2) lower frontal callus often broader than high and plain, shining black or brownish black, 3) the palpi more slender and with shorter hairs on the under side, 4) upper margin of the antennal bow broader towards the middle line, and 5) 2nd sternite with a large,

quadratic, dark spot. *H. lundbecki* n. sp. may be distinguished from *tuxeni* n. sp., *m. montana* Meig. and *montana flaviceps* Zett. by the following characters: 1) third antennal joint broad and brown, and 2) notopleural callus as a rule blackish.

H. staegeri n. sp. (= *mühlfeldi* auctt. nec Brau.) has whitish halteres, yellowish brown sidemarkings on 1st—4th tergite, 3rd antennal joint narrow and mainly black and may easily be distinguished from *lundbecki* n. sp. by means of these characters.

The males of the species of the *montana*-group may be distinguished from the preceding nine species by the following characters: 1) shorter hairs on vertex, 2) palpi more slender, and 3) the hairs on upper side of 1st antennal joint are shorter than the length of 1st and 2nd joint together. *H. lundbecki* n. sp. may be distinguished from *tuxeni* n. sp., *m. montana* Meig. and *montana flaviceps* Zett. by having 3rd antennal joint distinctly reddish brown and always with a distinct, dorsal tooth, and finally the notopleural callus as a rule is blackish. The male of *staegeri* n. sp. is not known to me, but has very pale halteres like the female.

Description.

♀: The frontal stripe broad, 3—4 times higher than broad at the base, yellowish grey or greyish brown dusted and with rather long, black and pale hairs. On the vertex a tuft of mixed pale and blackish, short hairs. Lower frontal callus of somewhat varying form, sometimes rectangular and then broader than high, more often of a rounded triangular or pentagular form. The variation is due to rubbing off. Its colour is shining black or brownish black, plain and not transversely wrinkled as in the preceding species. Middle frontal callus black, broadly spindle-shaped, sometimes connected with the lower frontal callus by a narrow line. The ocellar callus dark and rounded triangular. The hairs on the eyes short and pale. 1st and 2nd antennal joint brownish with grey dust, 3rd joint broad and with a distinct dorsal tooth, the colour reddish brown, dorsally a little darker, the style completely black. Upper antennal bow somewhat broader towards the mid line. The palpi slender, not swollen basally; they are pale brownish with some black and

whitish hairs on the outer side. The under side of the palpi with rather short hairs.

Thorax greyish black and with rather distinct, grey longitudinal stripes. Notopleural callus black or almost black. Abdomen with 1st—3rd (seldom 1st—4th) tergites light yellowish brown or reddish brown. The dark middle stripe occupies not more than $^1/_3$ the width of the segments, which have very distinct triangles in the middle, reaching the fore margins. 4th—7th tergites as a rule completely greyish black. The venter with 1st sternite mainly greyish black, the following two or three sternites with yellowish brown coloration on the sides. 2nd sternite always with a large, dark, quadratic spot, which reaches the hind margin and which is spread out basally along the fore margin. On the following two sternites a more or less broad middle stripe. The last sternites black. The hairs on abdomen yellowish grey and black.

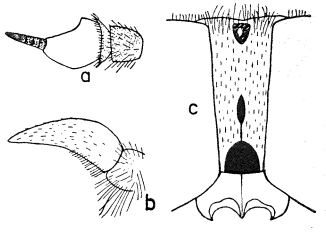


Fig. 16: *H. lundbecki* n. sp. (female, holotype), a: Antenna, b: Palp and c: Frontal stripe.

Femora grey, tibiae brownish, distally darker. Tarsi dark brownish.

♂: Eye-facets of almost equal size. The hairs on the eyes longer and more dense than in the female, their colour whitish brown. 1st and 2nd antennal joint brownish, often strongly grey dusted. The hairs on upper side of 1st antennal joint shorter than the length of the two first joints together. 3rd joint not so broad as in the female, but still with a distinct tooth and the colour reddish brown, but darker distally (fig. 4b). The palpi slender and not swollen basally, their colour pale brownish (fig. 4c). Abdomen with light sidemarkings on 1st—4th tergite. The middle stripe narrower than in the female, on

3rd tergite about $^1/_5$ the width of the tergite. The underside as in the female. The hairs darker than in the female, pale hairs mostly along the hind margins of the segments. Otherwise as in the female.

Length: 15—17 mm.

Type-material.

Holotype: ♀ 5th June 1906, Hareskov N of Copenhagen (coll. Lundbeck).

Allotype: ♂ 5th June 1906, Hareskov N of Copenhagen (coll. Lundbeck).

Holotype and allotype taken in copula by C. R. Larsen. Both in Zool. Museum of Copenhagen. I have named the species in memory of the famous Danish dipterist W. Lundbeck (1863—1941).

Discussion.

I have given the name *lundbecki* n. sp. to parts of *montanus* Meig. of various authors and to *fulvicornis* of various authors but not Meigen. The description of *fulvicornis* Meig. (1820, p. 46) was drafted by Wiedemann from an Italian specimen (a female) in Germar's collection and this description was sent to Meigen, who published it without ever having seen the type-specimen. This description is that of a species of the restricted genus *Tabanus*, according to the statement: "Stirne mit schwarzer Längslinie über die Mitte", i. e. there was no lower callus as in the *Hybomitra*-species, but only a narrow, black line similar in this respect to the frons in species as *graecus* Fabr. and *apricus* Meig. Brauer was therefore correct, when he states (1880, p. 13): "*Graecus* Fabr. E. Syst. 1794 = *ferrugineus* Meig. et *fulvicornis* Meig. 1804". Mr. J. E. Collin has called my attention to the fact that the first person suggesting the use of the name: *fulvicornis* Meig. for a hairy-eyed *Hybomitra*-species was Villeneuve (1910), and he was mistaken in stating that Meigen's type of this species was in Paris. The type-specimen of *fulvicornis* Meig. may be either in Wiede-

mann's own collection or in Germar's collection, but I have not succeeded in finding it. In a material of *lundbecki* n. sp. sent me as *fulvicornis* Meig. from Vienna there was a female with one of Wiedemann's original labels: "Hercyn/trop.", but this specimen can not be the type, because it does not agree with the description.

The majority of Lundbeck's material of *montanus* Meig. is *lundbecki* n. sp., only two of his *montanus*-specimens being the true *montanus* of Meigen. Eight females of Kauri's *fulvicornis* Meig. were all *lundbecki* n. sp. Of a material of 63 specimens of *montanus* Meig. (Kröber det. 1920-21) from various German collections (see p. 79) the majority (42 specimens) was *lundbecki* n. sp. Three specimens of *fulvicornis* Meig. (Kröber det. 1921) were also *lundbecki* n. sp.

Various authors have considered their *fulvicornis* Meig. (= *lundbecki* n. sp.) to be only a variety of *m. montana* Meig. There is no doubt, however, that they are two well separated species, though the morphological differences are only small. *H. lundbecki* n. sp. has a flying-period, which is about two weeks earlier than that of *m. montana* Meig. Also the distribution-patterns in Denmark are different (see below).

Occurrence in Denmark.

H. lundbecki n. sp. seems to be the most common *Hybomitra*-species in Denmark. It is evenly distributed all over the country, though perhaps a little more frequent in Jutland than on the islands, especially when the stronger intensity of collecting in the islands is taken into consideration. In the collection of Zool. Museum of Copenhagen I could separate 30 females and 20 males, and in Aarhus naturhist. Museum there are 29 females and 13 males.

The following localities can be given. Jutland: Ø. Assels in Mors, Gravlev enge, Buderupholm, Rebild, Dollerup, Lemming bæk N of Silkeborg, Funder and Mausing at Silkeborg, Gindeskov at Skive, Nørholm at Varde, Stensbæk plantation at Gram, Kjelstrup; — Funen: Mid-

delfart; — Zealand: Tibirke, Tisvilde, Tyvekrog in Grib skov, Stenholtsvang, Strødam, Hillerød, Gandløse Ore, Ryget at Værløse, Hareskov, Rudehegn, Geel skov,

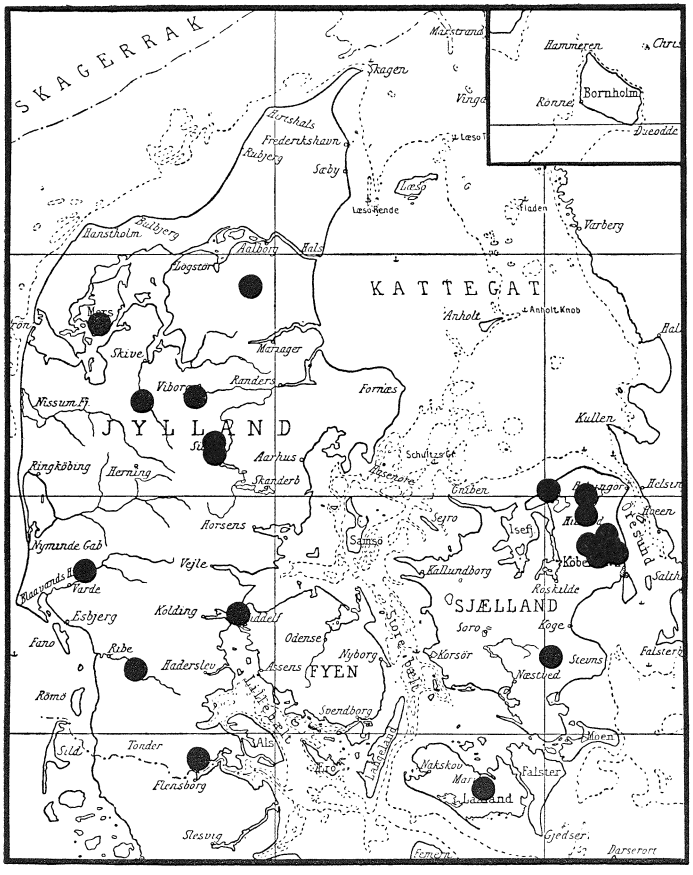


Fig. 17: The distribution of *H. lundbecki* n. sp. in Denmark.

Ermelund, Dyrehaven, Frerslev hegn; — and Lolland: Borgø at Maribo.

Distribution.

Sweden: Rather commonly distributed all over the country (Kauri 1951, p. 104). Germany: "Aus einzelnen

Teilen Deutschlands bekannt" (Kröber 1932, p. 80). The same author (1930, p. 30) names 8 localities for this species in Schleswig-Holstein. According to Collin (in litt. 6th May 1957) this species does not occur in Britain, though Goffe (1931, p. 97) states that he has seen some specimens (from Nethy Bridge) of this form or of a form intermediate between *fulvicornis* and *montanus*. It may be the following species: *tuxeni* n. sp.

Its further distribution is according to Leclercq (1957): Belgium, Central-Europe, Austria, Czecho-Slovakia, Switzerland, France, Italy, and U. S. S. R.

Biology.

The flying period according to Kröber (1932, p. 80) is May—August. In Denmark the flying-period is from 25th May to 28th July with the maximum in June and the first third of July and followed by a sudden decrease. A comparison with the distribution of the material of *m. montana* Meig. shows that the flying-period of this species occurs about two weeks later than that of *lundbecki* n. sp.

As mentioned under the preceding species (p. 127) I have never during my collecting-excursions in the region NW of Copenhagen been surrounded by this or other species of the *montana*-group. This curious fact indicates a biological difference between the two groups, a difference, about the nature of which nothing can be said with certainty.

11. *Hybomitra tuxeni* sp. nov.

Syn.: partim *montanus* auctt. nec Meig.
„ *fulvicornis* Kröb. nec Meig.

Identification.

The females of the *montana*-group are rather difficult to distinguish from each other. *H. lundbecki* n. sp. is most easily separated by means of its broad and brown 3rd antennal joint and black notopleural calli. *H. tuxeni* n. sp. is a rather large species (15.5—18 mm), the sides of abdomen with golden and black hairs, and 3rd antennal joint rather narrow and distinctly brown at the base,

whereas *H. m. montana* Meig. and *montana flaviceps* Zett. both are smaller species (12,5—16 mm) and have grey and black abdominal pubescence and 3rd antennal joint more narrow and mainly black.

The males of the *montana*-group are only little known to me. Besides 33 males of *lundbecki* n. sp., which may be distinguished by its rather broad third antennal joint and black notopleural callus, I have only seen eight males belonging to this group. A description of these males is given on p. 135.

Description.

♀: Frontal stripe broad, 3—4 times higher than broad below, yellowish grey dusted and with many yellowish and a few blackish hairs. Lower frontal callus of somewhat varying form, but often broader than high and always shining black or brownish black. Middle frontal callus spindle-shaped and black. The ocellar callus brownish with more or less grey dust. Behind the ocelli a tuft of rather short, yellowish hairs, intermixed with some black hairs. 1st and 2nd antennal joint rather strongly grey dusted. 3rd antennal joint more narrow than in *lundbecki* n. sp., the upper tooth less pronounced. Outer half of the joint always darkened, the basal half brownish. The style black. Upper margin of the antennal bow broader towards the middle line. The palpi not especially slender, light brownish, the tip blunt. With many pale and a few black hairs.

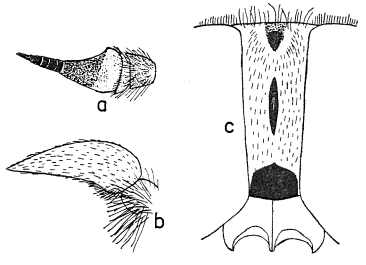


Fig. 18: *H. tuxeni* n. sp. (female, holotype), a: Antenna, b: Palp and c: Frontal stripe.

Thorax grey, notopleural callus distinctly brown. Abdomen dorsally with yellowish brown sidemarkings on 1st—3rd tergite, sometimes also a little brown spot on the sides of 4th tergite. The dark middle stripe is nearly $^1/_3$ the width of the segments, with distinct yellowish middle triangles.

Pubescence on abdomen conspicuously golden (not greyish as in *montana* Meig.), and besides black hairs in various numbers. The under side greyish black with brown sidemarkings on 1st—4th tergite. On 2nd sternite a large, dark, quadratic spot. On the following sternites a more or less distinct, dark middle stripe. Legs as in *lundbecki* n. sp. Wings more or less distinctly darkened, especially along the veins.

Length: 15,5—18 mm (average of 18 Danish females: 16,7 mm).

♂: Eye-facets of equal size. The eyes with pale brownish pubescence which is longer and more dense than in the female. No black hairs behind the ocelli. 1st and 2nd antennal joint strongly grey dusted; hairs on upper side of 1st antennal joint shorter than 1st and 2nd joint together. 3rd joint a little more narrow than in the female, blackish distally, brownish at the base. Palpi not so slender as in *lundbecki* n. sp. (fig. 4 c), the tip rounded (not pointed). Their colour pale brownish, often somewhat grey dusted. Thorax as in the female with brown notopleural callus.

Abdomen dorsally with dark, yellowish brown sidemarkings on 1st—4th tergites and dark middle stripe of about $^1/_5$ the width of the tergites. The under side with 1st—4th sternites yellowish brown, 2nd sternite with a dark, quadratic spot, which is broader towards the base. On 3rd and 4th sternites as a rule no dark middle line. Otherwise as the female, the wings also more or less darkened, especially along the veins.

Length: 16—17,5 mm.

Discussion.

It is evident that there are several species (or subspecies) in most authors' *montanus* Meig. One of them I have separated here as *tuxeni* n. sp. It differs from the lectotype of Meigen's *montanus* in Vienna and from my further material of the true *montanus* Meig. by the mor-

phological characters given above. Besides the morphological differences between the two species there also seem to be different distribution-patterns in Denmark (see fig. 20 and 22). *H. tuxeni* n. sp. has an eastern distribution, *m. montana* Meig. a western distribution in Denmark, and these facts indicate that they are two subspecies. On the other hand both forms have been taken (three of each species) at Stensbæk plantation in S-Jutland, and I have therefore provisionally separated them as two species. Also the seasonal distribution indicates that they are two different species (see below).

From *montanus* Meig. sensu Lundb. I could separate three females and two males of this species. A female of *solstitialis* Schin. (Kröber det. 1920) from Staatliches Museum in Stuttgart belongs to this species, and from Deutsch. Ent. Inst. in Berlin I received three females of *tuxeni* n. sp., one labelled *fulvicornis* Meig. (Kröber det. 1931) and two labelled *montanus* Meig. (Kröber det. 1921 and 1931). These four females together with eighteen females and eight males from Denmark form my material of this species. As mentioned on p. 97, Mr. J. E. Collin has undertaken an examination of Linné's types of *tropicus* in "The Linnean Collection" in London. The result was that *tropicus* L. does not belong to the *bimaculata*-group, but in all visible characters correspond with a form of *montanus* Meig. "The abdomen of the type differs from most specimens of *montanus* in having a small isolated yellowish patch on fourth tergite. However, I possess both Scottish and English specimens of *montanus* which also have this patch, and these were taken at the same time and place as normal specimens without this patch. The *tropicus*-type also has rather darker wings than normal British *montanus* and a more noticeable small dark "cloud" about the base of the forked apical vein. In fact it is really more like your "dark" *montanus* [= *tuxeni*, author's remark]. Both type-specimens have

lost their antennae." (Collin in litt. 15th October 1958).

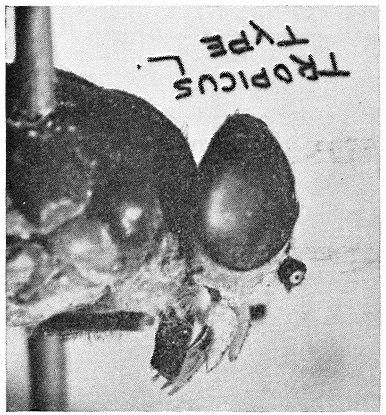


Fig. 19 a.

I have not myself seen the type-specimens, but the photographs (fig. 19) indicate that *tropicus* L. is identical with the species here described as *tuxeni* n. sp. In order to avoid the complications an exchange of names may cause, I have on p. 99 proposed that the name *tropicus* L. be deleted.

Type-material.

Holotype: ♀ 9th June 1918, Bremersvold in Lolland. No allotype is selected. The type in Zool. Museum, Copenhagen.

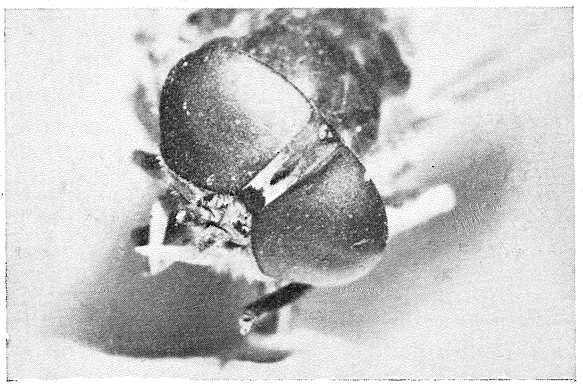


Fig. 19 b.

Fig. 19. Type-specimen of *tropicus* L., a: Showing the palpi and the brown notopleural callus, b: Frontal stripe. (Phot. Mr. Tams, South Kensington Museum, London).

I have named this species in honour of Dr. S. L. Tuxen, the head of the entomological department of Zool.

Museum, Copenhagen, where I have met much hospitality during the preparation of this paper.

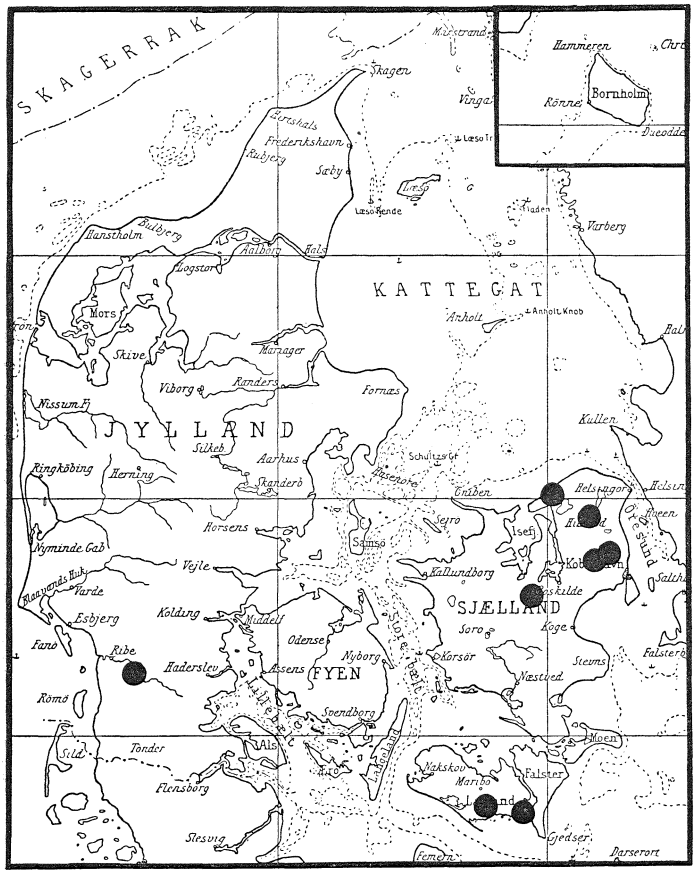


Fig. 20: The distribution of *H. tuxeni* n. sp. in Denmark.

Occurrence in Denmark.

A rather common species in the islands, but very sparse in Jutland, where it seems to be replaced by *m. montana* Meig. and *m. flaviceps* Zett. (Compare fig. 20 and fig. 22). Localities in Jutland: Stensbæk plantation at Gram; — Zealand: Hvalsø, Tisvilde, Hillerød, Jonstrup

at Ballerup, Hareskov, Frederiksdal; — Lolland: Roden skov, Kærstrup and Bremersvold.

Distribution.

Nothing can be said with certainty before a revision has been undertaken in the various countries. I have seen four German specimens, one of which was labelled Berlin, Finkenkg.

Biology.

Flying-period according to the dated Danish specimens: 24th May to 11th July. One specimen in May, seventeen in June and eight in the first third of July. According to this rather sparse material it seems evident, that *tuxeni* n. sp. is an earlier species than *m. montana* Meig. and with a flying-period most resembling that of *lundbecki* n. sp. On 4th June 1958 and 2nd July 1958 I captured 2 + 2 males hovering in the early morning over a road near a wood N of Copenhagen.

12. *Hybomitra m. montana* Meig., 1820.

Identification.

On p. 127 characters are mentioned, by means of which the species of the *montana*-group may be distinguished from the species of the *bimaculata*-group. From *lundbecki* n. sp., *m. montana* Meig. may be distinguished by having 3rd antennal joint narrow and mainly black, the notopleural callus brown and the brown sidemarkings on 1st—3rd tergite of a darker coloration and with distinct, greyish shadows. From the preceding species *m. montana* Meig. is more difficult to distinguish. Both have brown notopleural calli, but in *m. montana* Meig. the third antennal joint is still more narrow and blackish, the ground coloration more blackish and the abdominal pubescence grey and black (not golden and black) and finally *m. montana* Meig. is a smaller species. In the other subspecies of *montana: m. flaviceps* Zett. the distinct brown sidemarkings on 1st—3rd tergites much reduced or absent. Further the venter is mainly greyish black and the antennae very narrow and black. *H. staegeri* n. sp. (= *mühlfeldi* auctt. nec Brau.) has whitish halteres, sidemarkings on 1st—4th tergites and very narrow middle stripe, especially on 3rd tergite.

The males of the *montana*-group may be distinguished from

the males of the *bimaculata*-group by means of the characters given on p. 128. My material of males of the *montana*-group is rather sparse. Of *lundbecki* n. sp., which may be distinguished by its black notopleural callus and rather broad, brownish 3rd antennal joint, I have seen 33 Danish specimens. Of males with brown notopleural calli I have only seen eight Danish specimens, all of which I consider as *tuxeni* n. sp. Therefore I can give no details on the distinction of *tuxeni* n. sp., *m. montana* Meig., *montana flaviceps* Zett. and *staegeri* n. sp.

Description.

♀: Frontal stripe broad, 3—4 times higher than broad below, grey dusted. Lower frontal callus often broader than high, upper margin straight or with a little point at the middle. Colour shining black, not transversely wrinkled. Middle frontal callus broad spindle-shaped and black, sometimes connected with the lower callus by a narrow line. Ocellar callus not so distinct as in the preceding species, brownish and more or less grey dusted. Behind the ocellar callus some blackish hairs, which are shorter than in the species of the *bimaculata*-group. The frontal stripe also has some rather short, pale and blackish hairs. Pubescence of the eyes sparse, consisting of short, whitish hairs. 1st and 2nd antennal joint grey dusted, 3rd antennal joint narrow with a weakly developed dorsal tooth. The colour mainly black, often a little brownish coloration at the base. The style black. The palpi light yellowish brown, slender and with pale and black hairs.

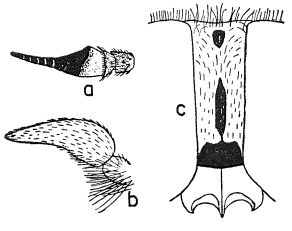


Fig. 21: *H. m. montana* Meig. (female), a: Antenna, b: Palp and c: Frontal stripe.

Thorax greyish black with indistinct grey longitudinal stripes. Notopleural calli brown. Halteres brownish with paler tips.

Abdomen with yellowish brown or reddish yellow sidemarkings on 1st—3rd tergite or 1st—4th tergite; sidemarkings often with greyish shadows. Middle stripe

black with distinct, grey middle triangles. The width is $^1/_3$ the width of the tergites. The black middle stripe continues to the tip, and the sides of the last tergites of the same grey coloration as the middle triangles. Pubescence grey (not golden) and black. The venter somewhat variable in colour, but the sides of the first sternites always more or less distinctly yellowish brown or reddish brown. 2nd sternite with a quadratic dark middle spot. On the following sternites a more or less distinct, dark middle stripe. The legs with grey femora, tibiae brownish, the first pair darker. Tarsi brown, first pair blackish.

Length: 12,5—16 mm (average of 20 Danish females: 14,4 mm).

♂: Se remarks under "Identification".

Discussion.

The species here mentioned as *H. m. montana* Meig. is only identical with part of *montanus* Meig. of various authors, which is a very mixed species. I have seen one of Meigen's types (a female) from "Hohe Ween". It was given by him to Winthem and is now found in Naturhistorisches Museum in Vienna. This specimen I herewith appoint as lectotype to *m. montana* Meig.

Lundbeck's (1907, p. 112) *montanus* Meig. is mainly *lundbecki* n. sp., though there are six specimens of *tuxeni* n. sp. among them. Of the present Danish material of the true *m. montana* Meig., none can have been seen by Lundbeck.

I have seen 66 specimens of Kröber's *montanus* Meig. (Kröber det. 1920—21) from various German collections (see p. 79). Of these one was *collini* n. sp., two *schineri* n. sp., one *distinguenda* Verr., fortythree *lundbecki* n. sp., four *tuxeni* n. sp. and only seventeen the true *m. montana* Meig.

For the specific distinction between *tuxeni* n. sp. and *m. montana* Meig. see p. 136.

Occurrence in Denmark.

The species is in Denmark only known from Jutland as seen on the map (fig. 22), and it seems to be at-

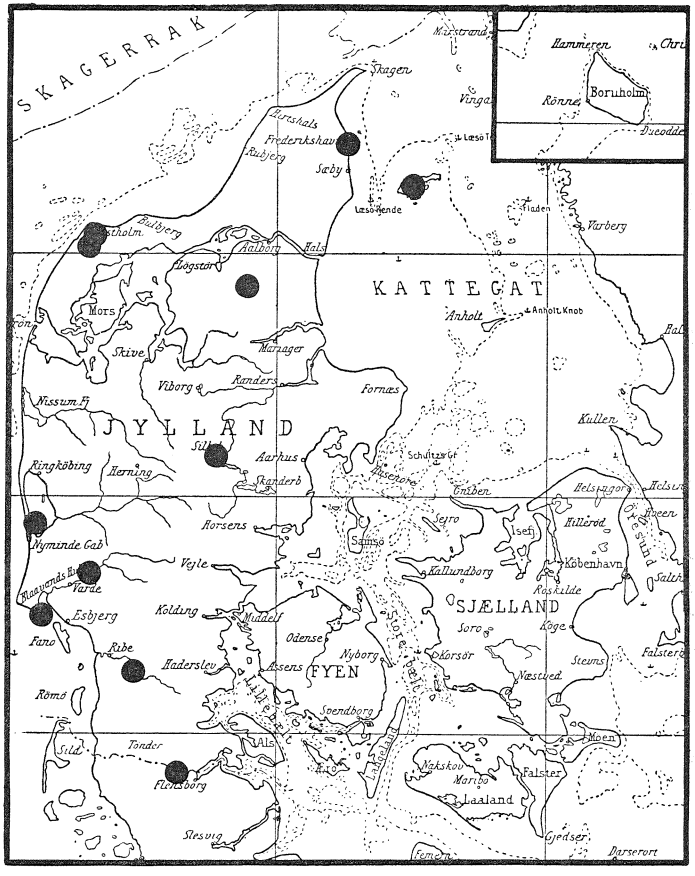


Fig. 22: The distribution of *H. m. montana* Meig. in Denmark.

tached to the coastal region farthest to the west. In accordance with this, Goffe (1931, p. 97) writes about the distribution in Great Britain: "The species appears to be quite common in the Scottish Highlands and in a number of places in mountainous districts in S.W. Ireland".

Later on the species has also been found in several places in England, but it seems not to occur in the southeastern counties (Oldroyd 1939, p. 93). The explanation of these distribution-patterns may be that *m. montana* to a higher degree than other *Hybomitra*-species can hold its own in humid and windy districts.

The material in the Zool. Museum of Copenhagen consists of 21 females, no males. Naturhist. Museum in Aarhus has a single female and in my own collection there is also one female.

Localities in Jutland: Læsø, Frederikshavn, Ørgård at Nors (Thy), Sårup at Hanstholm, Buderupholm, Silkeborg, Tipperne, Nørholm hede at Varde, Skallingen, Stensbæk plantation at Gram, and Frøslev.

Distribution.

In Sweden frequent all over the country, but replaced in the northernmost districts of Lapland and along the Scandinavian mountain-range by the darker subspecies: *m. flaviceps* Zett. (Kauri 1954, p. 242).

As mentioned above *m. montana* Meig. in Britain is distributed, though locally, all over the country with exception of the southeastern counties, and is mainly frequent in the Scottish Highlands and in Ireland (Oldroyd 1939, p. 93). According to Kröber (1932, p. 80) it is common in Germany and is also known from Schleswig-Holstein (Kröber 1932, p. 30), but only a minority of Kröbers *montanus* Meig. is Meigen's species in my sense, see above.

Leclercq (1957) gives the further distribution as: Holland, Belgium, France, Central-Europe, Austria, Switzerland, N. Italy, Czecho-Slovakia, Bulgaria, U. S. S. R. and Finland.

Biology.

Occurs from May to August on pastures and roads. The males often hover in great numbers in the sunshine over roads in woods and in similar places (Kröber 1932, p. 80). With regard to the flying period the Danish ma-

terial is from the period 23rd June to 5th August and with a distinct maximum in the first half of July. Accordingly this species seems to have a flying-period, which is some weeks later than that of *lundbecki* n. sp. and *tuxeni* n. sp. (see fig. 1). Oldroyd (1939, p. 93) mentions that the species is mainly met in mountainous or hilly districts, but is not restricted to such places. This is also the case in Denmark, where most of the localities are situated in low-lying and only little undulated districts.

13. ***Hybomitra montana flaviceps* Zett., 1842.**

Identification and Description.

♀: Differs from *m. montana* Meig. by the following characters: 1) the brownish sidemarkings on the first tergites lacking or reduced into very small markings; 2) the under side mainly greyish black, sometimes a faintly reddish brown coloration on the sides of 2nd and 3rd sternite; and 3) antennae still more narrow and darker than in the nominate form. Ringdahl (1943, p. 171) mentions that specimens with completely black notopleural calli are common. Otherwise as in the female of *m. montana* Meig.

♂: Not known by the author, see p. 140.

Discussion.

This form was described as a subspecies of *montana* Meig. by Kauri (1954, p. 242), but Ringdahl (1943, p. 171) had mentioned *flaviceps* Zett. and stated that it was probably only a melanistic variety of *montana* Meig.

Occurrence in Denmark.

Only three females known, all from Jutland. Dates: Højen at Skagen 19th July 1908 (Coll. Lundbeck) and Tipperne 2 spp. 15th June 1940 (Søgård Andersen). On basis of this sparse material *m. flaviceps* seems to be a form connected with the west coast of Jutland.

Distribution.

In Sweden *m. flaviceps* Zett. replaces the nominate form in the northern Lapland and along the Scandinavian mountain-range. Though specimens are caught in southern Sweden the species occurs here singly and accidentally (Kauri 1954, p. 242). From the description by Goffe (1931, p. 96) of his *montanus* Meig. the present subspecies also occurs in Great Britain, but he has not separated the form. According to Ringdahl (1943, p. 171) *m. flaviceps* is identical with *montanus* f. *obscura* of Olsoufiev (1937, p. 378), and the latter states the distribution of his form as: North-Europe, northern part of the European U. S. S. R. and Siberia.

14. ***Hybomitra staegeri* sp. nov.**

Syn.: *mühlfeldi* auctt. nec Brau.

Identification.

The female of this species may be distinguished from all other *Hybomitra*-species by its completely whitish yellow halteres. The frontal stripe, antennae and palpi almost as in *m. montana* Meig., but it may be distinguished from this species by its very light abdominal sidemarkings on 1st—4th tergites and a middle stripe, which on 2nd and 3rd tergites is very narrow (about $^1/_8$ the width of the tergites),

The males is not known by the author. According to Olsoufiev (1937, p. 379) it has whitish yellow halteres like the female, eye-facets in upper two thirds of the eyes 2—3 times larger than those in the lower third and the venter with a dark middle spot on 2nd sternite.

Description.

♀: Frontal stripe about four times higher than broad below, yellowish grey dusted. Pubescence of pale and blackish hairs. Lower frontal callus broader than high, upper margin rounded, the colour shining brownish black. Middle callus rather broad, about $^1/_3$ the width of the frontal stripe, pointed in the ends, and downwards by a narrow line connected with lower callus. The ocellar callus flat and rounded triangular, the colour brownish and

partly grey dusted, placed on a somewhat protruding vertex. Behind the vertex some blackish hairs. Pubescence on the eyes very sparse, short and whitish. 1st and 2nd antennal joints yellowish brown, only little dusted. 3rd antennal joint rather narrow, but with a distinct tooth dorsally. The colour black in the distal part, at the base somewhat brownish. Palpi rather slender, ending in a blunt tip, the colour pale, with some short black and many whitish hairs.

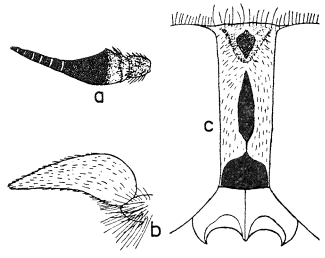


Fig. 23: *H. staegeri* n. sp. (female, holotype), a: Antenna, b: Palp and c: Frontal stripe.

Thorax greyish black, notopleural callus and upper part of mesopleura brownish. The suture from wing-root to scutellum is very deep and forms a U-shaped groove, which is as deep as broad. This characteristic suture is not found in other Danish *Hybomitra*-species, where a flat and broad depression is formed. Halteres yellowish white.

Abdomen dorsally with broad, yellowish brown sidemarkings on 1st—4th tergites. Middle stripe brownish black, with greyish middle triangles at the middle. The width of the middle stripe is on 2nd and 3rd tergites about $^1/_8$ the segment's width. At the hind margins of 2nd and 3rd tergites the middle stripe is interrupted, but continues on 4th tergite being $^1/_3$ the width of this tergite. The remaining tergites greyish black. On the under side 1st—4th sternites are yellowish brown, 3rd and 4th a little greyish along the hind margin. At the middle of 2nd sternite a quadratic spot in the hindmost half of the sternite. Also the middle part of 1st sternite darkened, but only faintly. 5th—7th sternites mainly pale greyish, 5th with small yellowish sidemarkings.

Femora greyish, tibiae light brownish, 1st pair distal-

ly somewhat darker. Tarsi brownish, 1st pair almost black.

Length: 17 mm.

♂: See the "Identification".

Discussion.

The description above is based on the single Danish specimen of this species, which by Olsoufiev (1937, p. 190) and Dinulescu (1958, p. 146) is named *mühlfeldi* Brau. I have not seen specimens of the two authors' species, but my specimen agrees in all details with their description and figures. As mentioned on p. 123 two females of Brauer's *mühlfeldi*, which I received from Vienna, do not agree with the type-specimen of Brauer's species, which is a male sent by v. Mühlfeld to Meigen. Meigen mentions it as *graecus* (not *graecus* Fabr.). Later on Meigen's *graecus* was separated into *mühlfeldi* and *miki* by Brauer (1880, p. 149). The type-specimen of *mühlfeldi* Brau. belongs to the *bimaculata*-group, while the *mühlfeldi* Brau. sensu Olsoufiev and Dinulescu belongs to the *montana*-group.

One of the *mühlfeldi*-females from Vienna is from Syria. As mentioned on p. 123 it belongs to the *bimaculata*-group, but is not identical with my true *mühlfeldi*-females. The other specimen (from Amur) is closely related to the specimen here described as *staegeri* n. sp. It has like the Danish specimen a very deep suture from wing-root to scutellum, and also the abdominal middle stripe is of a similar form. On the other hand it is much paler than the Danish specimen, antennae yellow in the basal half and brownish distally, and also the abdominal coloration is much paler. The differences, however, are of such a nature that I consider the Amur-specimen to be a *staegeri* n. sp. It has not been possible to get German material of Kröber's (1932, p. 79) *mühlfeldi* Brau. from the German collections mentioned on p. 79, and I regard his *mühlfeldi* as a mistake (see also Kröber 1958, p. 48).

Type-material.

Holotype: ♀, 21st June 1908, Hareskov N of Copenhagen (Coll. Lundbeck). The type in the Zool. Museum of Copenhagen.

Occurrence in Denmark.

Only one female known, the holotype.

Distribution.

Only little can be said with certainty. Olsoufiev (1937, p. 380) gives the following information: "Middle- and South-Europe, the Ukraine, the Caucasus, the steppe of Sibiria, Transbaikalien, Asia Minor and Mongolia."

Biology.

No information. The flying-period by Kröber (1932, p. 79) established as April—August.

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Ændringer i vor billefauna. 1958 [1]).

Af
Victor Hansen.

213 a. **Amara crenata** Dej. Nogle stkr. ved Sose på Bornholm under sten på leret, grusblandet bund, 29. 8. 58 (Bangsholt leg., V. H. det.). Arten er ikke fundet i Norge eller Sverige og i Finland kun en enkelt gang, i Ålands skärgård (1 stk. under tang på stranden efter storm sammen med talrige *Amara majuscula*), jfr. Not. Ent. 1941 p. 144 og Lindroth, Svensk Insektfauna 9 (1942) p. 251. I Reitters Fauna Germanica I (1908) p. 164 er der indløbet en trykfejl, som umuliggør bestemmelsen: l. 5 f. n. skal „mit einem" rettes til „ohne". I D. F. XX p. 213 kan arten indsættes ved, at man øverst på siden indføjer:

32 a. Vingedækkerne ret smalle, i midten omtrent parallelsidede, næppe bredere end pronotum, med kraftige, meget kraftigt punkterede striber, hvis punkter griber ind i stribemellemrummene. Hannens bagskinneben uden tæt hårklædning på indersiden ..... 28 b. *crenata*.

Vingedækkerne bredere, betydeligt bredere end pronotum, med rundede sider, striberne mindre kraftige og mindre kraftigt punkterede ..... 32 b.

I linie 1 f. o. p. 213 ændres „32 a" til „32 b".

A. crenata adskiller sig yderligere fra *A. apricaria* og *majuscula* ved, at hagens midtertand er simpel, ikke tvespidset. Længde 7,5—8,5 mm.

709 a. **Acrotrichis danica** Sundt (D. F. XX, p. 142, art nr. 6, Sundt i Norsk Ent. T. X (1958) p. 255). Dyrehaven, Luknam ved Holte (V. H. leg., Sundt og V. H. det.).
Slægten *Acrotrichis* er nybehandlet i D. F. XX p. 129—150 og af E. Sundt i Norsk Ent. T. X (1958) p. 241—277.

713 c. **A. arnoldi** Rossk. (D. F. XX, p. 146). Sundby Storskov, i plantedele under et grævlingeådsel, i antal i beg. af juli 1958 (V. H. leg. og det.).

713 d. **A. suecica** Sundt (D. F. XX, p. 144 l. 3 f. n., Sundt i Norsk Ent. T. X (1958) p. 272). Jægerspris Nordskov, 1 ♀ i en hvepsevågerede, juli 1958 (V. H. leg., Sundt det.).

[1]) Jfr. Ent. Medd. XXVIII, p. 333.

2005a. **Caenoscelis grandis** Thoms. (Thure Palm i Sv. Ent. T. 1943, p. 86—90). Dyrehaven, 1 stk. sigtet, 9. 10. 57 (F. Larsen leg., V. H. det.). Arten adskilles fra *C. ferruginea* ved stærkere tværbredt pronotum, tykkere følehorn og lidt betydeligere størrelse.

2907b. **Trachyphloeus digitalis** Gyll. (D. F. XX, p. 28). Arten er nu fundet på Samsø, 1 stk. ketset på havskrænten ved Mårup, 25. 7. 58 (M. Rudkjøbing leg., samme og V. H. det.).

3053a. **Anthonomus varians** Payk. (D. F. IV, p. 214). 1 stk. i Asserbo plantage ved ketsning, 10. 8. 58 (Johs. Petersen leg. og det.).

In Dänemark getroffene Arten von Bombus und Psithyrus (Hym., Apidae)

von K. Faester
Zoologisk Museum, Kopenhagen

Bombus

1. *distinguendus* Mor.
2. *subterraneus* L.
3. *hortorum* L.
4. *ruderatus* F.
5. *pomorum* Panz.
6. *ruderarius* Müll.
7. *equestris* F.
8. *sylvarum* L.
9. *nigrescens* Pérez
10. *agrorum* F.
11. *muscorum* F.
12. *variabilis* Schmiedek.
13. *terrestris* L. (incl. *lucorum*)
14. *soroeensis* F.
15. *cullumanus* Kirby
16. *lapidarius* L.
17. *pratorum* L.
18. *hypnorum* L.
19. *jonellus* Kirby

Psithyrus

1. *rupestris* F.
2. *barbutellus* Kirby
3. *campestris* Panz.
4. *bohemicus* Seidl.
5. *meridionalis* Rich.
6. *norvegicus* Sparre-Sch.
7. *sylvestris* Lep.

B. nigrescens ist mit *sylvarum* morphologisch identisch aber wie *ruderarius* gefärbt und diesem zum Verwechseln ähnlich. Weil *sylvarum* und *nigrescens* ohne Uebergänge nebeneinander vorkommen, dürfte es berechtigt sein sie als artverschieden aufzufassen. Unterschiede gegenüber *ruderarius:* ♀ *nigrescens:* Kiel des Analsternites trommelschlägelartig, *ruderarius:* einfach oder fehlend. ♂ *nigrescens:* 3. Fühlerglied so lang wie 4., *ruderarius:* deutlich länger.

B. cullumanus. Im männlichen Geschlecht leicht von dem sonst ähnlichen *soroeensis* zu unterscheiden. Während die Vorderkante des hinteren Metatarsus bei *cullumanus* scharfrandig ist wie ein Lineal, ist sie bei *soroeensis*, gegen die Kante gesehen, proximal

abgeplattet und schwach, wie durch einen Messerschnitt, eingekerbt. Im Gegensatz zu den Weibchen von *lapidarius, pratorum, hypnorum, jonellus* und mehreren anderen Arten, deren mittlerer Metatarsus basal an der Aussenfläche lange Borsten trägt, haben die Weibchen von *soroeensis* und *cullumanus* an der ganzen äusseren Fläche fast einheitlich kurze Borsten oder Haare (Seitenansicht, parallel der Fläche). Beim *soroeensis*-Weibchen trägt wiederum die Fläche der Hinterschiene an der proximalen Hälfte fast immer vereinzelte Borsten, beim *cullumanus* aber keine. Bisher im Material verkannt.

Ps. bohemicus zuvor mit *vestalis* Geoffr. verwechselt. Letzterer scheint in Dänemark nicht vorzukommen.

Ps. norvegicus zuvor im Material nicht von *sylvestris* gesondert.

Anmeldelser.

Otto Pflugfelder: **Entwicklungsphysiologie der Insekten.** Probl. d. Biol. Band 5. 2. stark erweiterte Auflage. Leipzig (Akad. Verlagsgesellschaft) 1958. 490 pp. Pris indb. 35 DM.

Udviklingsfysiologi er jo en ganske ny Disciplin, ikke mindst inden for Insekterne; Ordet, der har udviklet sig af det oprindelige "Entwicklungsmechanik", dækker over de Processer, der betinger Individets Udvikling fra Æg til voxen. Betegnelsen "-mechanik" var nu ikke helt ved Siden af, for Kendskabet til disse Processer faas ved, at man paa enhver optænkelig Maade søger at hindre dem, og saa ser, hvad der sker. Efterhaanden som disse ydre Indgreb er blevet mere og mere planmæssige, er der da ogsaa fremkommet en Række Resultater, der allerede nu giver et Billede af, hvad der foraarsager det, der sker; og det er højst fortjenstfuldt af Pflugfelder, der selv har arbejdet med Hormonspørgsmaalene, at sammenfatte det nuværende Kendskab. Indholdsfortegnelsen er 7 Sider lang og næsten et Stikordsregister, som til Gengæld mangler; Litteraturlisten næsten 80 Sider, hvad der jo maa siges at være imponerende i Betragtning af, at man i Anm.'s Studietid for 30 Aar siden docerede ex cathedra, at Insekterne ingen Hormoner havde. Omtalen af deres hormonale Virkninger optager Halvdelen af Bogens 400 Textsider, Determinationsanalyse af Udviklingen af de enkelte Organer saavelsom af den tidligste Embryonaludvikling Resten, hvori dog ogsaa indgaar en Oversigt over den normale Udvikling samt af Begrebet Diapause. Her skal ikke gaas ind paa Enkeltheder; om de "Zusammenfassungen", Forf. hist og her giver af de under-

tiden modstridende Forsøgsresultater, er rigtige, skal jeg ikke kunne tage Stilling til; men Resultaterne selv synes nøgternt refereret.

I Forordet fremhæver han, at han udførligere end ellers i fysiologiske Arbejder har gjort Rede for det morfologiske Grundlag, thi "et Kendskab til dette muliggør ofte først Forstaaelsen af de fysiologiske Foreteelser". Man glæder sig; men undrer sig over, at det behøver at siges.

S. L. Tuxen.

Stefan von Kéler: **Entomologisches Wörterbuch mit besonderer Berücksichtigung der morphologischen Terminologie.** 2. durchgesehene Aufl. Berlin (Akademie-Verlag) 1956. 679 Sider, 33 Tavler. 90 DM. indb.

Skal man lave et Lexikon eller en Ordbog, maa man først og fremmest være Pedant, først derefter kan man lade den saakaldte sunde Fornuft, hvis Vilkaarlighed allerede Descartes fremhævede, raade. Skal man tro Forfatterens Forord, har han sprunget første Led over i Planlægningen af denne "Entomologisches Wörterbuch". Nu er "Wörterbuch" jo et tvetydigt Begreb, det kan dels være en Ordbog, i hvilken man finder, saavidt den menneskelige Begrænsning tillader det, alle Ord inden for det givne Emne, dels kan det være en Encyclopædi, hvor Redaktørens Valg maa præge Bogen, men hvor Læseren, eller rettere Brugeren, maa være klar over Retningslinierne for dette Valg. Dertil har man da Redaktørens, eller i dette beundringsværdige Tilfælde Forfatterens, Forord, og af dette fremgaar det da, at Forfatteren er en Kompromis'ets Mand.

Han har ikke taget alle historiske Ord med, da "Bogens Rammer derved vilde blive sprængt", han har kun valgt 10 % af "Gruppenavne" ud, "for ikke at gøre Bogen for stor", han har hyppigt givet Forklaringer paa latinske Termini under de tyske Ord, "for at disse ikke langsomt skulde gaa i Glemmebogen", men ikke desto mindre er Forklaringen paa "Abart" givet under "Varietät", men paa "Maxilla" under "Unterkiefer" (ak, disse ulykkelige "Oberkiefer" og "Unterkiefer" for Kindbakke og Kæbe). Han giver en meget udførlig Liste over naturhistoriske Lexika fra 1567 og til Dato, men er meget karrig med Litteraturhenvisninger under Stikordene. Han giver Regler for Etymologien, men skriver ikke desto mindre acrotrem med c i Textforklaringen til Ordet akrotrem. Kort sagt, pedantisk Konsekvens maa man ikke vente.

I et saadant Tilfælde kan man enten ærgre sig over det, der mangler, eller glæde sig over det, der er. Den kloge gør det sidste, hvis det, der staar, altsaa er rigtigt. Og her maa jeg endnu engang fremhæve den umenneskelige Opgave, Forf. har taget sig paa

ved at være Eneforfatter. Trods den Hjælp, han nævner han har faaet af Kolleger, der har gennemlæst Manuskriptet, kan een Mand ikke overkomme en saadan Opgave, og at Bogen er blevet saa righoldig, saa alsidig og saa god, som den er, tjener Forf. i høj Grad til Anerkendelse.

Selvfølgelig slaar man først og fremmest op paa sit eget, Proturerne. Det maa indskydes, at Forf. har haft den Ambition at ville lave en lille entomologisk Lærebog for de enkelte "Grupper", et uklart Begreb, der i hvert Fald dækker ned til Familier. Disse Lærebogsafsnit er undertiden flere Sider lange; men Anm. kan ikke se, at de giver Udbytte for den Plads, de tager. En Litteraturhenvisning (hvoraf der ingen er) havde gavnet langt mere. De to Spalter om Proturer rummer kun et begrænset Antal Fejl, ingen kan jo vide alt, men alligevel tør man jo ikke forlade sig paa Angivelserne, hvis man har Brug for dem, men maa selv finde frem til Kilderne. Proturernes Hoved er "pantotremt", hedder det, men under pantotrem faar man at vide, at ingen Insekt-Imago har pantotremt Hoved, men kun acro- og mesotreme, hvor Adskillelsen forøvrigt ikke er klart defineret. Proturernes sidste Praeimaginalstadium hævdes at være Maturus junior, men det *er* Praeimago, som overhovedet ikke defineres. De mærkværdige hunlige Genitalia er ganske galt beskrevne og deres indenfor Insekterne enestaaende Lighed med Hannernes slet ikke nævnt. De tre Par Abdominallemmer siges at være to-leddede; men selv under "Acerentomidae", hvor det ikke er Tilfældet (og denne Familie omfatter de fleste Proturer), nævnes dette ikke; Definitionen paa Acerentomidae kunde gælde alle Proturer. Tarmen hævdes at være uden peritrofisk Membran, hvad ingen ved.

Anm. kan selvfølgelig ikke gennemlæse og bedømme hele Ordbogen, og han stoler paa — hvad mange Stikprøver ogsaa viser — at Oplysningerne gennemgaaende er rigtige. Men jeg tror, at en kort Definition og en Litteraturhenvisning i de fleste Tilfælde havde været i hvert Fald tilstrækkelig, eventuelt nyttigere. En Litteraturliste kunde selvfølgelig spares; "Zoological Record" vil hjælpe. En Mængde Enkeltarter, fortrinsvis Skadedyr, er nævnt under deres Artsnavn, hvad der vil glæde Lepidopterologer s. str., og mange Navne er etymologisk forklarede; for ikke græskkyndige er der indledningsvis et Alfabet, men desværre ikke Forklaring paa de græske Genus-Angivelser. Endelig ender den hele Bog med en mærkelig umotiveret Oversigt (40 Sider) over Insekternes Muskler.

Det er let at rette Indvendinger mod et Værk som det nævnte, men dette bør ikke tilsløre, at det er en Bedrift af en Mand at lave en saadan Ordbog, og at Masser af Mennesker i Masser af Til-

fælde vil ty til den efter Oplysninger. Det er velfortjent, at den efter kort Tid maatte komme i 2. Udgave, og det er at haabe, at den med Begrænsninger og Pedanteri maa se mange Udgaver.

S. L. Tuxen

Kurt Harz: **Die Geradflügler Mitteleuropas.** Jena (Gustav Fischer) 1957. 494 Sider. 20 Farvetavler. 69,20 DM indb.

Gennem mange Aar har "Retvingerne" herhjemme været faunistisk forsømt; Esben Petersens lille Bog i "Danmarks Fauna" er dels for kortfattet, dels forældet, dels udsolgt, og en Forfatter af en ny Udgave har ikke kunnet findes. Indrømmes skal det ogsaa, at det ikke har været nogen nem Opgave at tage op; Begrebet Retvinger er i høj Grad gaaet op i Sømmene, og Systematiken indenfor de enkelte Ordner har været i Støbeskeen. Derfor er den Bog, hvis Titel er Overskrift hertil, meget kærkommen, for den sammenfatter alt det uoverskuelige, der hidtil har været ved disse Insekters Systematik, og muliggør et regulært faunistisk Arbejde, ogsaa herhjemme, med dem. Maatte nogen tage det op!

Men den giver meget mere; foruden Systematiken med Bestemmelsesnøgler og udførlige Artsomtaler, giver den Økologi, Biologi, Zoogeografi etc. etc. Den har store Ambitioner; saa store, at Forfatteren i Forordet kan sige: "ich glaube nicht, dass ich irgendeine wesentliche Arbeit übersehen habe". Sligt bærer altid Nemesis i sig, og det er da virkelig en følelig Mangel, at Tetens Nielsens Arbejde (endda paa Tysk) fra 1938 om de tre store danske Løvgræshoppers Økologi, Aktivitet, Sang ikke er omtalt, skønt Emnet udførligt belyses (Sangen fordeles f. Eks. i ca. 40 Grupper, med 4 Slags Underafdelinger!), eller at Weis-Fogh kun nævnes med sin lille Artikel i "Nature", skønt et Hovedafsnit hedder: Flug. Store Mangler gaar Haand i Haand med overflødig Omstændelighed (f. Eks. at Markfaarekyllingens Sang naar: "C 5 (= C'''''), also dem fünfmal gestrichenen C"; saa haaber han, man har fattet det); Tegningerne er ikke kønne og tilsyneladende endda omtegnet, hvor de er taget fra andre Forfattere, og heller ikke Tabellerne er altid saa klare, som man kunde ønske sig det ("mindestens 8 mm" contra "höchstens etwa 7 mm" som eneste Adskillelse er man ikke lykkelig for; i samme Tabel, det er de meget svære Ectobia det drejer sig om, spiller "Drüsengruben" en stor Rolle, men det er grumme svært i Teksten at finde, hvor paa Dyret disse Drüsengruben findes, og Tegningerne er uoverskuelige og angiver heller ikke Segmenternes Numre).

Er dette sagt, maa dog de utroligt mange og alsidige Oplysninger fremhæves, som Bogen giver, og den overskuelige Opstil-

ling. Vi havde i 1909 36 Arter herhjemme, nu vel over 40 kendt; men Harz's Bog omfatter med "Mitteleuropa" Omraader helt til Syd for Alperne (hvorfor sydlige Former kommer med) og øst paa til Rumænien (hvorfor endog pontiske Arter og enkelte balkanske er med), saa bortset fra rene "Banan"-Arter er det usandsynligt vi herhjemme skulde finde Former, der ikke kan bestemmes efter denne bog. Og dog drejer det hele sig kun om 200 Arter, nemlig 16 Kakerlakker og en Knæler, 76 Løvgræshopper, 13 Faarekyllinger, 83 Markgræshopper og 11 Ørentviste. Disse Grupper er nu almindeligvis systematisk fjernet fra hinanden. Kakerlakker, Ørentviste og Græshopper har faktisk ikke saa meget med hinanden at gøre; men den umiddelbare Betragtning hæfter sig dog ved et Fællespræg, og som samlet Samleobjekt skulde de synes at være tillokkende. Det maa meget haabes, at denne Bog, der letter Arbejdet saa meget baade for Begynderen og den viderekomne, maa rumme denne Tillokkelse.

S. L. Tuxen

A. D. Imms: **A General Textbook of Entomology.** Ninth edition entirely revised by O. W. Richards and R. G. Davies. London (Methuen & Co.) 1957. 886 pp. Pris 75 s.

Da Anm. begyndte sit Studium var Imms' Textbook lige udkommet og blev en stor Inspiration for mig; maaske er det disse Ungdomsminder, der virker, men ingen entomologisk Lærebog før eller siden synes mig at kunne maale sig med den. Ved sin Klarhed, sin Fordomsfrihed og ved sin alsidige og udførlige Gennemgang af selve Systemet, af et skønsomt Udvalg ganske vist, men dog utrolig mangesidet, af de knap 1 Million kendte Insektarter, syntes den mig at byde alt det, en Entomolog ikke kan være foruden. Webers Lærebog er kommet siden, flere amerikanske, Grandis italienske, Grassé's franske, 4 Bind af en planlagt 6-Binds paa czekisk (af Oberberger) o. a.; de kan tage flere Grene af de entomologiske Videnskaber med, de kan som Webers særlig indgaaende hellige sig en enkelt (Morfologien), men de kan i Nøgternhed og knap og koncis Ro ikke maale sig med "Imms". Siden Imms' Død, og ogsaa før, er flere Udgaver, 7 ialt, udkommet, hvor blot nye Synspunkter og Opdagelser er sat til efter hvert Afsnit; først nu kommer den Revision, som Bogen fortjener. Og det være sagt strax, at Revisorerne har holdt Imms' Aand igennem hele Bogen samtidig med at de med en utrolig Belæsthed har bragt den paa Højde med Tiden.

Om dens Opbygning kan siges kort, at 247 Sider er helliget den almindelige Entomologi, Resten de enkelte Ordner. Den almindelige Del er overvejende helliget Morfologi, Anatomi og Udvik-

lingen, medens Fysiologien spiller en mindre Rolle og Økologien kun en meget lille. Selvfølgelig gælder det samme den specielle Del. Disse Sider af Entomologien maa altsaa søges andetsteds, hvad heller ikke er svært. Kedeligere er det, at Palæontologien spiller en saa ringe Rolle; det specielle Afsnit havde vundet meget, om de uddøde Ordner var medtaget paa deres rette Plads, men det havde maaske sprængt Rammerne. Under Systemets Motivering finder de dog en, omend meget beskeden Omtale. Systemet selv følger, hvad Ordnerne angaar, Imms' oprindelige. Det medfører mærkelige Ting, som at de ectognathe Thysanurer, der leder direkte over til de vingede Insekter, staar før de tre meget afvigende entognathe Apterygot-Grupper; ligeledes slægtskabsmæssigt forvirrende Placeringer af visse andre Ordner (Psocoptererne f. Ex.); men da et sikkert Slægtskab endnu ikke er fundet, gør det mindre, blot burde maaske de andre Syspunkter være nævnt, saasom at Mallophager og Anoplurer oftest opfattes som een Orden og Hemiptererne som to, etc.

Iøvrigt er manglende Omtale af divergerende Opfattelser ikke det, der præger "Imms"; i en sjælden Grad er der taget Hensyn til Litteraturen og i en sjælden Grad vil man kunne faa Støtte til videregaaende Studier. Maaske den slaviske Litteratur kan siges at være for lidt kendt af Udgiverne; til Gengæld er den vestlige alsidig. Vi kan glæde os over saa mange danske Forfattere, hvis Arbejder er fundet værdige til Henvisning, og vi kan rent historisk med Fornøjelse konstatere, hvilken alsidig Rolle Meinert har spillet inden for den systematisk-morfologiske Entomologi, Schiødtes direkte Arvtager, der paa Grund af sin Alderdoms Senilitet undertiden herhjemme miskendes. Nogle enkelte besynderlige Mangler konstaterer man ganske vist ogsaa for den vestlige Litteratur, men intet Menneskeværk er jo fuldkomment.

At nogle nye latinske Navne har erstattet vor Ungdoms gode, kendte, er jo uundgaaeligt; men det hilses med Glæde, at de "gode" Meigen-Navne for Diptererne stadig er de brugte; Tendipedidae f. Ex. er end ikke nævnt — hvad der maaske dog er at gaa for vidt!

For den, der vil vide sig hjemme i systematisk Entomologi, er "Imms" som Haandbog, og maaske endog som Lærebog, den rette.

S. L. Tuxen

Erich Martin Hering: **Bestimmungstabellen der Blattminen von Europa.** I—III. s'Gravenhage (Junk) 1957. 1185+ 47 pp., 86 Taf. Pris heftet 194 Gylden.

Der er nogle Mennesker, for hvem et Stof under Arbejdet krystalliserer ud i talrige smaa Enheder, og andre for hvem det naturnødvendigt kun kan tage Form i altsammenfattende Helheder. Hvis

disse Helheder ogsaa virkeligt er altomspændende, er der dermed gjort Generationer frem i Tiden en Tjeneste, der ikke kan paaskønnes tilstrækkeligt. Hering, Berliner-Museets Lepidopterolog, men først og fremmest Alverdens Mineforsker, hører til den sidste Gruppe Mennesker. Den Viden, han gennem Aarene har forskaffet sig om Miner, maatte først sammenfattes i en almen Oversigt over Begrebet Miner i 1926, derefter i en Bestemmelsestabel over Nord- og Mellemeuropas Miner (1935—37). Men efter Krigen var saa meget Stof lagret, at en ny almindelig Oversigt, dobbelt saa stor som den første og nu paa engelsk, maatte komme (Biology of the Leafminers, 1951); og nu er da Bestemmelsestabellen over alle fra Europa kendte Miner (5551) udkommet (paa tysk; den var egentlig planlagt paa engelsk, men maatte udgives paa tysk for at faa økonomisk Støtte) — en Parallel til Houards Gallebog, men naturligvis mere moderne og overskuelig.

For den, der kender Herings Energi — da han engang boede hos Anm. kom han daglig til Morgenbordet Klokken halvotte efter flere Timers Excursion efter Miner, hvilket da ogsaa bl. a. medførte en for Videnskaben ny Art, der beskrives i det her omtalte Værk — er der intet forbausende i denne Arbejdspræstation; men den kræver netop en saa støt, rolig og ene for Sagen begejstret Arbejdsform, som er Hering egen, og som kan læses ud af de meget beskedent formede Kommentarer, spredt i Bogen, hvor Tvivlstilfælde skal afgøres. I denne, saa lidt som i nogen anden Sag er det sidste Ord sagt endnu; men der er lagt et Grundlag, som bør inspirere mange og vil gøre dem Arbejdet lettere. Thi ogsaa de mange uløste Spørgsmaal er der gjort opmærksom paa.

De to Bind omfatter alle 5551 Miner, ordnet alfabetisk efter Plantenavnene og stadig med Hensyntagen til os gammeldags, der ikke er fulgt med i de nyeste Nomenklatur-Ændringer; Bind III er dels Nybeskrivelser af hidtil ukendte Arter og Lister over Planteslægternes og Minedanner-Slægternes naturlige Rækkefølge, dels mere end 700 Figurer af Minerne, og hyppigt ogsaa af systematiske Karakterer hos Minedannerne, i enkle men anskuelige Streger.

At Danmark spiller en fremtrædende Rolle i Udbredelses-Angivelserne skyldes jo H. P. S. Sønderup, med hvem Hering stod i livlig Forbindelse, og hvis vigtige Mineherbarier findes i Københavns og Aarhus' Museer. Hans særlige Evne til at klække Minerne — det vigtigste Punkt ved Minebestemmelsen! — er det vel ikke enhver givet at have; men det maa meget haabes, at nogle yngre, nu da Grundlaget i Herings Bog (og i Sønderups Fortegnelse over de danske Miner fra 1949) er lagt, vil tage dette Arbejde op igen. Det er sjældent, der kan bygges paa noget saa velfunderet.

S. L. Tuxen

Victor Hansen: **Biller XIX. Almindelig del.** Larveafsnittet ved Sv. G. Larsson. Danmarks Fauna 63. Kbh. (G. E. C. Gad) 1957. 248 pp. Pris indb. 22 Kr.

Victor Hansen: **Biller XX. Tillægsbind.** Danmarks Fauna 64. Kbh. (G. E. C. Gad) 1958. 244 pp. Pris indb. 22 Kr.

Efter at hele Billesystemet nu har været gennemgaaet i 18 Bind følger der endnu 2 Billebind: en almindelig Del og et Tillægsbind. Begge Dele meget fortjenstfulde Bøger, der bringer Behandlingen af Danmarks Biller, som har staaet paa i 50 Aar, paa Højde med Situationen.

Den almindelige Del er en meget heterogen Bog og falder egentlig lidt uden for "Fauna"ens almindelige Plan. Den indledes med et Forord, hvor Redaktøren omtaler de manglende Larveafsnit i de sidste Bind, som "ingen mere end han" (men mange lige saa meget) kan beklage. Vi faar dermed en Tryghed for, at denne Mangel vil blive søgt afhjulpet; og skulde det bringe Billebindene op paa en endnu større Procentdel af det samlede Antal Bind, end de 30 % de nu fylder, saa bør det dog hilses med Glæde.

Selve Bogen er delt i tre Afsnit, og det er vel Grunden til at Sv. G. Larsson kun er med i Undertitlen. 93 Sider omfatter Imagines, 56 Sider Larverne, og Resten en Liste over Planterne og de derpaa fundne Billearter. Typografisk er den Liste mærkværdig ved at staa som et Underafsnit af Sv. G. Larssons Larvedel, medens den maa være forfattet af Victor Hansen. I det hele taget har de to Forfattere ikke koordineret deres Afsnit, bortset naturligvis fra at disse skulde indeholde almindelige Bemærkninger og en Familie-Bestemmelsestabel over henholdsvis Imagines og Larver.

Victor Hansens Gennemgang er, som rimeligt er, for den rene Begynder: der er danske og latinske Navne for hver enkelt morfologisk Del, hvor man maaske kunne have ønsket et Valg (man kommer jo oftest ikke uden om at maatte bruge det latinske), men man faar den morfologiske Viden, der er nødvendig for at bestemme en Bille. Maaske man dog netop her vilde have søgt en Beskrivelse af de nu for Systematiken saa vigtige hanlige Parringsorganer og ikke mindst en Omtale af, hvordan man præparerer dem frem, men det maa saa faas andetsteds. Indsamlings- og Samlingsteknik og udførlige Oplysninger om Samle-Biotoper er ogsaa en nyttig Side af Bogen; og saa naturligvis først og fremmest Løsningen af den saare vanskelige Opgave der hedder et lave en Familie-Bestemmelsestabel. Vanskeligheden viser de mange Undtagelser der maa nævnes; men skal en saadan Tabel kunne bruges, maa Karaktererne være klare og nogenlunde let anvendelige. En Række (179), desværre lidt over Evne nedsatte Figurer illustrerer Typerne.

Gisle Larssons Afsnit forudsætter betydeligt mere hos Læseren især af det morfologiske Afsnit, og med Rette; man kan ikke beskæftige sig med Billelarver uden Forudsætninger. Maaske af den Grund benytter han Lejligheden til en Række sammenlignende morfologiske, fylogenetiske og biologisk-udviklingsmæssige Spekulationer, som Læseren ingen Forudsætninger har for at bedømme, og hvis Originalitet han heller ikke kan vide noget om. De havde maaske bedre fundet Plads for et andet Forum. Et udmærket Afsnit omhandler Klækning, som "er en sport", skriver Forf.; gid mange vilde drive den; her er i hvert Fald noget at bygge paa. Og saa følger den meget værdifulde Familie-Bestemmelsestabel, som vel delvis bygger paa hvad Forf. allerede i 1942 publicerede i nærværende Tidsskrift (hvad Forf. beskedent undlader at omtale i Litteraturlisten). Hvorfor Familienavnene her er kursiverede, men ikke i Imago-Tabellen, unddrager sig Forstaaelse.

Tillægsbindet er en Række Side-for-Side Tilføjelser til de foregaaende 18 Binds Imago-Afsnit, mest naturligvis de tidligere, og giver Indføjelse af nye Arter i de gamle Bestemmelsestabeller, evt. helt nye; nye Findesteder; Tegninger af Repræsentanter for nytilkomne Slægter; er kort sagt et meget vigtigt Supplement til den forhaandenværende Række og giver en saa fuldstændig Sikkerhed ved Arbejdet med de enkelte Grupper, som man i dette Øjeblik er i Stand til at faa. Tillægsbindet er nødvendigt for alle Brugere af blot nogle af de tidligere Bind.

S. L. Tuxen

Kurt Werner: **Die Larvalsystematik einiger Kleinschmetterlingsfamilien (Hyponomeutidae, Orthoteliidae, Acrolepiidae, Tineidae, Incurvariidae und Adelidae).** Abh. z. Larvalsystematik d. Insekten Nr. 2, Berlin (Akademie-Verlag) 1958, 146 pp. Pris 19,50 DM.

Et virkeligt System over Sommerfuglelarverne er først blevet opstillet af Fracker i 1915, og paa dette Grnndlag bygger ogsaa denne Bog videre. Det er de samme morfologiske Karakterer, der henvises til, Børsterne paa Segmenterne først og fremmest, men ogsaa Strukturer ved Hovedet og ved Lemmerne. En morfologisk Oversigt indleder og gør Anvendelsen af selve Bestemmelsestabellerne lettere. Der er Tabeller baade til samtlige Micros-Familier (denne usalige Deling mellem Macros og Micros!), til Slægterne inden for de i Titlen nævnte Familier og til de Forf. bekendte Arter inden for disse Slægter. Disse Arter kender Forf. dels fra sine egne Klækninger, dels fra et stort Materiale af Larver i Münchens Museum; og selvom det tydeligt er tilkendegivet hvilke Arter han har

fra sidstnævnte Sted, saa havde det næsten været bedre at udelade dem, da de ikke er baseret paa Klækninger og altsaa ikke kan have samme Beviskraft som de Forf. "personligt" bekendte.

Men med denne Indvending og uden at have benyttet Tabellen vil Anm. fremhæve det højst fortjenstfulde i overhovedet at gaa i Gang med en saadan Opgave. Altfor længe har Entomologi været Kendskabet til Imagines, og Imago-Samlernes Betydning skal ingenlunde underkendes; det Kendskab de har skabt til Arternes Udbredelse er en nødvendig Forudsætning. Men Kendskabet til Larverne er ogsaa en væsentlig Side, og netop som Modvægt mod den med de moderne Metoder mere ensidige Imago-Indsamling er det værdifuldt at have Grundlaget for ogsaa at arbejde med Larverne. De taler ikke til Samlerens æstetiske Sans, de talte i gamle Dage til hans biologiske, dengang Klækning af Larverne var et Led i Samlingens Frembringelse; dengang kunde Larverne eventuelt kendes, men ikke bestemmes; det kan de i større eller mindre Grad nu, og det er at haabe, at nogen vil føle sig fristet ogsaa herhjemme af denne Opgave. Ikke mindst da en moderne Teknik (som angivet f. Ex. i Oldroyd's Bog, anmeldt nedenfor) tillader Opstillingen af en smukt præpareret Larvesamling.

Bogen er tungt og uanskueligt skrevet og kræver — ogsaa paa Grund af de irriterende mange Forkortelser, der næppe forkorter Bogen med mange Sider, og den fra Tierwelt Deutschlands overtagne Bestemmelsestabel-Opstilling — et pænt Forarbejde, inden man kan bruge den uhæmmet; men den lønner Besværet.

Nogle storsystematiske Betragtninger over Larve- og Imago-System afslutter Bogen.

S. L. Tuxen

Alexander Petrunkevitch: **Amber Spiders in European Collections.** Trans. Conn. Acad. Arts and Sci. (Yale Univ. Press or Ejnar Munksgaard) Vol. 41, 1958, p. 97—400. Pris $ 7.00.

I sommeren 1949 foretog en gammel erfaren videnskabsmand en indsamlingsrejse af ikke helt almindelig karakter. Manden var den kendte arachnolog fra New Haven, Connecticut, Alexander Petrunkevitch, samleobjektet var noget så usædvanligt som rav indeholdende edderkopper, og "biotoperne" var en række europæiske museer og samlinger. Professor Petrunkevitch hjemførte som sit videnskabelige bytte noget over 200 stykker rav, af hvilke hen ved halvdelen var udlånt fra danske samlinger.

Rejsens bogstaveligt håndgribelige resultat er det foreliggende digre værk, hvor indholdet af hvert enkelt ravstykke er underkastet en nøje beskrivelse. Dette videnskabelige materiale er i sig

selv ikke almindelig tilgængelig lekture, men forskningsrapporter af blivende brugsværdi for en lille kreds af videnskabelige kolleger. Den teknik, hvormed den erfarne forsker gør sit stof tilgængeligt, har derimod bud til alle, der har interesse for ravfossiler.

Man må gøre sig klart, at selv om man i tidens løb har haft nogle hundrede ravstykker med spindlere til videnskabelig behandling (der er ialt beskrevet ca. 200 arter fossile edderkopper), så er det kun et uendelig lille udsnit af den fauna, der har levet i de 15—20 millioner år, hvor de ravproducerende fyrretræer har eksisteret, tilmed øjensynligt i et varmt og frodigt klima. Det er derfor ikke overraskende, at et meget stort antal arter kun kendes i et enkelt eksemplar og selv de almindeligste kun i få. Endvidere er de fleste af dyrene mere eller mindre defekte; det kan være sket ved det naturlige slid, som ravet har været udsat for, før det er indsamlet, eller ved en for nærgående slibning og polering; men det kan også være sket, mens det nyfangede dyr har kæmpet for livet i overfladen af det friske, endnu flydende rav. Dyrenes kamp for livet, roende bevægelser af lemmerne og for insekternes vedkommende tillige af vingerne, har desuden fremkaldt eller forstærket de uendelig fine, luftholdige spalter i ravet, der undertiden kan være til stor gene for det videnskabelige arbejde, hvad der også ofte i høj grad er tilfældet med "mælkede" og grumsede partier.

Alt dette bevirker, at man ved beskrivelser af ravfossiler i langt højere grad end ved beskrivelser af nulevende arter må gøre sig klart, at det først og fremmest er et individ, til og med oftest et mangelfuldt individ, og ikke nær så meget en repræsentant for en art, man har for sig, og at man intet kan ændre i dets ofte noget forvredne stilling. Af hensyn til sammenligning med eventuelle senere fund af andre forskere, som ikke har adgang til direkte sammenligning, må beskrivelserne være meget omstændelige, også hvad angår dyrenes stilling og mangler. Den fremstilling af stoffet, som Petrunkevitch giver i sin bog, er netop et meget lærerigt eksempel på beskrivelser af denne art. Et savn er det imidlertid, at forfatteren mod sædvane har udeladt habitusfotografier og alene har ledsaget sin tekst af videnskabelige detailtegninger; som forklaring herpå anfører han, at fremstillingen af fotografier er meget tidsrøvende og reproduktionen kostbar.

I bogens forord er der en ganske kort omtale af de vigtigste præparationsprocesser, nærmest et resume fra forfatterens tidligere publikationer. Petrunkevitch anvender en tæt tilslibning, hvor de absolut plane flader giver den i det enkelte tilfælde bedste synsvinkel. Luftspalter fjernes under vacuum i balsam (f. eks. Canadabalsam), og senere monteres ravstykket i balsam mellem objekt- og

dækglas. Derved klares ravet, og generende lysbrydninger reduceres mest muligt. Forfatteren gør dog opmærksom på de vanskeligheder, der knytter sig til en afmontering af sådanne præparater; målinger og andre iagttagelser, som ikke kan gøres på monterede stykker, bør i forvejen udføres på de tilslebne stykker i et bad af parafinolie.

Forfatteren anbefaler varmt at opbevare ravfossiler i glas med farveløs mineralolie og ikke tørt i æsker, som det oftest er tilfældet. "Experience has shown that pieces of dry amber exposed to air deteriorate in the course of years. Old pieces appearing dark brown on the surface are often almost glass clear a millimeter under the surface. The darkened, deteriorated layer is often further ruined by a network of fissures."

Professor Petrunkevitch har forlængst passeret sit firsindstyvende år, og selv om han stadig er virksom, er det vel usandsynligt, at han skulde byde sig selv den anstrengelse, som en ny europarejse vilde være. Men hvis det skulde ske, så vilde han erfare, at hans tidligere besøg også har haft anden virkning end den foreliggende bog. Den interesse, som han vakte for sit emne, har bevirket en væsentlig forøgelse af vore samlinger af ravfossiler i det forløbne tiår, således at han idag vilde kunne vende tilbage til New Haven med en endnu større ny høst end i 1949, og samtidig er vor samling af andre ravfossile leddyr vokset på tilsvarende måde.

Sv. G. Larsson

Harold Oldroyd: **Collecting, preserving and studying insects.** London (Hutchinson) 1958. 327 pp. 25 sh.

Der er i Tiden en Tendens, forstaaelig og sympatisk, til at opsummere sin Viden til Glæde for andre. Saaledes ogsaa sine Erfaringer med Hensyn til Indsamling og Præparering af Insekter. Den her nævnte Bog er ikke den eneste af sin Slags, men den nyeste mig bekendt, og skrevet paa en tillidvækkende og humørfyldt Maade. Forfatteren er en af British Museums højt ansete Specialister, Dipterer især Tabaner; men at han er mere end Specialist fremgaar af denne Bog, der røber Viden paa de forskelligste indsamlingsekniske Omraader. Den indleder, bevidst og pædagogisk, med at ortælle hvor og hvordan man *finder* Insekterne; lægger Vægt paa t man iagttager dem, før man samler dem, og skjuler ikke hvor norm vor manglende Viden er! Derpaa naturligvis Indsamlingseknik, Præparationsteknik inklusive mikroskopiske Præparater, og Studiet af Dyrene, Tegning og Fotografering.

Et stort Afsnit, 100 Sider, er en Slags lille entomologisk Lære-

bog og burde maaske hellere have været sparet, eftersom 100 Sider er baade for lidt og for meget til et saadant Emne; faa vil have den Nytte deraf, som maa kunne forlanges af de 4—500 £ det efter Forfatterens egen Opgivelse (p. 294) koster at trykke dem. Paa den anden Side er et Skøn over, hvad hvem kan have Nytte af, vanskeligt; og Forfatteren har ret i at misbillige den Forsker der ikke ville lade sin Opdagelse trykke for ikke at berøve andre Fornøjelsen ved at gøre den!

Men de tekniske Afsnit, de første 194 Sider, er uhyre righoldige, vel grupperede og forsynede med en Masse kloge Raad (ogsaa om Etikettering og Forkortelser; "those who feel it necessary to speak and write of "Paris-France", will appreciate a little help with Sutton-under-the-Whitestone-Cliff", p. 119), og smaa menneskelige Træk, som naar han efter at have forklaret, i Forbindelse med Lyslokningen, at en Spyflue i sit Valg mellem to Lyskilder vil søge den fjernere, svage, for saa naar den er naaet at tabe Interessen og flyve til den anden — tilføjer "a reaction not unknown in humans". Detailler skal selvfølgelig ikke gives her; hvad Anmelderen har kunnet kontrollere har næsten altid været i Overensstemmelse med Anmelderens egen Mening, hvad der jo altid virker overbevisende — ikke mindst naar Forf. samtidig fordomsfrit fremhæver Betydningen af enhvers egen Erfaring.

Det er en Bog der er hyggelig at læse og uhyre udbytterig; de fleste Samlere vil kunne finde noget nyttigt deri, ikke mindst fordi det sidste Afsnit fordeler Indsamlingsmaaden paa de enkelte Insektordner (hvor dog mærkeligt nok Diplurerne er blevet ganske borte). Og 25 sh er en overkommelig Pris. Fremhæves maa ogsaa de overordentlig illustrerende Figurer, Tegninger eller Fotografier.

Væsentlig billigere, 50 cents, men ogsaa med langt færre Figurer, er en canadisk Lærebog: **Collecting, preparing and preserving insects**, kompileret af Bryan P. Beirne, og udgivet af Canada Dept. of Agriculture, Entomology Division, May 1955 (Publ. 932). Den er mindre ordrig og mindre velskrevet end Oldroyd's, men giver paa 133 Sider det samme som ham, med udførligere Fordeling af Stoffet på Ordnerne (men Diplurerne er ogsaa her glemt, og den tvivlsomme Anbefaling af Polyvinyl-Lactofenol fremfor Faure's Vædske hos Proturerne gaar ogsaa igen). Begge Bøger har Opskrifter paa Vædsker bagerst, den canadiske fyldigst.

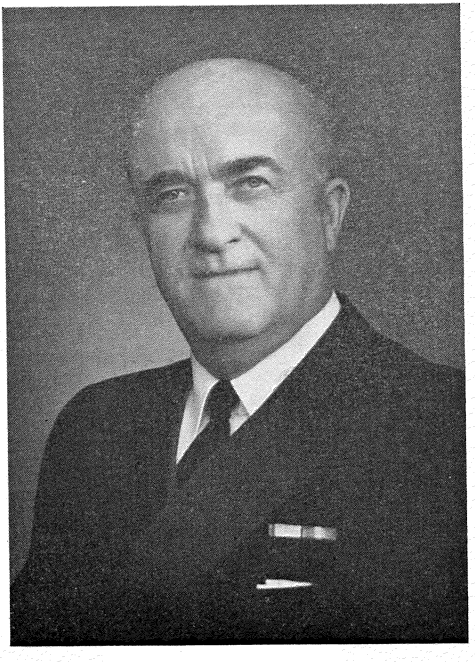
En kortfattet Vejledning er i 1954 udgivet af Hamburgs Zoologiske Museum (32 Sider); og glemmes maa jo heller ikke, at vort Naboland Sverige i Lindroths lille Bog fra 1949 har en god kortfattet Vejledning; herhjemme har vi egentlig kun van Deurs: Vejledning for Sommerfuglesamlere (1948).

S. L. Tuxen

Else Jahn: **Insektenviren.** In Rudder, Ruttner und Steinhauser; Probleme der Bioklimatologie, Bd. 4, Leipzig (Akademische Verlagsgesellschaft Geest & Portig K.-G.) 1958, 200 pp. Pris indb. 24 DM.

Vægten i denne bog ligger så afgjort på virus, men desuagtet har den ikke ringe interesse for entomologer, der holder af at læse om, hvad der hænder i entomologiens periferi. For insekterne er virussygdommene absolut ikke af periferisk karakter, idet angreb af vira i mange tilfælde medfører udslettelse af hele bestande. Ifølge bogen kendes virussygdomme hos 157 navngivne insektarter, men forskningen øger stadigt dette tal. Lepidoptera (velkendt fra klækning af larver) og Hymenoptera er mest udsat for infektion, mens der blandt insekter med ufuldstændig forvandling kun kendes få værter. Bogens største afsnit giver en udmærket oversigt over de insektpatogene vira, deres form og størrelse, kemiske og fysiske egenskaber, dannelse, vækst og forhold til værten etc. Derefter følger, så at sige i tilgift, da "Insektenviren" dækker mere end en direkte oversættelse af ordet lader formode, et fyldigt afsnit om de vira, der af insekter overføres til andre dyr eller til planter. Smittespredningens veje er ofte forunderlige. En skam at fremstillingens videnskabelighed gør dem trange at befærde. Læsningen af dette afsnit giver et stærkt indtryk af insekternes store betydning for deres medskabninger. Talrige er de sygdomme af virusnatur, der hærger blandt planter og dyr, incl. mennesket, som udelukkende spredes af insekter. Afsnittet om bioklimatiske faktorers indflydelse på virussygdommenes optræden og spredning, såvel som oversigten over teorierne vedr. virus opståen og slægtsforhold til andre organismer læses med interesse, mens bogens sidste afsnit om den praktiske anvendelse af kendskabet til insektviraerne er et noget tyndt anhang.

Børge Petersen



Tage Feddersen

19. juli 1898 — 24. februar 1959.

Af Flemming Weis.

Efter et halvt aars sygdom er stabslæge i søværnet, Tage Feddersen i februar 1959 afgaaet ved døden, kun 60 aar gammel.

Feddersen tilhørte en familie, hvor de zoologiske interesser havde været fremtrædende gennem flere generationer. Ferskvandsbiologen og forfatteren af "Samleren" Arthur Feddersen var hans ældste farbror. Allerede fra sine tidlige drengeaar havde han derfor modtaget mange forskelligartede impulser, der dog endte med, at han som aktiv samler specialiserede sig indenfor de danske storsommerfugle. Ved sin død efterlod han sig en meget omfattende samling, hvori der blandt mange andre sjælden-

heder forefindes saa bemærkelsesværdige arter som *Trochilium crabroniformis* og *Acidalia subsericeata*.

Som fastansat læge indenfor Søværnet levnedes der Feddersen relativt megen fritid til at dyrke sin interesse, og naarsomhelst man talte med ham, var han altid levende optaget af at planlægge ture og drøfte de muligheder, der kunne være tilstede ved besøg paa de forskellige lokaliteter. At turene ikke altid naaede at blive realiseret i det paatænkte omfang, skyldtes hans mange andre interesser, der, side om side med faglige emner, beslaglagde hans tid. Og Feddersen gav sig altid god tid til det, der i øjeblikket optog ham. Han var til stadighed ivrigt optaget af slægtshistoriske studier og havde i aarenes løb erhvervet sig omfattende viden paa dette omraade.

Alligevel var det dog nok sommerfugle-interessen, der var dominerende hos ham, og naar hans ture blev til alvor, blev de, ganske uanset om det var en flerdagstur eller blot en enkelt dag- eller aftentur, gennemført med en ukuelig fysisk udholdenhed. Der var aldrig tale om at give op før den sidste mulighed var udtømt.

Feddersen færdedes i naturen baade sagligt iagttagende og æstetisk nydende, altid med en vaagen sans for baade skønheden i landskabets store linier og for enkelthederne i de forskellige lokaliteters særpræg. Hans botaniske viden rakte langt videre end det, der blot betinges af den entomologiske interesse. Derfor var det altid en fornøjelse at færdes i hans selskab — mærke hans umiddelbare naturglæde og fornemme den menneskelige trofasthed, der var karakteristisk for ham i alle livets forhold.

Da Galathea-ekspeditionen planlagdes, ønskede man som læge en mand, der, udover sit hverv som saadan, ogsaa var interesseret i ekspeditionens formaal. Valget faldt paa Feddersen som den mest velegnede, og han kom til at deltage i togtets første halvdel. At udbyttet af

hans indsamling maaske ikke helt kom til at holde maal med forventningerne, skyldtes bl. a. forskellige uheldige opbevaringsforhold ombord.

I visse perioder gjorde Feddersen tjeneste som marinelæge i Grønland og hjembragte fra sit sidste flere maaneder lange ophold i Grønnedal adskillige interessante fund fra disse uudforskede egne. I et foredrag i Entomologisk Forening fortalte han om sit indsamlingsarbejde og fremviste sine resultater.

I en række somre efter at "Entomologisk Forenings Thy-undersøgelse" var paabegyndt opholdt han sig i Hansted, hvor han gjorde et grundigt og aktivt arbejde med indsamling af lokalitetens sommerfuglefauna, og førte aar for aar "undersøgelsen"s sommerfuglelister à jour.

Om sine praktiske erfaringer inden for samletekniken har han i Entomologiske Meddelelser bd. 26, 1953, p. 506—07 publiceret en artikel: "Mere om Calotaenia celsia".

Ingen, som er kommet i kontakt med Feddersen, har kunnet undgaa at lade sig paavirke af hans umiddelbare glæde over de oplevelser, som arbejdet med sommerfuglene gav ham. Han delte beredvilligt sine erfaringer med andre og vil derfor blive savnet i vide kredse — stærkest der, hvor savnet tillige griber ind i et personligt venskab.

Genital Preparations of Male Lepidoptera.

By
Jørgen Birket-Smith
Nigerian College A. S. T., Ibadan.

The following preparation method for genitalia of male Lepidoptera can actually be divided into two independent methods, the Extirpation and the Free Mount respectively. Compared to the usual methods they have the following advantages and disadvantages:

Extirpation,

Advantages:
1. It leaves the abdomen in situ.
2. Hardly any traces will be left on the specimen (except for the missing genitalia).

Disadvantages:
1. It requires some skill. (On the average 25 specimens will suffice for this)
2. It requires, apart from a stereomicroscope, some special dissection instruments.

Free Mount,

Advantages:
1. The entire genital apparatus will at any time be ready for examination in its natural perspective without distortion because of flattening.
2. The mounted genitalia can be kept on the same pin as the specimen itself.

Disadvantage: The mounted genitalia are not as well protected against injury, as when kept on a slide (but as well protected as the specimen itself).

The figures explaining the method are slightly diagrammatical. As an example a medium sized moth, *Eilema xantopa* Holl. is chosen, span 14 mm, length of abdomen 5 mm, diameter of abd. hardly 2 mm.

Fig. 1, The Special Instruments Used.
A. Fly-leg Forceps ($\times$ 1/2). This instrument is readily made from an old hack-saw blade on an electric hone. The blade is broken into halves and these are solidly riveted together through the holes in the ends of the blade; the two halves should cover each other exactly. While

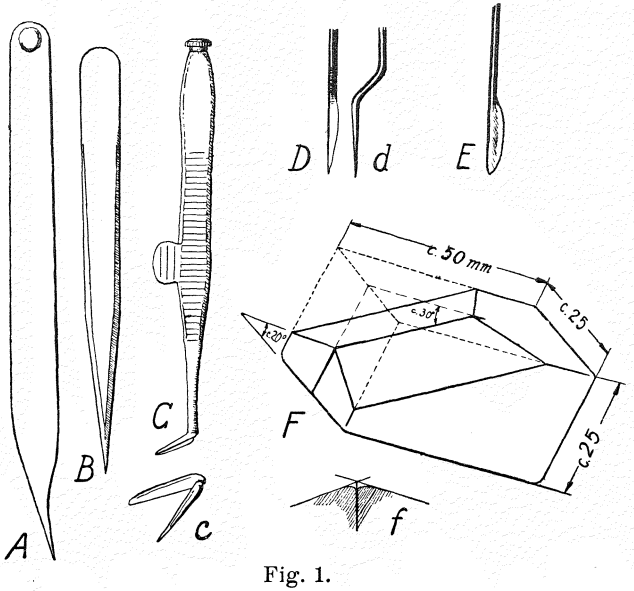


Fig. 1.

they are hold close together the two halves are shaped as shown on the figure and the teeth are removed on the electric hone. All sharp edges are removed with emery paper, and the final touch to the fine ends is given by hand on a fine hone ("Belgian hone"). The fine ends of the limbs shold be about 2 mm wide at base and 0.1 mm at the tips; their thickness at the base should be that of the blade, at the tips 0.05 mm, tapering down to this thickness mostly on the outermost 5 mm. Finally the tips should be carefully rounded. The internal surfaces of the fine ends of the two limbs should be nearly

parallel. Given this shape, these forceps will not crush even very delicate objects, as a too strong pressure on the upper part will cause the tips to open and release the object.

B. Watchmaker's Forceps ($\times$ 1/2). These can be bought at most watchmakers. The points must be needle sharp and of exactly the same length.

C. Iris Scissors or Weber's Ophthalmic Scissors ($\times$ 1/2). These can be bought at suppliers of surgical instruments. It is most useful to grind the tips of the blades as shown on the figure (c, $\times$ 1, where they are seen from the end).

D. Needle Scalpel ($\times$ 4). This can conveniently be made from a fine sewing needle or from a steel insect pin no. 3. The outermost 3 mm are hammered flat while red hot and then ground down on a fine hone until the "blade" is hardly wider than the diameter of the needle. The blade is tempered by dipping it into water while red hot and is then finally sharpened. It is mounted in a wooden handle. I have found it practical to give the needle a slight S-shape above the blade, as shown (d, $\times$4, where it is seen from the back).

E. Pygmy Scalpel ($\times$4). This is made in the same way as the needle scalpel, the blade, however, should be wider and it should be straight.

It is most important that all the points of the instruments are sharp and not bent or hooked and they must not be rusty. The points should be examined under the microscope before use, and they should allways be protected whilst not in use, for example by a small cork.

F. Rubber Vice ($\times$1/2). It is most important that the specimen is firmly supported during the preparation. The cheapest and easiest way of making a holder is from a piece of not too soft eraser gum, about 25$\times$25$\times$50 mm. A clean cut is made along the midline from one of the ends and half way to two-thirds through the piece with

a sharp, wet knife. The "vice" can be used in this state, but it is recommended to shape it as on the figure. This can be done with a sharp, wet knife, or still easier and better on the side of an electric hone. The cut should just divide the ridge between the oblique faces. Finally this ridge is rubbed on a piece of hard smooth paper which will give the shape shown (on f) to the transverse section of the ridge. This vice will readily hold any specimen from the size of a small pyralid to a medium noctuid, supporting the abdomen. Heavier specimens usually need not to have any support of the abdomen.

A fine water colour brush (Sable hair no. 0) is also needed.

Extirpation, dry specimens.

Fig. 2. The specimen, which must be mounted on a pin, is placed upside down in the vice, the top end of the pin in the cut and the abdomen resting on the ridge, the anal end uppermost. To avoid hairs and scales being rubbed off the abdomen, a small piece of thin cellophane can be placed between rubber and abdomen. The end of the abdomen is moistened with a drop of 50 % alcohol (methylated is as good as any), big enough to moisten the anal half of the abdomen, but not more. This drop is immediately followed by a drop of distilled water; both drops are applied with the brush.

Fig. 3. After a lapse of about 30 minutes, the sternites will usually be soft and flexible. While holding the abdomen with the fly-leg forceps the needle scalpel is introduced ventro-laterally between the left valva and the 8th sternite, penetrating the intersegmental membrane between vinculum and the 8th sternite. Heavier specimens will usually need another drop of 50 % alcohol and one of water at this stage; the two last drops will readily penetrate into the interior of the abdomen through the hole in the membrane. (Especially difficult specimens can instead of the last drop of water be mois-

tened with a drop of 2 % ammonium hydroxide. This will not harm the specimen and disappears without trace. (This may not, however, be very pleasant for the preparator.) Smaller specimens will usually be sufficiently relaxed all through, for the immediate continuation of the preparation.

Fig. 4. The fine pointed blade of the Iris Scissors is inserted through the hole in the intersegmental membrane and a longitudinal ventro-lateral cut is made through the last 3-4 sternites. The edges of this cut are carefully separated by means of the fly-leg forceps.

Fig. 5. While holding, first in the edges of the longitudinal cut, later in the vinculum, the intersegmental membrane between the 8th sternite and the vinculum is cut by means of the needle scalpel (or, for heavier specimens, the pygmy scalpel as well), first ventrally, then along the left and the right side until the tegumen.

Fig. 6. The whole genital apparatus is now "broken" out with a backwards and upwards movement of the fly-leg forceps. The genitalia are still retained by the ductus ejaculatorius (which will often break), the gut and the muscles to vinculum. While holding the genitalia with the fly-leg forceps, these structures are cut with the iris scissors (the blunt blade lowermost). The remaining bit of the intersegmental membrane dorsal to the tegumen will rarely need cutting, but usually it will tear easily by removing the genitalia completely.

Fig. 7. While the abdomen is still moist and soft, the two edges of the longitudinal cut are carefully brought together and the specimen is allowed to dry completely. The abdomen is then moistened with a drop of strong alcohol, and immediately after with a large drop of xylol and dried quickly (under an electric bulb). After this treatment the hairs and scales will look perfectly fresh and undisturbed.

Fresh specimens.

A fresh specimen should first be pinned and then

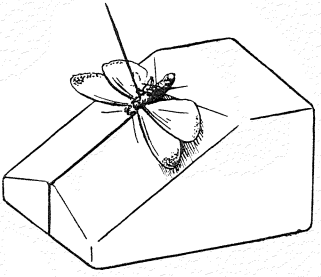


Fig. 2

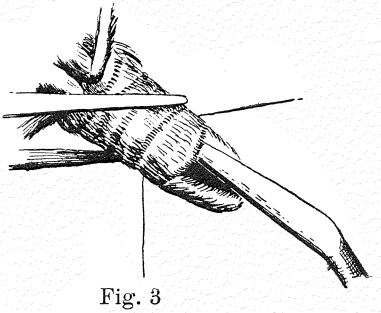


Fig. 3

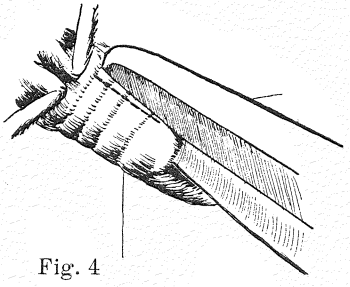


Fig. 4

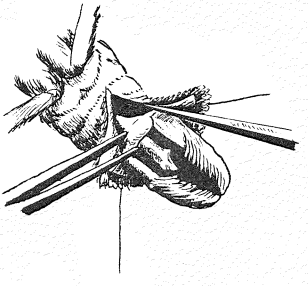


Fig. 5

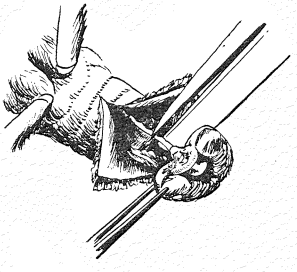


Fig. 6

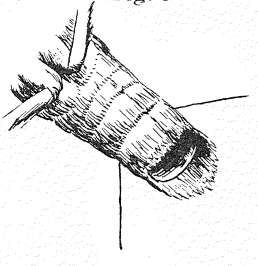


Fig. 7

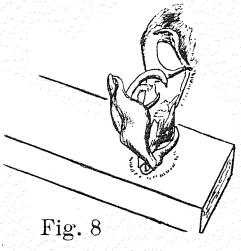


Fig. 8

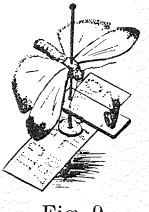


Fig. 9

placed in the vice (Fig. 2). If the specimen is completely relaxed, a slight pressure on the sides of the abdomen with a broad pair of forceps just in front of the genitalia will cause these to protrude. Whilst still the pressure is exerted on the sides of the abdomen, the intersegmental membrane between vinculum and the 8th sternite can easily be cut with the needle scalpel; this allows a grip with the fly-leg forceps in the vinculum, and the genital apparatus can then be removed (Fig. 6). It should be noted that a longitudinal section through the sternites is n o t necessary in this case. Care should be taken however, to suck up (with filter paper) all moisture from the abdomen, since this will soil the hairs and scales.

Damaged specimens.

If the interior of the abdomen of an old specimen has been eaten away, great care should be taken, not to apply too much moisture to soften the specimen, as this may cause the entire abdomen to collapse. If only a minute amount of 50 % alcohol is applied, this type of specimen is often the easiest one to deal with.

The genitalia are dumped into cold 5 % potassium (or sodium) hydroxide and left until next day (smaller specimens) or for a couple of days (heavier specimens). They s h o u l d n o t b e h e a t e d, as this makes the membranes unnecessary fragile and may cause ruptures. From the hydroxide the genitalia are transferred into distilled water in a watch glass under the microscope and cleaned with the brush. At this stage it is fairly easy to turn the vesica inside out by means of the watchmaker's forceps, while holding the aedeagus with the fly-leg forceps.

The cleaned genitalia can either be mounted in Canada balsam or Venitian terpentine on a slide in the usual way, or they can be mounted as a Free Mount.

Free Mount.

In cases where the genitalia are devoid of hairs and other fine structures they can be dried directly from the water, while kept in the desired shape by means of insect pins. If it is desirable to keep any hairs, scales or other fine structures, the following procedure is recommended. The genitalia are kept in the desired shape while still soft on a piece of filter paper under the microscope, and a drop of strong alcohol is applied to them. This will harden them in the desired shape, and they are now passed through 2 lots of strong alcohol and one of xylol (5 minutes in each). From the xylol they are placed on a piece of filter paper and dried quickly (under an electric bulb). While the genitalia are wet from xylol, minor adjustments of the shape are still possible.

It is practical to keep the different liquids needed in small (approx. 10×50 mm) flat-bottomed glass tubes, closed with corks. There should never be more than one set of genitalia in the same tube. A pin with a numbered label, corresponding to a similar label on the specimen, can be stuck in the cork and follow the set of genitalia from tube to tube. The tubes may be conveniently placed in holes in a piece of board, having for example 4 times 10 holes.

Fig. 8. A tiny drop of a mixture of 4 parts of amyl acetate and 1 part of a good cellulose glue ("Pandetikon", "Durofix" etc.) is placed towards the end of a small sheet of celluloid (approx. 2×10 mm) and the completely dry genitalia are placed in the drop and kept in the required position until the glue has stiffened (a few seconds). The thinned cellulose glue will by capillar retraction enter the hollow sclerotized parts of the genitalia, where it on drying will leave a thin invisible internal membrane of cellulose. At the same time it will dissolve the surface of the celluloid and thus the attachment of the genitalia

to the celluloid will be a very firm one. To remove the genitalia again, it is necessary to moisten them with amyl acetate and after having detached them, to rinse them in amyl acetate.

Fig. 9. Finally the small sheet with the genitalia is stuck above the labels on the same pin as the specimen.

The method described above may be applied to most Lepidoptera (and to some other orders as well); in certain groups of Lepidoptera are, however, modifications of the genitalia and the dissection must be modified accordingly. In cases where it is desirable to study the intersegmental membrane between the 8th segment and the vinculum, this membrane should not be cut; in cases of doubt as to the desirability of such a study, the whole 8th segment should be removed and cleaned together with the genital apparatus, before a decission about the mounting is taken. Sometimes structures on the 8th or 7th or earlier segments are to be studied as well. It is then recommended to remove and clean such segments together with the genitalia before detaching the genitalia proper.

The entire preparation as described will take 5—10 minutes for each specimen, when more preparations are made at the same time and it is not necessary to wait for each specimen to soften.

The description of the method is made for right-handed persons. For left-handed preparators right and left should be changed.

For informations on the anatomical names, consult: S. L. Tuxen (ed.): Taxonomist's Glossary of Genitalia in Insects, Copenhagen, 1956.

Notes on some Species of the Genus Scoparia Hw. (s. str.) (Lep., Pyraustidae)

By
Niels L. Wolff
(With plates 1–2)

The genus *Scoparia* Hw. contains a number of similar looking species, the correct identification of which has caused severe difficulties. As a considerable variability of the wing pattern exists within the various species, an identification based upon the wing markings alone, becomes most unreliable.

Nearly half a century ago Chapman (1912: 501—518) undertook a revision of the group on the basis of an examination of the genitalia in both sexes of all British and some Continental species. His microphotographs are admirably sharp, although hardly sufficiently enlarged, and his paper has highly assisted in clearing up previous errors. He divided the genus into two main sections, the 'root-feeders' (*Scoparia* s. str.), and the 'moss-feeders'. In the 'root-feeders' the sacculus of the valva carries a hooked, sclerotized protrusion, and the aedeagus contains cornuti, characters not present within the 'moss-feeders'.

The five British *Scoparia* (s. str.) treated by Chapman are the same as are known to occur in Great Britain to-day (Beirne 1952: 120—122), and the same five as occur in e. g. Denmark (van Deurs 1942: 77—80), and Sweden (Benander 1946: 10), viz.: *cembrae* Hw., *ambigualis* Tr., *ulmella* Kngs., *basistrigalis* Kngs., and *dubitalis* Hb.

The illustrations of the genitalia of both sexes published by Pierce & Metcalfe (1938: pl. 21) are drawn on a rather small scale, and, regarding the females, somewhat schematic, but still enable a safe identification of the British species.

Recently Marion (1959: 15—22) has published a paper on the French species, illustrated by photographs of

specimens and outline drawings of the male genitalia alone.

Although the genus has been far from being neglected by systematists, there still seems to remain problems which have to be solved before a safe identification of even common and widely distributed species has been made possible. In the following note a hitherto apparently unacknowledged species is described and compared with its allies, and in this connection attention is called to some incorrect statements in the previous literature concerning some of these species.

The female genitalia exhibit characters most useful for identifying the various species and deserve more attention than is generally paid to them. The aspect of ductus bursa is an important character, whereas the bursa itself is less convenient for study due to its tendency to collapse during the dehydration of the preparation. In the male genitalia the shape of the cornuti is a character of utmost taxonomic importance.

It may be added that the study of the cornuti in some species (e. g. *ingratella,* and *dubitalis*) is often obstructed because the spines are generally superposed and their tips concealed which gives the impression that they are but one long rod. This difficulty can be overcome in the following way. After the genitalia have been dissected and placed in a small drop of water the valves are spread out and, by means of a stumpy needle, some pressure is put on the surface of the aedeagus at the precise spot beneeth which the cornuti are situated. At the moment when the spines become sufficiently separated, the needle is kept in position, and a drop of Absolute Alcohol is applied to the preparation by means of a pipette. The whole manipulation must be constantly supervised through a powerful binocular microscope, and care must be taken not to damage the spines. The pressure must not be released until the position of the spines has been fixed by

the hardening action of the Alcohol, a process which happens within a short time.

1. *Scoparia sylvestralis* n. sp.

In late June and early July 1959 I collected a number of specimens of a *Scoparia* occurring very numerously in a forest at Jungshoved (Denmark, south-eastern part of Zealand). As regards size and wing markings the specimens resembled *basistrigalis* Kngs., but the cilia of the forewing was not barred, and in the male genitalia the cornuti consisted of a single row of spines, thus distinctly differing from *basistrigalis*. The only other *Scoparia* present in the locality was *dubitalis* Hb., which, however, was much less common.

Being unable to identify the species on the basis of the literary sources I applied to the British Museum (Natural History) in London, and Mr. Paul E. S. Whalley, having examined my material and compared it to numerous specimens af *basistrigalis* and *ambigualis*, concluded that he was unable to match the species. I am greatly indebted to Mr. Whalley for his valuable assistance. In the Palaearctic Collection of the Zoological Museum of Copenhagen I happened to find a (male) specimen (locality: Switzerland, St. Gallen, 23. VI. 12) resembling the species in question; by dissection the genitalia, as well, proved identical. This specimen was identified as *ingratella* Zell., a species which generally is considered a *'forma'* of *dubitalis* Hb. Examination of original material of *ingratella* Zell. (see later) proved, partly, that *ingratella* Zell. is a valid species, partly that the Swiss specimen was wrongly identified.

Afterwards I have found more Danish specimens in various collections, some originating from the island of Falster, some from the island of Lolland, both localities situated in the south-eastern part of Denmark.

No doubt this species occurs in several collections, also abroad, confounded with e. g. *ambigualis*, or *basistrigalis*. In the course of

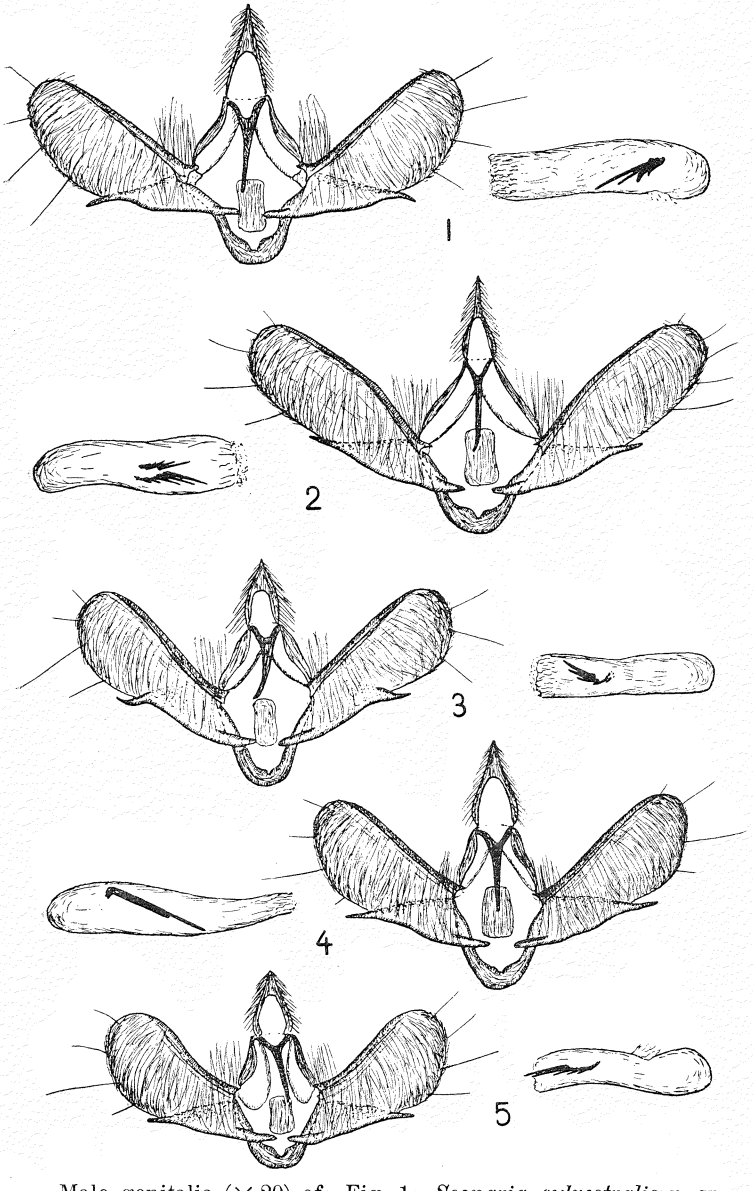
time a number of Scoparias, now regarded as synonyms of *ambigualis*, have been named (vide e. g. Klima 1937: 13—15) without any notice of their genitalia. It cannot be excluded that an examination of the type specimen (ordinary collection material will not do) of the entire number of such 'forms' may prove one of them to have the same genitalia as this species. As hunting up the complete material may take several years, I consider it most practical now to draw attention to this interesting, and at any rate unacknowledged, species by giving a description, even if the name in future may happen to be added to the list of synonyms within this genus.

Scoparia sylvestralis n. sp. (Figs. 31—32). Wing expanse 21—24 mm. Regarding wing markings close to *S. basistrigalis* Kngs. First cross-line whitish, apically bordered with a blackish shade including a distinct black streak running parallel to dorsum. Second cross-line white, its inner edge less black-marked than in *basistrigalis*, meeting costa at an almost right angle. Cilia not barred, but divided by a sharply defined blackish line. Fresh specimens have orbicular and claviform filled up with yellow-ochreous scales.

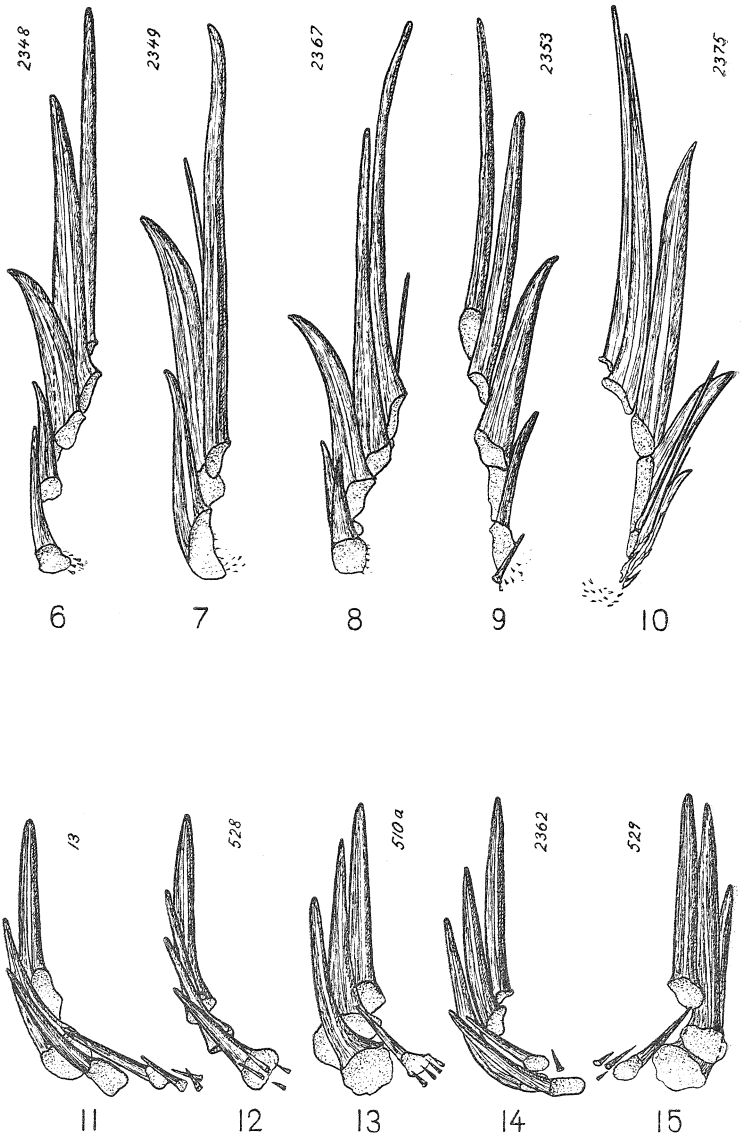
Male genitalia (Fig. 1). Uncus long, evenly tapering to a point. Gnathos long. Cornuti (Figs. 6—10) arranged in a single row, consisting of 2—3 long spines followed by 2—3 shorter, stout, curved ones. At the base of the group of spines an indefinite number of extremely minute thorns. The specimen, the cornuti of which are shown in Fig. 10, originates from Switzerland, those illustrated in Figs. 6—9 are of Danish origin.

Female genitalia (Fig. 26). Ostium wide, a sclerotized plate near ostium, ductus bursae twisted just before widening into bursa, which is squamous on one side, spined on the other.

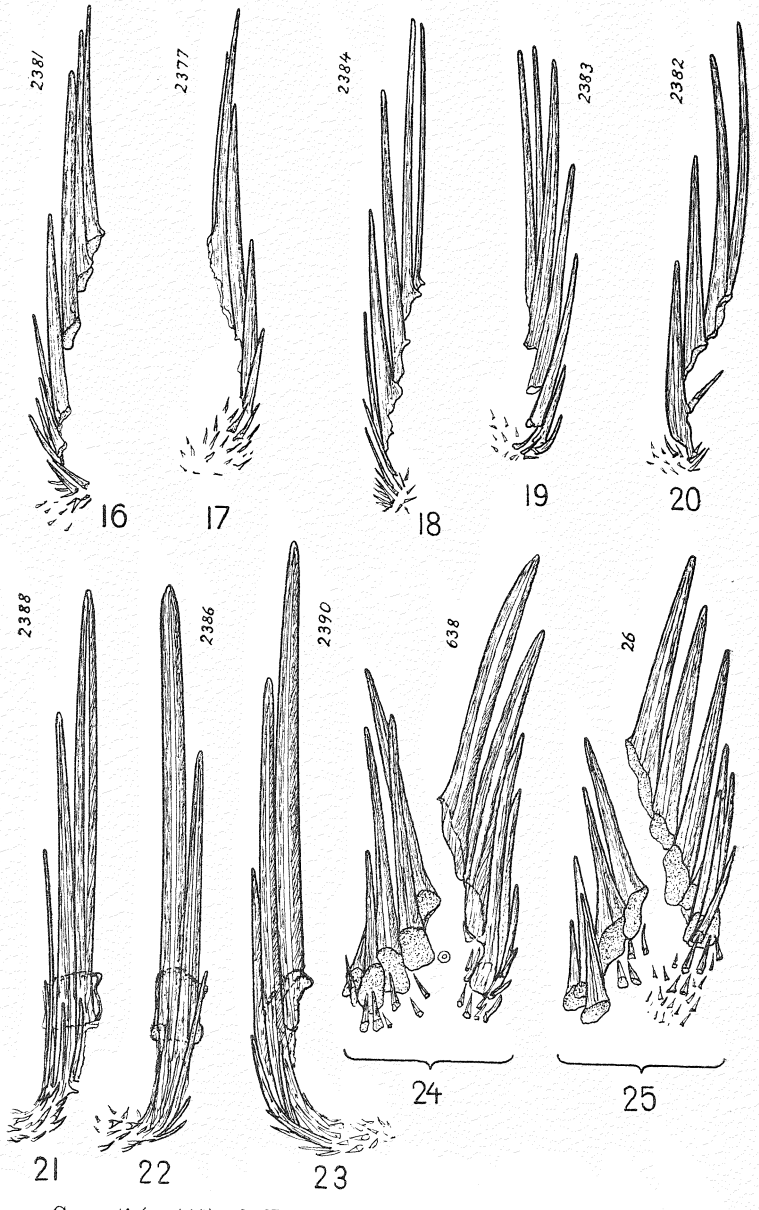
Material studied: 57 specimens. Genitalia dissected: 9 males, 6 females. Holotype (♂), locality Dania, Jungshoved 20. VI. 1959 incl. genit. slide NLW 2348, and allotype (♀), locality Dania, Jungshoved 4. VII. 1959. incl. genit. slide NLW 2366 are presented to the Zoological Museum of Copenhagen.



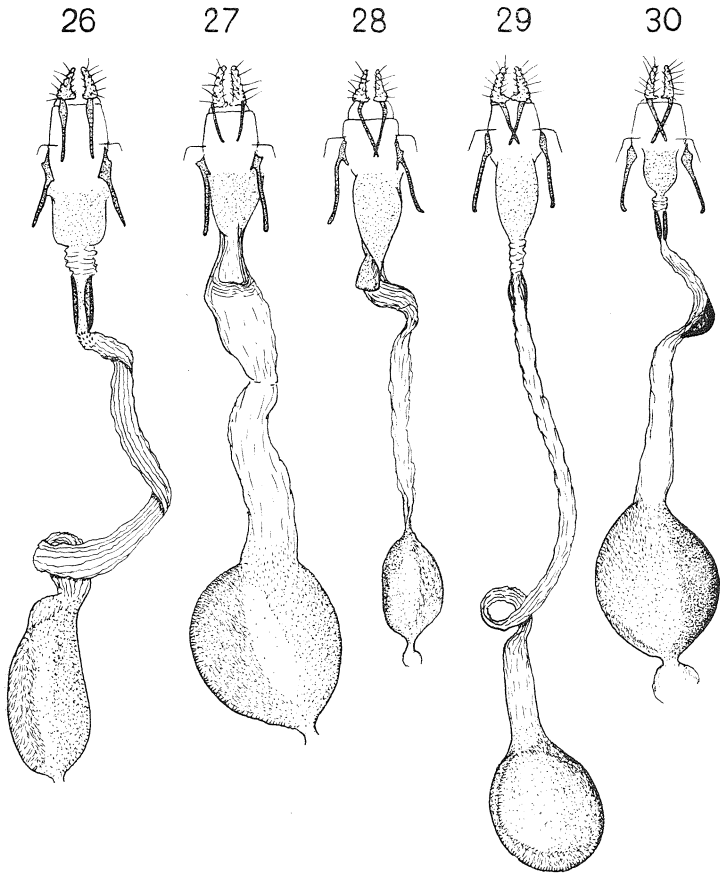
Male genitalia (× 20) of: Fig. 1: *Scoparia sylvestralis* n. sp., Fig. 2: *S. basistrigalis* Kngs., Fig. 3: *S. ambigualis* Tr., Fig. 4: *S. ingratella* Zell., Fig. 5: *S. dubitalis* Hb.



Cornuti (× 110) of: Figs. 6—10: *Scoparia sylvestralis* n. sp., Figs. 11—15: *S. ambigualis* Tr.



Cornuti (× 110) of: Figs. 16—20: *Scoparia dubitalis* Hb., Figs. 21—23: *S. ingratella* Zell., Figs. 24—25: *S. basistrigalis* Kngs.



Female genitalia (× 13) of: Fig. 26: *Scoparia sylvestralis* n. sp., Fig. 27: *S. basistrigalis* Kngs., Fig. 28: *S. ambigualis* Tr., Fig. 29: *S. ingratella* Zell., Fig. 30: *S. dubitalis* Hb.

Distribution. Known from Denmark and Switzerland, but probably widely distributed.

2. *Scoparia basistrigalis* Kngs.

This species (Fig. 33) is easily distinguished from *sylvestralis* by its sharply barred cilia. In the male genitalia

(Fig. 2) the uncus is long, narrow, pointed. Gnathos long. The cornuti are placed in two separate groups, an arrangement also present in *S. cembrae*. As the shape of the cornuti is utmost different in these two species, and as these, regarding colour and wing markings, do not resemble each other, no possibility of confounding them exists.

Figs. 24—25 show the cornuti of (a Danish and a German) *basistrigalis*. The one group consists of 3—4, the other of 2—3, strong spines, followed by some smaller ones. At the base of each group a large number of minute spines.

The female genitalia (Fig. 27) have at $^1/_3$ an abrupt widening on ductus bursa which, itself, is wide before reaching bursa.

Distributed from Great Britain through e. g. France, Germany, Northern Europe, incl. Denmark and Sweden.

3. *Scoparia ambigualis* Tr.

S. ambigualis is widely distributed and in many localities in Europe a common species. Fig. 34 gives an idea of the normal appearance of Danish specimens. In the Northern part of its area (e. g. Ireland, Scotland, Faroes) it is substituted by ssp. *atomalis* Stt., which is smaller and far more variable, sometimes occurring as an aberration having in the forewing the central band white, and the basal part, as well as the outer area, unicolourous black. This aberration has been described (from the Faroes) as a separate species, *S. klinckowströmi* Hamfelt (1917: 3—7). In a paper dealing with the Lepidoptera of the Faroes (Wolff 1929: 15—17) I have established that all Faroese Scoparias recorded, irrespective of the variation of their wing markings, belong to only one species. In the said paper I, however, made a mistake, treating the Faroese species under the name *S. atomalis* Stt. instead of as *S. ambigualis* Tr. ssp. *atomalis* Stt. This error happened because a specimen of a "typical *ambigualis*" which I obtained from Germany for comparison in rea-

lity belonged, not to *ambigualis,* but to *basistrigalis,* a species unfortunately not familiar to me in 1929. The names *atomalis* and *ambigualis* in the paper mentioned consequently have to be altered into *ambigualis* ssp. *atomalis,* and *basistrigalis,* respectively.

Fig. 3 shows the male genitalia of *S. ambigualis.* Tip of uncus shorter, and broader, gnathos shorter, than in preceding species. Concerning the cornuti Chapman (1912: 512) gives the following description: "The cornuti are in a group of two rather long (0.25 mm) and strong, a third smaller, and three or four others deminishing so that the smallest is hardly visible." Pierce & Metcalfe (1938: 36) state: "Cornuti rather variable, two or three strong thorns with three or more smaller ones at the base". I have, myself, examined numerous *ambigualis* (localities: Denmark, Faroes, Great Britain (also Pierce's original slides)) and have found the appearance of the cornuti in all cases to fit well in with these two characteristics. The specimens the cornuti of which are shown in Figs. 11—15 originate partly from the Faroes (Fig. 11, "*S. klinckowströmi*"), partly from Denmark (Figs. 12—15).

Although insufficiently detailed the figure of *ambigualis* ♂ published by Müller-Rutz (1925: 432) agrees fairly well with Fig. 3 above. Zerny (1935: 34) has drawn the cornuti of his *ambigualis* as a solid bulk, which makes it impossible to state definitely its identity, but it seems not absolutely out of question that his illustration may concern *sylvestralis.*

The illustration of the genitalia of "*ambigualis*" published by Marion (1959: 19) together with his remark (l. c.: 17): "Sous faible grossissement les cornuti paraissent semblables à ceux de *dubitalis* mais deux fois plus grands. Un fort grossissement montre qu'en réalité chaque cornutus est composé lui-même de plusieurs épines, ce qui n'est pas le cas chez *dubitalis.* Les figures de PIERCE et METCALFE et de CHAPMAN sont inutilisables, le fait leur

ayant échappé" clearly indicate that Marion does not illustrate *ambigualis* (as shown in Fig. 3) but some different species. His illustration of the cornuti of *"ambigualis"* (P. No. 468 a) reminds of *sylvestralis*.

I have discussed the problem with dr. Marion who has been kind enough to inform me that he agrees concerning the supposition that his *ambigualis* corresponds with my Figs. 6—10, instead of with Figs. 11—15, but he is still of the opinion that he is illustrating a true *ambigualis* Tr. and, consequently, that *ambigualis* sensu Chapman, Pierce & Metcalfe, Wolff etc. is wrongly identified.

Treitschke's coll. in Budapest contains 5 *ambigualis*, regarded as typoides. They carry no locality label, but each specimen is marked 'Treits 3401'. Unfortunately only two have their bodies left, and an examination of the genitalia proved that both were — *cembrae* Hw. ♂(!). Dr. Gozmány, whose kind help I highly appreciate, has enabled me to study the remaining bodyless specimens. Two were unmistakably *cembrae*, but as to the third I do not doubt that it belongs to what I illustrate (Fig. 34) as *ambigualis* Tr.

As *locus typicus* of *ambigualis* is stated by Treitschke (1829: 185) to be Austria, I have applied to dr. Klimesch (Linz) who kindly assisted in examining the genitalia of Austrian *ambigualis* from his own coll., proving these to correspond with my Figs. 11—15, thus confirming the occurrence of this species in Austria.

To preserve the name *ambigualis* Tr. (1829) I have — in spite of its lack of abdomen — selected as the lectotype the specimen mentioned above. The name *cembrae* Haworth (1812) remains unaffected.

Should in future the material now present in coll. Treitschke be doubted as 'authorized typoides' the name *ambigualis* Tr. can still be preserved by regarding Chapman (1912) as the 'first revisor' restricting this name to a distinct species.

Female genitalia (Fig. 28). Ostium apically connected to a bent, lightly sclerotized, plate. Ductus bursa not wide before reaching bursa.

4. *Scoparia ingratella* Zell.

In his revision of the Scoparias Chapman (1912: 507—508), concerning this species, made a mistake concluding that *ingratella* was not a *bona species* but a form of *dubitalis* Hb. This error has largely been repeated by subsequent authors, thus by e. g. Meyrick (1928: 440), Pierce & Metcalfe (1938: 36), and Marion (1959: 16).

The material of *S. ingratella* Zell. which I have been able to study (a total of 7 specimens) originates partly from the Zeller collection preserved in the British Museum in London (BMNH), partly from the Humboldt Museum in Berlin. I am greatly indebted to the Authorities of both Museums for their generous help. Mr. Paul E. S. Whalley of the BMNH has kindly enabled me to dissect 3 males and 2 females. The appearance of the cornuti of these males, prepared as mentioned above, appears from Figs. 21—23, and the genitalia of one of the females are shown in Fig. 29.

According to the original description Zeller (1846: 283—285) described this species on the basis of a material consisting of 8 specimens (7 ♂♂, 1 ♀). Professor Erich M. Hering has kindly informed me that the Museum in Berlin originally possessed 3 of these specimens of which one still is present. As Zeller, himself, did not select types, this specimen — although carrying a label stating it to be the holotype (no. 14199) — must be regarded as the lectotype. In appearance it is somewhat different from the specimens in the BMNH, and a previous student has fixed a label to the pin stating: "*Scoparia basistrigalis* (Knaggs) det. M. Maslowski". The genitalia had already been mounted, and these are indeed very different from *basistrigalis*. In the preparation the cornuti are super-

posed, and difficult to study in details, but compared to the genitalia of four males in the Zeller coll. (BMNH) they all prove to belong to the same species, and thus to be true *ingratella*.

Fig. 35 shows a male which seems to be a fair representative of the species. As stated by Chapman it somewhat resembles *dubitalis*, although larger.

Male genitalia (Fig. 4). Uncus narrower than in *ambigualis*. Basal part of valva stronger. Cornuti (Figs. 21—23) consist of 2—3 long, strong spines, curved close to base, and followed by an indefinite number of slender, slightly curved spines. At the base of the patch of larger cornuti, as usual in the genus, a number of minute spines.

Female genitalia (Fig. 29). Ostium long, followed by a short, sclerotized part. Ductus bursa long, narrow, twisted at $^2/_3$ before widening into bursa.

S. ingratella is in fact a *bona species*, distinctly separated from *dubitalis*, and Chapman would undoubtedly not have considered them conspecific, if he had been able, also in this case, to examine the genitalia of both sexes.

As *ingratella* for so many years has been confounded with *dubitalis*, its distribution is not known with certainty. The type material came from Austria.

5. *Scoparia dubitalis* Hb.

Although variable this species (Fig. 36) is in most cases recognizable by its whitish ground colour and distinct cross-lines. It is distributed over greater parts of Europe.

Male genitalia (Fig. 5). Valva shorter and more evenly rounded than in preceding species. Uncus short. The cornuti (Figs. 16—20) consist of a row of generally 4 long, slender, very lightly curved spines, sometimes followed by 2—4 shorter ones. At the base a number of small spines. The long cornuti are often superposed and require to be somewhat dislocated during dissection, before they can be studied in details.

Female genitalia (Fig. 30). A narrow, sclerotized plate with margins salient, just beneeth ostium. Ductus bursa curved at $^1/_3$, at this point strongly sclerotized at the outer part of the bend, evenly widening towards bursa.

In the present paper I have made use of the same trivial name — *dubitalis* Hb. — for this species as is used in all references, except one, quoted, but from a nomenclatorical point of view this is not correct. As stated by Benander (1946: 74) the name *dubitalis* Hübner (not earlier than 1796) has to be replaced by *arundinata* Thunberg (1792: 61).

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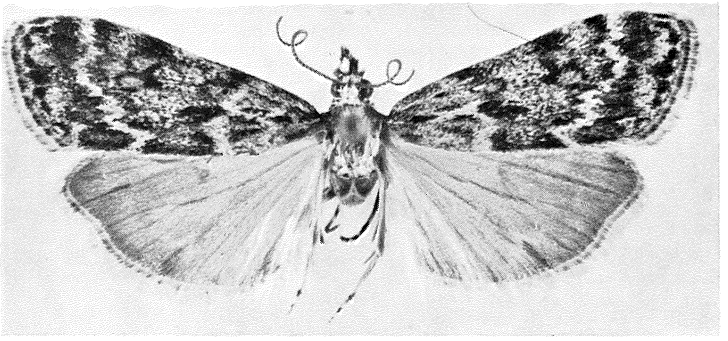


Fig. 31. *Scoparia sylvestralis* n. sp. ♂ Holotype (×4)

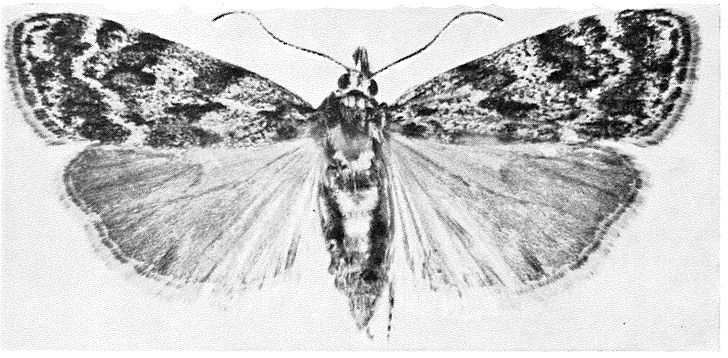


Fig. 32. *Scoparia sylvestralis* n. sp. ♀ (×4)

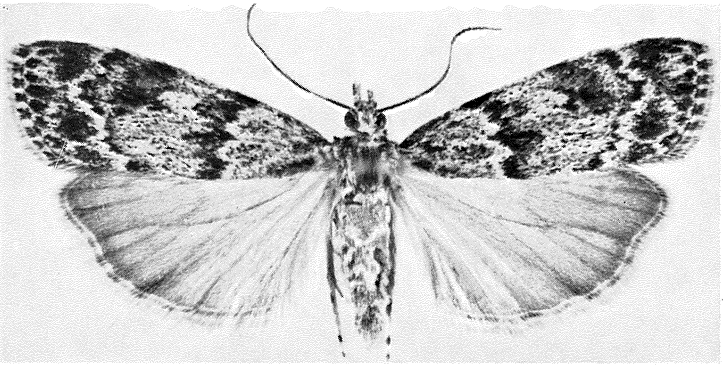


Fig. 33. *Scoparia basistrigalis* Kngs. ♀ (×4)

H. V. Christensen photo.



Fig. 34. *Scoparia ambigualis* Tr. ♂ (×4)

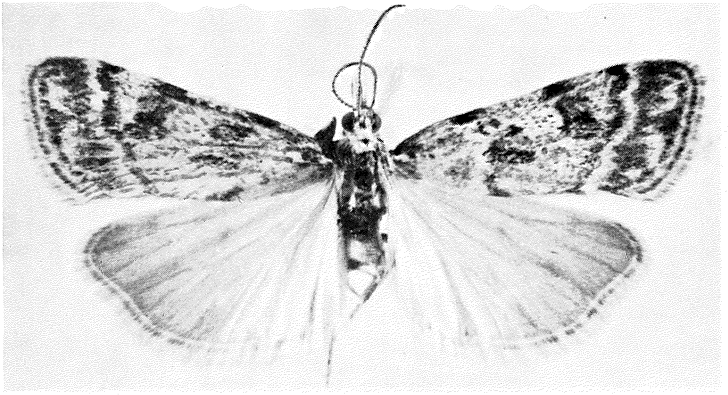


Fig. 35. *Scoparia ingratella* Zell. ♂ (×4)

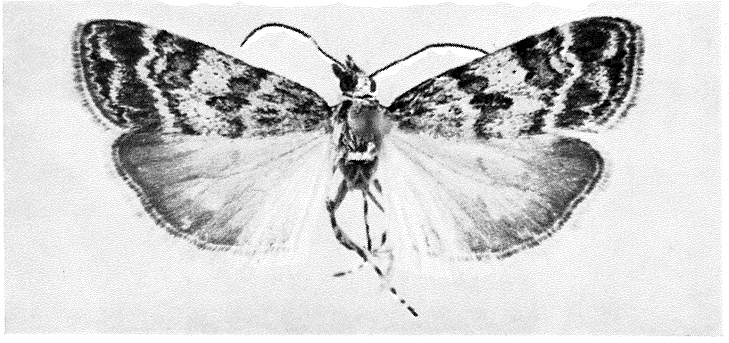


Fig. 36. *Scoparia dubitalis* Hb. ♂ (×4)

H. V. Christensen photo.

A List of Danish Aphids.

1.: *Macrosiphoniella* Del Guerc. and *Dactynotus* Raf.

By Ole Heie
(Skive Seminarium, Skive).

Several aphid species are known to be noxious to cultivated plants in Denmark, but a list of species occurring in this country has not been published before. The present list is based upon the writer's collections and observations, mainly since 1956, but besides references are given of other findings known to the writer, partly from the literature and partly from professor, Dr. Math. Thomsen's collection of slides from 1916—1918.

For full descriptions of the genera and most of the species treated here in the first part of the list see Hille Ris Lambers: Contributions to a Monograph of the Aphidae of Europe, I and II (Temminckia III, 1938 and IV, 1939). Notes on the distribution of the species mainly derive from this work and from Börner: Europae centralis Aphides (Mitt. Thür. Bot. Ges., 1952). For synonyms shall be referred to these two publications too.

In Sweden E. Wahlgren has drawn up lists of the aphid species occurring there (1938, 1954, 1955, 1957). As the occurrence of Danish aphids in our neighbouring countries has particular interest records from Sweden will be mentioned, even when the distribution in Europe is not more closely specified.

The writer wishes to thank Dr. D. Hille Ris Lambers, Bennekom, Netherlands, for determination of several specimens and professor, Dr. Math. Thomsen, Copenhagen, who most kindly lent me his collection of slides.

List of the species.

1. *Macrosiphoniella artemisiae* (B. d. Fonsc., 1841).
2. *M. millefolii* (De Geer, 1773).
3. *M. oblonga* (Mordvilko, 1901).
4. *M. obtecta* (Börner, 1950).
5. *M. pulvera* (Walker, 1848).
6. *M. sanborni* (Gillette, 1908).
7. *M. sejuncta* (Walker, 1848).
8. *M. tanacetaria* (Kaltenbach, 1843).
9. *M. usquertensis* Hille Ris Lambers, 1935.
10. *M. (Asterobium) asteris* (Walker, 1849).
11. *Dactynotus achilleae* (Koch, 1855).
12. *D. cichorii* (Koch, 1855).
13. *D. cirsii* (L., 1758).
14. *D. hypochoeridis* Hille Ris Lambers, 1939.
15. *D. muralis* (Buckton, 1876).
16. *D. obscurus* (Koch, 1855).
17. *D. sonchi* (L., 1767).
18. *D. tussilaginis* (Walker, 1850).
19. *D. (Uromelan) aeneus* Hille Ris Lambers, 1939.
20. *D. (U.) campanulae* (Kaltenbach, 1843).
21. *D. (U.) jaceae* (L., 1758).
22. *D. (U.) solidaginis* (Fabr., 1794).
23. *D. (U.) taraxaci* (Kaltenbach, 1843).

Genus **MACROSIPHONIELLA** Del Guercio, 1911.
Subgenus **MACROSIPHONIELLA** s. str.

1. *Macrosiphoniella artemisiae* (Boyer de Fonscolombe, 1841).

Macrosiphoniella artemisiae Hille Ris Lambers, 1938, p. 15.
Macrosiphoniella artemisiae Börner, 1952, p. 168, no. 637.

Distribution: Europe and Siberia. Known from Sweden.

Occurrence in Denmark: Found on Artemisia vulgaris at Skive in Jutland (15-7, 3-9-56, 4-8-58), at Fåborg (13-7-57) and Avnslev on Funen (9-7-58), at Onsbjerg on Samsø (12-8-58), and at Sophiehøj on Lolland (15-8-58), especially on the upper parts among the flowers. Both greyish green and dark red specimens have been collected.

M. artemisiae like other species of the genus lives on its herbaceous host from spring to autumn. Sexuales developed here produce eggs, which hibernate.

2. *Macrosiphoniella millefolii* (De Geer, 1773).
Macrosiphoniella millefolii Hille Ris Lambers, 1938, p. 22.
Macrosiphoniella millefolii Börner, 1952, p. 166, no. 626.

Distribution: Europe. Known from Sweden.

Occurrence in Denmark: Very common on Achillea millefolium, especially between the flowers, where it often occurs in great numbers. In Jutland found at Harboøre (22-6-57), Nr. Nissum (25-7-57), Struer (8-10-57), Hvidbjerg in Salling (24-6-57), Skive (1957-58), Kisum (22-7-57), Højslev (3-8-57), Rindsholm (16-7-56), Sønderup in Himmerland (22-9-58), Ribe (2-7-58), and near Løgumkloster (5-7-58). On Funen found at Årslev (26-7-55) and in Svanninge Bakker (12-7-57). On Sealand found at Benløse (14-8-58) and Holte (16-8-58). In other parts of the country: Tåsinge (3-7-57) and Læsø (6-8, 8-8-57).

In the autumn (September and October) sexuales were collected on Achillea millefolium. It was noticed that some reddish nymphs developed into alate males. The normal colour of this aphid species is green, but reddish larvae may be seen from the end of August.

3. *Macrosiphoniella oblonga* (Mordvilko, 1901).
Macrosiphoniella oblonga Hille Ris Lambers, 1938, p. 25, pl. II, fig. 8.
Paczoskia (Phalangomyzus) oblonga Börner, 1952, p. 166, no. 624.

Distribution: Europe. Known from Sweden, where Wahlgren (1957) records it from Artemisia vulgaris.

Occurrence in Denmark: Oviparous females and larvae have been collected on Chrysanthemum indicum at Skive in October 1958 (N. J. Vinther leg.).

According to Hille Ris Lambers it lives on Artemisia vulgaris, A. noxa, and Chrysanthemum indicum, but he writes that it is not absolutely certain that the Chrysanthemum-form is identical with the Artemisia-form.

4. *Macrosiphoniella obtecta* (Börner, 1950).
Paczoskia obtecta Börner, 1950, p. 14.
Paczoskia obtecta Börner, 1952, p. 164, no. 618.
Macrosiphoniella obtecta Hille Ris Lambers, 1954, p. 276.

Hille Ris Lambers (1954) pointed out that only few of the species placed by Börner in the genus *Paczoskia* Mordv. belong there, viz. those from Echinops.

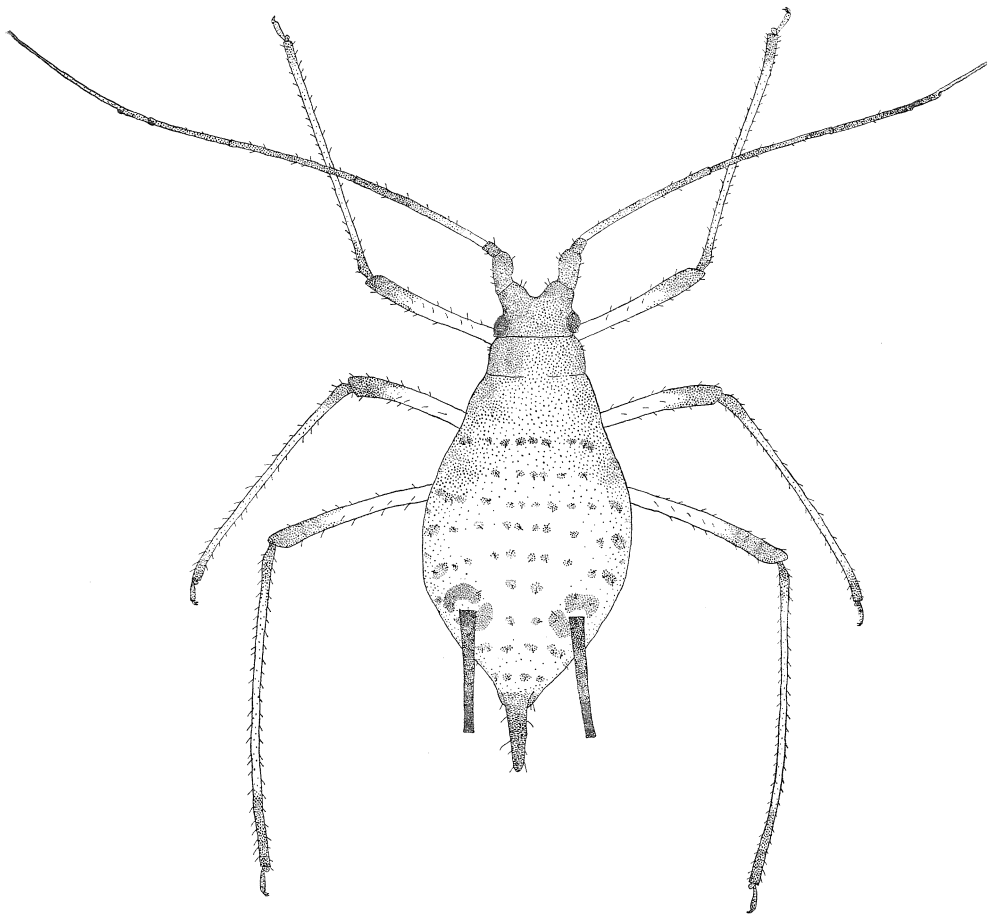


Fig. 1. *Macrosiphoniella obtecta* (Börner), apterous viviparous female. × 19.

The original description (Börner, 1950) is brief enough to be quoted in its entirety:

"Ungeflügelte mit 25—34 Rhinarien am Glied 3, die die Gliedermitte überschreiten. Rüssel 0,67—0,70 mm, Endglied so lang oder etwas kürzer als Hintertarsus. Siphonen 0,7—0,8 mm, Netzgürtel $^1/_3$—$^1/_4$ der Sipho-Länge mit 25—27 Maschenzeilen. 2,8—3,6 mm. An Centaurea scabiosa, unterseits der bodennahen Blätter. Verbreitet."

Description of apterous viviparous female (Danish material):

Morphological characters: Body spindle shaped (fig. 1). Abdominal hairs placed on distinct scleroites. Broad, distinct, semiluniform antesiphuncular sclerites present. Postsiphuncular sclerites present too, broad and undivided or abrupt in the middle. Frontal tubercles very well developed, diverging, so that the sinus frontalis becomes distinctly V-shaped. Antennae longer than the body, IIIrd segment with 38—43 secondary rhinaria on basal $^3/_4$ (fig. 2, a). Rostrum reaching to 3rd pair of coxae, last segment about as long as second joint of hind tarsi (without claws) or a little longer. Siphunculi $^1/_5$—$^1/_4$ length of body, reticulated on distal $^1/_4$—$^1/_3$ (fig. 2, b). Cauda $^2/_3$ times the length of the siphunculi, with about 10 hairs. Legs long, with 3-3-3 setae on first tarsal segment.

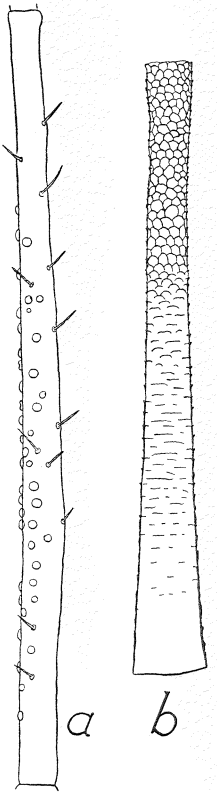


Fig. 2. *Macrosiphoniella obtecta* (Börner), apterous viviparous female, a) IIIrd antennal segment, b) siphunculus. × 100.

Colour: Body bronze brown, shining, with darker sclerites. Siphunculi and cauda black. Antennae dark with base of IIIrd segment yellowish. Legs yellow, knees and apices of tibiae black. Eyes bright red.

Measurements of 3 specimens (in mm):

No.	Body	Antenna (I—VI)	Ant. flag. jt. ratios (III—VI)	Siph.	Cauda	Caudal hairs	Apical joint rostr.	2. jt. hind tarsus
1	3,82	—	75:68:48½:(15+?)	0,93	0,64	9	0,17	0,16
2	3,60	4,04	68:62:42:(14+70)	0,84	0,64	10	0,17	0,16
3	3,97	4,11	74:60:47:(15+67)	0,84	0,57	12	0,17	0,15

(1: Tylstrup, 11-8-56; 2—3: Rønbjerg, 22-7-57).

Distribution: Outside Denmark only known from Germany (Thüringen) and Austria (Steiermark) on lower leaves of Centaurea scabiosa (Börner, 1952) and from France (Gironde) on Centaurea aspera (Remaudière, 1954).

Occurrence in Denmark: This species was first found on Centaurea cyanus at Tylstrup, Vendsyssel (11-8-56), one apterous adult with some larvae on the stem. Dr. Hille Ris Lambers most kindly determined the aphids. Later on the species was found on two places respectively east and west of Rønbjerg (22-7-57), the distance between the two places being about 1½ km. In each case only one apterous viviparous female with its offspring was observed sitting on the upper stem of Centaurea cyanus.

Usually great, brown aphids on Centaurea spp. will appear to be *Dactynotus (Uromelan) jaceae* (L.), which has black eyes, black legs and no antesiphuncular sclerites.

5. *Macrosiphoniella pulvera* (Walker, 1848).

Macrosiphoniella pulvera Hille Ris Lambers, 1938, p. 29, pl. I, fig. 5.

Macrosiphoniella pulvera Börner, 1952, p. 168, no. 640.

Distribution: Europe.

Occurrence in Denmark: Found on Artemisia maritima, especially on the upper parts, at Frederikshavn (9-8-50), and at Bøjden on Funen (14-7-57). The colour is just like that of the host plant.

6. *Macrosiphoniella sanborni* (Gillette, 1908).

Macrosiphoniella sanborni Hille Ris Lambers, 1938, p. 30, pl. II, fig. 9.

Pyrethromyzus sanborni Börner, 1952, p. 168, no. 645.

Pyrethromyzus sanborni Börner & Heinze, 1957, p. 250, Abb. 99.

Distribution: All over the world wherever Chrysanthemums are grown.

Occurrence in Denmark: Found on Chrysanthemum sp. at Lyngby, out of doors (14-9-53, Børge Petersen leg.).

According to Hille Ris Lambers it lives on Chrysanthemum indicum and C. frutescens during the whole year. Overwintering takes place in the parthenogenetic stage in greenhouses, in warm climates also out of doors.

7. *Macrosiphoniella sejuncta* (Walker, 1848).
Macrosiphoniella sejuncta Hille Ris Lambers, 1938, p. 32, pl. III, fig. 10.
Paczoskia sejuncta Börner, 1952, p. 166, no. 622.

Distribution: Outside Denmark known from England, Netherlands, Germany, and France.

Occurrence in Denmark: Collected on Achillea millefolium at Skive (28-7-57).

The species lives on the lower leaves of its host, where it is difficult to find, because the aphids by the slightest disturbance fall to earth and play possum, and they are coloured like earth.

8. *Macrosiphoniella tanacetaria* (Kaltenbach, 1843).
Macrosiphoniella tanacetaria Hille Ris Lambers, 1938, p. 34.
Macrosiphoniella tanacetaria Börner, 1952, p. 167, no. 636.

Distribution: Europe. Known from Sweden.

Occurrence in Denmark: Found on Tanacetum vulgare at Lyby in Salling (19-7-56), at Skive (4-9-56), and on Avernakø (11-7-57), on Matricaria inodora at Skive (3-9-56, Hille Ris Lambers det.), on Chrysanthemum parthenium at Skive (21-8-58), on Chrysanthemum indicum at Skive (7-10-58, N. J. Vinther leg.), and in a yellow Moericke-trap at Borris (3-8-56, Hille Ris Lambers det.).

Sexuales were observed in September-October on Tanacetum vulgare and Chrysanthemum indicum. The normal host is Tanacetum vulgare, which is attacked by colonies among the inflorescences and on the upper

stems. Only once have colonies been observed on Matricaria, which never else has been recorded as host plant of this aphid species.

9. *Macrosiphoniella usquertensis* Hille Ris Lambers, 1935.
Macrosiphoniella usquertensis Hille Ris Lambers, 1938, p. 41, pl. III, fig. 11.
Macrosiphoniella usquertensis Börner, 1952, p. 167, no. 627.

Distribution: Outside Denmark known from Netherlands, England, Germany, Austria, and France.

Occurrence in Denmark: Found on the lower leaves of Achillea millefolium at Østerby on Læsø (8-8-57). They immediately fell to earth when being disturbed. The upper parts of the same plant were infested with *M. millefolii*.

Subgenus **ASTEROBIUM** Hille Ris Lambers, 1938.

10. *Macrosiphoniella (Asterobium) asteris* (Walker, 1849).
Macrosiphoniella (Asterobium) asteris Hille Ris Lambers, 1938, p. 17, pl. I, fig. 3.
Dactynotus (Uromelan) asteris Börner, 1952, p. 174, no. 678.

Distribution: Outside Denmark known from England, Netherlands, Italy, Germany, Sweden, and France.

Occurrence in Denmark: Found on Aster trifolium on Amager (29-8-51).

Genus **DACTYNOTUS** Rafinesque, 1818.
Subgenus **DACTYNOTUS** s. str.

11. *Dactynotus achilleae* (Koch, 1855).
Dactynotus achilleae Hille Ris Lambers, 1939, p. 11, pl. I, fig. 1.
Dactynotus achilleae Börner, 1952, p. 169, no. 649.

Distribution: Outside Denmark known from Germany, Netherlands, England, Belgium, France, and Austria.

Occurrence in Denmark: Found on the lower leaves of Achillea millefolium at Rindsholm (16-7-56) and at Harboøre (22-6-57). Winged specimens have been caught in a yellow Moericke-trap at Borris (1956). All in Jutland.

This species like the other members of the genus *Dactynotus* does not migrate, but lives on its host from spring to autumn. Hibernation takes place in the egg-stage (holocyclic).

12. *Dactynotus cichorii* (Koch, 1855).

Dactynotus cichorii Hille Ris Lambers, 1939, p. 13.
Dactynotus cichorii Börner, 1952, p. 171, no. 661.

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

Occurrence in Denmark: Found on Cichorium intybus on Bornholm (22-7-54), at Svendborg (3-7-57), at Rudkøbing (5-7-57), on Avernakø (11-7-57), at Fåborg (13-7-57), and at Brattingsborg on Samsø (10-8-58), on Crepis biennis at Hesselager on Funen (8-7-58), and on Crepis capillaris at Holte (16-8-58) on Sealand.

The colonies sit on the upper parts of the hosts, mainly on the stems.

Hille Ris Lambers (1939) distinguishes between four subspecies: 1) *cichorii* s. str. on Cichorium, 2) *grossus* on Crepis, 3) *leontodontis* on Leontodon, and 4) *carduicola* on Carduus. Only specimens of the first and the second subspecies have been collected in Denmark. The different forms are not only biologically divergent, but also morphologically — at least in the early summer —, as Hille Ris Lambers pointed out that specimens of *cichorii* s. str. had a processus terminalis more than 5½ times as long as the base of the VIth antennal segment, whereas it was shorter in subsp. *grossus*. I could not find any morphological character separating the two forms, possibly because my material belonged to generations later than the 2nd generation. The ratio VIb/VIa exceeded 5½ in both forms (apt. viv. from Cichorium: 5,6—7,6, apt. viv. from Crepis: 6,4—7,7).

13. *Dactynotus cirsii* (Linné, 1758).

Dactynotus cirsii Hille Ris Lambers, 1939, p. 18, pl. I, fig. 3.
Dactynotus cirsii Börner, 1952, p. 170, no. 656.

Distribution: Outside Denmark known from Sweden, England, Netherlands, and Germany.

Occurrence in Denmark: Found on Cirsium oleraceum at Søndersø on Sealand (8-9-17, Math. Thomsen leg.) and at Buderupholm in Himmerland (4-9-58, J. Jespersen leg.), on Cirsium arvense at Rindsholm (16-7-56) and at Skive (15-8-56, 6-9-58), and on Cirsium palustre at Skive (1-9-56).

The aphids form colonies on upper leaves and stems. On the three species of Cirsium mentioned oviparous females have been collected in the first part of September. They have only 14—22 secondary rhinaria on the IIIrd antennal segment (Hille Ris Lambers states for a single specimen 28—29), but the number of rhinaria is a variable character of this genus. The variation in number of rhinaria on the IIIrd antennal segment in the apterous viviparous females has been found to be greater than stated by Hille Ris Lambers on Dutch specimens (22—35), viz. 17—43.

14. *Dactynotus hypochoeridis* Hille Ris Lambers, 1939.

Dactynotus hypochoeridis Hille Ris Lambers, 1939, p. 21, pl. III, fig. 9.

Dactynotus hypochoeridis Börner, 1952, p. 170 and p. 226, no. 658.

Distribution: Outside Denmark known from Netherlands, Germany (Frisian Islands), Austria, England, and Sweden. According to Hille Ris Lambers its host is Hypochoeris radicata, and Börner adds Crepis (an alpine species).

Occurrence in Denmark: This aphid is common on Hypochoeris radicata and Leontodon autumnalis in Jutland. On Hypochoeris it was found at Krabbesholm (25-6-57, 5-8-58), at Dølby near Skive (19-7-57), at Rønbjerg (22-7-57), at Fly (24-7-58), at Jebjerg in Salling (26-7-58), at Savstrup near Holstebro (30-6-58), at Bryrup (11-7-58), at Henne (1-7-58), and on Rømø (3-7-58). On Leon-

todon it was found at Skive (1-9-56), at Resen and Dølby near Skive (19-7-57), at Rønbjerg and Kisum (22-7-57), at Fly (24-7-58), at Jebjerg (26-7-58), at Madum Sø in Himmerland (2-9-58), and on Læsø (6-8-57). On Sealand it was found on Hypochoeris at Holte (16-8-58), and a slide in Math. Thomsen's collection belongs to this species, collected in Hornbæk Plantage 10-8-16 (host unknown). The aphids sit in colonies on the upper parts of the plants under the inflorescences.

The aphids from Hypochoeris found in 1957 (in July) had more secondary rhinaria on the antennae than stated in the original description. Therefore I sent some specimens to Dr. Hille Ris Lambers, who confirmed the determination.

The aphids from Leontodon could not be *Dactynotus cichorii* Koch, which is the only *Dactynotus* species hitherto known from Leontodon (subsp. *leontodontis* H. R. L.), because the apical segment of labium was too short. Dr. Hille Ris Lambers most kindly identified the *Dactynotus* found on Leontodon in Denmark with *D. hypochoeridis*. Morphologically the short apical joint of rostrum (usually a little shorter than the second joint of hind tarsus, respectively on an average 0,17 mm and 0,18 mm) separates this species from *D. cichorii*.

The number of rhinaria on the IIIrd antennal segment is 32—75 on apterous viviparous females of *D. hypochoeridis* found in Denmark in July. Hille Ris Lambers (1939) states 18—40, but the original description was made from specimens of second and third generation, whereas the Danish specimens probably belong to third and later generations. The rhinaria of apterous females seemingly are the more numerous the later they are born. About $^1/_7$ 1958 the apterous viviparous female had on an average 40 secondary rhinaria on the IIIrd antennal segment (see p. 204). Later in the summer the number had increased (57 rhinaria on an average). Specimens bred

indoors in August had fewer rhinaria, however (31—54, 42 on an average), so it may be considered that the number of rhinaria depends on the surroundings (temperature etc.).

Simple experiments showed that *Dactynotus* from Hypochoeris radicata could thrive and reproduce on Leontodon autumnalis and vice versa. From $^{26}/_{7}$ to $^{8}/_{8}$ 1958 aphids from Hypochoeris and Leontodon were kept on stems and inflorescences of Leontodon and Hypochoeris respectively in glass tubes multiplying quickly, though several specimens drowned in water dew in the tubes. Some larvae born in the tubes became mature and bore larvae themselves. So it was established that Leontodon autumnalis is a host plant of *D. hypochoeridis*. In the nature Hypochoeris and Leontodon growing on the same place often both are infested with brown aphids, and this fact too confirms that they belong to one species.

Some measurements (in mm) of apterous viviparous females:

	Locality	*Body*	*Antenna (I—VI)*	*Rhin. on III*	*Ant. flag. jt. ratios (III—VI)*	*Siph.*	*Cauda*	*Apical joint rostr.*	*2. jt. hind tars.*
From Hypochoeris about 1st July	Savstrup	3,04	2,97	45+47	58:31:30:(10+62)	0,77	0,47	0,16	0,17
	—	3,47	3,63	46+45	74:37:36:(13+73)	0,82	0,60	0,17	0,19
	Henne	3,23	3,10	32+33	65:30:33:(11+60)	0,77	0,54	0,16	—
	—	3,67	3,40	35+36	70:35:34:(12+68)	0,81	0,60	0,17	0,19
From Hypochoeris from 19th July to 16th August	Dølby	3,67	3,99	75+69	82:48:41:(13+76)	0,87	0,64	0,17	0,19
	—	3,36	3,87	64+58	77:47:41:(14+73)	0,82	0,54	0,17	0,19
	Fly	3,92	3,69	52+58	80:39:40:(13+67)	0,94	0,60	0,17	0,19
	—	3,53	—	60+59	79:35:40:(12+?)	0,87	0,60	0,17	0,19
	Holte	3,86	3,93	51+55	82:41:42:(15+75)	0,91	0,64	0,17	0,19
	—	3,69	3,57	45+51	73:36:38:(12+71)	0,77	0,64	0,17	0,19
	—	3,42	3,56	49+45	70:40:37:(12+71)	0,82	0,60	0,18	0,19
From Leontodon from 19th July to 6th August	Resen	3,93	3,69	54+53	74:43:38:(11½+70)	1,01	0,56	0,17	0,19
	Kisum	3,24	3,22	59+56	62:34:34:(11+65)	0,71	0,53	0,16	0,17
	—	3,17	3,34	56+54	67:36:36:(11+66)	0,73	0,59	0,16	0,17
	Rønbjerg	3,22	3,83	57+61	76:44:42:(12+75)	0,86	0,57	0,16	0,19
	—	3,36	3,43	60+57	72:40:31:(9+68)	0,82	0,59	0,16	0,17
	Læsø	3,86	3,62	56+54	71:38:38:(11+74)	0,82	0,54	0,16	0,18
	Fly	3,43	—	64+62	81:41:42½:(13+?)	0,93	0,63	0,17	0,17
	Jebjerg	3,22	3,46	56+58	67:40:37:(13+67)	0,77	0,50	0,16	0,17

The original description includes the fundatrix and the apterous viviparous female (2nd and 3rd generation), but neither the alate viviparous female nor the oviparous female, which shall be described here:

Description of the alate viviparous female (material: 3 specimens from Hypochoeris sp., Rømø, 3-7-58):

Morphological characters: Dorsal hairs on small scleroites. Marginal sclerites, antesiphuncular sclerite and postsiphuncular sclerite present. Frontal tubercles well developed, diverging. Antennae longer than body. The IIIrd antennal segment about twice as long as the IVth, Vth segment about as long as IVth. The IIIrd segment with about 60 secondary rhinaria over whole length. Antennal hairs as long as the basal diameter of the IIIrd antennal segment. Last rostral segment as long as second joint of hind tarsi or slightly shorter. Siphunculi long, approximately cylindrical and reticulated on distal $^1/_4$-$^1/_3$. Cauda slender, its length about $^2/_3$ of the length of the siphunculus. First tarsal joints of all legs with 5 hairs. Wings normal.

Colour: Red-brown. Cauda yellow.

Measurements (in mm):

Body	*Antenna (I—VI)*	*Rhin. on III*	*Ant. flag. jt. ratios (III—VI)*	*Siph.*	*Cauda*	*Cdl. hairs*	*Apical joint rostr.*	*2. jt. hind tars.*
3,24	3,52	64+72	73:38:37:(12½+68)	0,73	0,50	15	0,17	0,19
3,17	3,66	54+62	75:39:37:(13½+72½)	0,77	0,52	16	0,17	0,18
3,03	3,59	64+63	70:39:36:(12+74)	0,70	0,47	14	0,17	0,17

Description of the oviparous female:

Morphological characters: Very much like the apterous viviparous female. Antennae a little longer or a little shorter than body. The IIIrd antennal segment with about 50 secondary rhinaria. Siphunculi reticulated on distal $^1/_5$. Hind tibiae swollen with 150—250 pseudosensoria on basal $^2/_3$—$^3/_4$. Cauda with 18—21 hairs.

Colour: Brown. Cauda yellow.

Measurements (in mm):

No.	Body	Antenna (I—VI)	Rhin. on III	Ant. flag. jt. ratios (III—VI)	Siph.	Cauda	Cdl. hairs	Apical joint rostr.	2. jt. hind tars.
1	3,43	3,27	49+51	66:34:35:(12+64)	0,79	0,52	18	0,16	0,16
2	2,96	3,33	51+51	72:35:32:(10+66)	0,83	0,52	21	0,16	0,18
3	2,72	3,22	50+44	67:34:32:(10+66)	0,79	0,52	20	0,16	0,17

(1: Leontodon autumnalis, Skive, 1-9-56; 2—3: Leontodon autumnalis, Madum Sø, 2-9-58).

15. *Dactynotus muralis* (Buckton, 1876).
Dactynotus muralis Hille Ris Lambers, 1939, p. 26.
Dactynotus muralis Börner, 1952, p. 171, no. 660.

Distribution: Outside Denmark known from England, Germany, Netherlands, France, Austria, and Sweden.

Occurrence in Denmark: Found on Lactuca muralis in Krabbesholm Forest (21-7-57, the determination certified by Dr. Hille Ris Lambers), an alate female with some larvae.

16. *Dactynotus obscurus* (Koch, 1855).
Dactynotus obscurus Hille Ris Lambers, 1939, p. 28.
Dactynotus obscurus Börner, 1952, p. 170, no. 657.

Distribution: Europe. Known from Sweden.

Occurrence in Denmark: Found on Hieracium umbellatum on Strandbyhede at Frederikshavn (19-8-56), in Hammer Bakker (26-6-57), on Læsø (9-8-57), at Henne (1-7-58), at Fly near Skive (24-7-58), and at Jebjerg (26-7-58), and on Hieracium pilosella at Henne (1-7-58).

The aphids infest stems and leaves of the host plant, especially the upper parts of stems and the inflorescences. Sexuales (oviparous female and alate male) were present in the sample from Strandbyhede (August).

17. *Dactynotus sonchi* (Linné, 1767).
Dactynotus sonchi Hille Ris Lambers, 1939, p. 37.
Dactynotus sonchi Börner, 1952, p. 170, no. 659.

Distribution: Europe, Central Asia, and South America. Known from Sweden.

Occurrence in Denmark: Found on Sonchus sp.

at Ålsgårde (2-8-17, Math. Thomsen leg. et det.), on Sonchus arvensis at Skive (15-7-56), on Sonchus asper at Refsvindinge on Funen (8-7-58), and on Chrysanthemum segetum at Stenskov near Næstved (14-8-58). Winged specimens have been caught in a yellow Moericke-trap at Borris (1956).

The normal host is Sonchus. In other countries this aphid does harm to lettuce, but hitherto it has not been noticed on Lactuca in Denmark.

The number of secondary rhinaria on the IIIrd antennal segment of the apterous viviparous female is 9—27 for Danish material (Hille Ris Lambers states 20—35).

18. *Dactynotus tussilaginis* (Walker, 1850).

?Aphis basalis Walker, 1848, p. 2220.
Aphis tussilaginis Walker, 1850, p. 390.
Dactynotus tussilaginis Hille Ris Lambers, 1939, p. 43.
Dactynotus basalis Börner, 1952, p. 169 and p. 226, no. 648.

Distribution: Outside Denmark known from England, Netherlands, Germany, Austria, France, Sweden, and Central Asia.

Occurrence in Denmark: Found on Tussilago farfara at Skive (14-7, 15-8-56, 4-8-57, 4-8-58), occurring on the underside of the leaves as single specimens or in colonies, Winged individuals have been caught in yellow traps at Årslev on Funen and at Borris in 1956.

From 1952 Börner began to use the name *basalis* Walker, but here the name *tussilaginis* Walker is preferred, though *basalis* is two years older, because the meaning of *basalis* must be regarded as dubious. Usually the long siphunculi of *D. tussilaginis* are brownish yellow with black bases and tips. In 1848 Walker described *Aphis basalis* mentioning this character, but other statements in the short description (host: Lycopsis (Anchusa) arvensis, colour of body: greyish green, size: rather small) do not fit in with the normal appearance of the big, brown aphid from Tussilago. Theobald (1917, p. 77) held *basalis*

as a synonym of *Aphis lycopsidis* Walker (1848, p. 2219), which is described with nearly the same words, and the type of this species appeared to be *Sitobion avenae* Fabr. (= *Macrosiphum granarium* Kirby) as shown by F. Laing (Theobald, 1926, p. 364), and Theobald adds: "No one could have identified this from Walker's description". The type of *Aphis basalis* has not been found, so no one can say with certainty what the name really means. Walker's description of *Aphis tussilaginis* is quite adequate, so that the meaning of this name is clear enough, and for more than 100 years it has been used by every aphidologist dealing with the species.

Subgenus **UROMELAN** Mordvilko, 1914.

19. *Dactynotus (Uromelan) aeneus* Hille Ris Lambers, 1939.
Dactynotus (Uromelan) jaceae subsp. aeneus Hille Ris Lambers, 1939, p. 54.
Dactynotus (Uromelan) aeneus Börner, 1952, p. 172, no. 665.

Distribution: Europe. Known from Sweden.

Occurrence in Denmark: Colonies were found on upper stems and underside of leaves of Carduus crispus at Fåborg (13-7-57) and near Næstved (14-8-58, N. F. Buchwald leg.).

20. *Dactynotus (Uromelan) campanulae* (Kaltenbach, 1843).
Dactynotus (Uromelan) campanulae Hille Ris Lambers, 1939, p. 47, pl. IV, fig. 13.
Dactynotus (Uromelan) campanulae Börner, 1952, p. 174, no. 677.

Distribution: Europe. Known from Sweden.

Occurrence in Denmark: Found on the calyx and the upper part of the stem of Campanula rotundifolia at Østerby on Læsø (8-8-57).

21. *Dactynotus (Uromelan) jaceae* (Linné, 1758).
Dactynotus (Uromelan) jaceae Hille Ris Lambers, 1939, p. 51.
Dactynotus (Uromelan) jaceae Börner, 1952, p. 172, no. 664.

Distribution: Europe and Central Asia. Known from Sweden.

Occurrence in Denmark: Found on Centaurea jacea at Lyby in Salling (22-7-57), on C. cyanus at Rønbjerg (22-7, 22-9-57) and at Skive (1-9-57), on C. scabiosa on Jegindø (20-9-56), on Avernakø (11-7-57), in Svanninge Bakker (12-7-57), at Fåborg (13-7-57), and at Ørby on Samsø (10-8-58), and on C. sp. on Langeland (6-7-57).

Börner (1950) showed that aphids from Centaurea scabiosa could not feed on C. jacea, for which reason subsp. *heinrichi* Börner was erected. *Dactynotus jaceae* s. str. according to Börner can thrive only on Centaurea jacea, C. phrygia, and C. cyanus.

The aphids mainly occur on the upper stems. Sexuales (oviparous female and alate male) were collected on Centaurea scabiosa on September 20th, 1956, and green eggs were observed. Among the animals collected on C. cyanus on September 22nd, 1957, no sexuales, however, were noticed, whereas alate females and nymphs with wing pads occurred in great numbers.

22. *Dactynotus (Uromelan) solidaginis* (Fabricius, 1794).

Dactynotus (Uromelan) solidaginis Hille Ris Lambers, 1939, p. 62.

Dactynotus (Uromelan) solidaginis Börner, 1952, p. 173, no. 670.

Distribution: Europe. Known from Sweden.

Occurrence in Denmark: Colonies were found on the upper parts of Solidago virga-aurea in Hammer Bakker (26-6-57), near Ålestrup (22-9-58), at Skive (28-8, 9-9-58), at Rønbjerg (18-9-58), and at Svendborg (2-7-57).

23. *Dactynotus (Uromelan) taraxaci* (Kaltenbach, 1843).

Dactynotus (Uromelan) taraxaci Hille Ris Lambers, 1939, p. 64, pl. IV, fig. 14.

Dactynotus (Uromelan) taraxaci Börner, 1952, p. 172, no. 669.

Distribution: Europe and U. S. A. Known from Norway (Tambs-Lyche, 1957) and from Sweden.

Occurrence in Denmark: A single apterous viviparous female was found on Beta vulgaris (beet) in a root clamp at Ørslev on Sealand (23-7-54). The normal

host is Taraxacum, but in 1957 and 1958 I looked for this aphid on dandelions in vain. The collected specimen probably had gone astray from a dandelion plant close to the beet on which it was found. Tambs-Lyche observed this aphid on potato leaves in Norway.

Winged individuals have been caught in a yellow Moericke-trap at Borris (27-7-56, the determination is certified by Dr. Hille Ris Lambers).

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Anmeldelse.

J. L. Cloudsley-Thompson: **Spiders, Scorpions, Centipedes and mites.** The ecology and natural history of woodlice, myriapods, and arachnids. London (Pergamon Press) 1958, 228 pp. Pris: 50 sh.

Ved i Forordet at fortælle, at denne Bog overvejende er blevet til under den hjemlige Opvask, tager Forf. Brodden af mange Indvendinger undtagen denne ene: hvorfor man overhovedet skriver en saadan Bog ved Opvasken og ikke i mere samlede Stunder. Forklaringen er den enkle, at Forf. er en "Strøtanke-Forfatter", og dette bærer baade Bogen og de utallige egne Afhandlinger, han henviser til, Præg af. Men dermed være ikke sagt, at det er en daarlig Bog, for en lang Række spredte Iagttagelser, ikke blot af Forfatteren, faar man her samlet og bragt i Rubrikker, skematisk for hver Gruppe: Classification, Behaviour, Food etc., Enemies, Life cycle etc. Bogen er overvejende biologisk-økologisk lagt til Rette; Forf. undgaar dog ikke den moderne Fælde, at omskrive simple biologiske Iagttagelser i pseudovidenskabeligt Sprog ("they normally collect at the moist end of a humidity gradiant", hvor der slet og ret menes, at de søger Fugtighed (p. 8) o. l.), og er selvfølgelig ikke sparsom med teleologisk-selektionistiske Formodninger ("no doubt")[1]). At Bogen er skrevet for Englændere især, fremgaar af Anvendelsen af Halfpenny-Stykker til Sammenligning paa Figurer, samt af Betegnelsen $^1/_{20}$ Tomme for 1 mm (eller endog en Størrelsesangivelse paa en Tooghalvfjerdsindstyvendedel af en Tomme, p. 63), hvorimod Størrelsesangivelsen af et aarligt Gennemsnitsantal (hvad det saa er) paa 1.672.704 Pauropoder pr. acre simpelthen skyldes Mangel paa Virkelighedssans.

Bogen vilde udfylde et Hul, hvis den ikke havde disse Skønhedspletter, for medens Insekter kan findes i talrige Haandbøger, saa er en samlet Haandbog over de øvrige Landarthropoder meget savnet (selvom Grassé's Traité dog giver Cheliceraterne); der er da ogsaa mange Afsnit man læser med Glæde i Bogen, især naturligvis Kapitlerne om de tropiske Former, Solifugerne, "Pedipalperne" (som de tidligere hed), Skorpionerne, Skolopendrene, og ogsaa Fremstillingen af de hjemlige Mejeres Livsforhold er der Momenter i. Bogen er for Naturhistorikere "everywhere", samt for Skolelærere og Universitets-Studenter — siger Forlæggeren.

Prisen er exorbitant.

S. L. Tuxen

[1]) Det antydes endog, at Edderkoppernes Rovgriskhed er Skyld i, at Insekterne udviklede Vinger – men saa lavede Edderkoppen til Gengæld Fangnet!

Laelia coenosa Hb.

En ny dansk storsommerfugl fra 1959.

Af Erling Bloch.

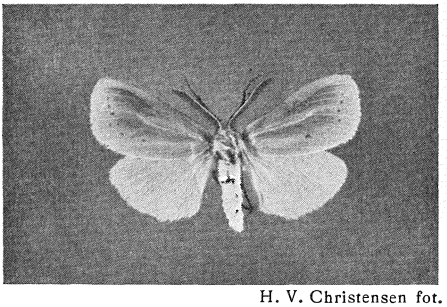
Til min kviksølvlampe i Tisvildeleje kom d. 29. juli ved halv elleve tiden om aftenen en lymantriide ♂, der ved nærmere undersøgelse viste sig at være en *Laelia coenosa*.

Denne spinder, der også forekommer i Østasien (Kina, Korea og Japan), har i Europa en så ejendommelig splittet udbredelse, som kun få andre europæiske arter og det på trods af at den ikke er bundet til et snævert varmegradsområde og synes temmelig uafhængig af klimaets beskaffenhed: (se kortet fig. 2). Biotopen er moser og sumpe og larven, der iflg. E. & H. Urbahn dec. 1939 (Stettiner Entomologische Zeitung 100, p. 351) i fangenskab kan fodres med meget forskelligt, der nævnes Glyceria, Scirpus silvaticus L. og palustris L., synes i naturen hovedsageligt at leve på Cladium mariscus R. Br. (Avneknippe), selv om den også i visse tilfælde skal kunne træffes på rør o. l.

Artens ekspansion i langt fra hverandre liggende områder og uddøen i andre, tyder på at endnu ukendte ydre faktorer har en afgørende indflydelse på dens placering.

I England uddøde den omkr. 1880 og South giver i The Moths of the British Isles en post mortem skildring af dens forekomst. Han fortæller at den dukkede op som britisk art i Whittlesea Mere omkr. 1819-20 og derefter blev fundet i Yaxley og Burwell moser. Den holdt sig på disse steder i en længere årrække så talrigt, at rørskærerne solgte larver for en shilling dusinet. I 1865 er denne pris betydeligt forhøjet og i 1871 er dyret blevet så sjældent, at kun to larver viser sig. Et par år senere kan en kraftig lygte trække en hel del ♂♂, men derefter

går det stærkt tilbage og lygten formår i 1880 ikke at lokke en eneste og man bliver snart klar over, at den sidste "Reed Tussock" har vist sig i "the fens". Iflg. The Entomologist 48 1915, p. 42 er de sidste engelske eks., fem imagines, fanget i Wicken fen i 1879. Medens arten endnu lever i England skriver E. Newman 1869 (The History of British Butterflies & Moths, p. 39), at imago allerede tidlig i juni viser sig og fortsætter gennem juli og



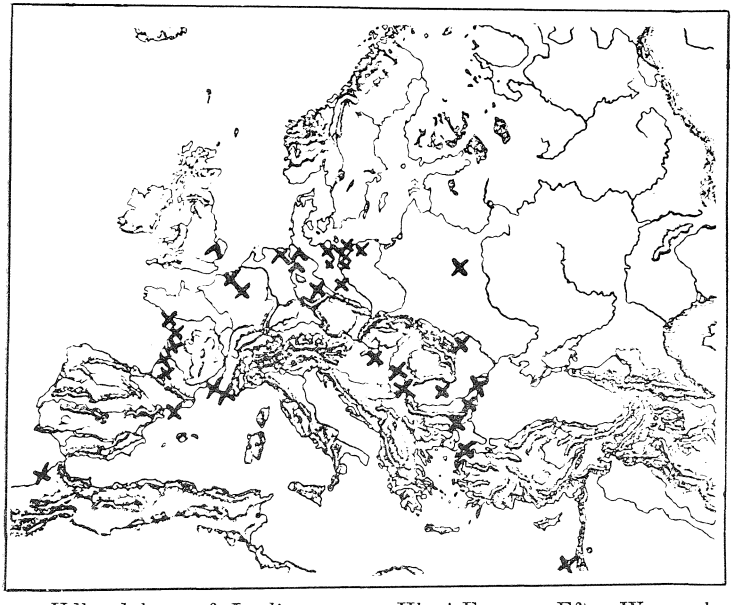
H. V. Christensen fot.
Laelia coenosa Hb.
Tisvildeleje 29. Juli 1959.

august, men i dette tidsrum kommer også larven til syne, således at det ofte er forekommet, at samlere har fået både larve og imago på samme dag, hvilket skyldes den mærkelige omstændighed, at de små larver af en og samme ♀ ikke kommer til verden samtidig, men klækkes gennem et tidsrum af syv uger.

Blandt de kontinentale forekomster i Europa er de tyske, og i særlig grad de nordtyske, de mest kommenterede. Som tysk art nævnes *L. coenosa* for første gang i 1834 af Treitschke (Schmetterlinge Europas, 10. bd., 1. afd. p. 175) og han bemærker at arten tidligere kun har været kendt fra England. 1836 skriver Freyer (Neue Beiträge, p. 34) at larven er fundet på Sparganium ved Berlin og brødrene Speyer angiver i 1858 (Geografische Verbreitung der Schmetterlinge Deutschlands und der Schweiz): "Få steder på de nordtyske lavsletter. Berlin.

Hannover." Andre forf. betegner allerede i 1850 arten som hyppig ved Misburg i omegnen af Hannover, men den forsvinder der, som også andre steder "aus unerklärlichen Gründen".

I en større artikel gør G. Warnecke i 1938 status med hensyn til *L. coenosa* (Stettiner Entomologische Zeitung 99, p. 231). Han behandler mange af de problemer, der



Udbredelsen af *Laelia coenosa* Hb. i Europa. Efter Warnecke 1939.

knytter sig til denne lymantriide og nævner en række forekomster, hvor der er tale om hyppighed og en lang række fund af enkelte ekspl. gennem sidste halvdel af forrige årh. og første tredjedel af dette, men særlig beskæftiger han sig med en påfaldende stærk fremgang i Pommern i tiåret 1928—38 i den nedre Oderdal. Warnecke gør opmærksom på at *coenosa* nøje bør iagttages i Europa og særlig i Nordtyskland, hvor et hovedudbredelsescenter synes at ligge.

Med artens variabilitet beskæftiger han sig kortere; det foreliggende materiale er for lille til at danne et klart billede, men han peger på, at der synes at være en stor forskel på de tyske og de engelske ekspl. og han nævner at Treitschke allerede i 1834 har en formodning derom, for Treitschke betragter Hübners billeder som mislykkede, men måske har maleren haft et engelsk eks. foran sig.

På Zoologisk Museum i København står to mellemeuropæiske ♂♂. Tisvilde eks. stemmer overens med disse såvel som med Spulers billede, men afviger stærkt fra South (pl. 45), hvis ♂ bl. a. har en klar lysebrun farve i modsætning til de snavset grå fra fastlandet.

En mørk ♂-form er beskrevet af H. Urbahn ab. *nigrociliata* (Int. Ent. Z., Guben, 29. J., 1935/36, S. 399). Den er sortagtigt formørket især på forvingespidsen, men også på søm og frynser af begge vingepar samt følere og ben, medens kroppen er svagt gråt bestøvet. Urbahn finder denne form interessant, da den viser en tendens til melanisme, som den har fælles med flere arter, der står *coenosa* nær.

Sætter man det danske fund i forbindelse med den nordtyske forekomst, og det er vel den eneste forbindelse man med nogen rimelighed kan antage, er det påfaldende, at eksemplaret fra Tisvilde er fuldkommen intakt med frynser, skel- og hårbeklædning i behold, således at man har svært ved at tænke sig, at en rejse over Østersøen og de danske øer kunne undgå at sætte sine spor på så sart et dyr.

Foderplanten Cladium mariscus forekommer, omend som sjælden, på Lolland-Falster og Sjælland og den findes også spredt i de sydsvenske landsdele, men er overordentlig almindelig på Gotland.

Det ville unægtelig være interessant om nye fund i Danmark eller Sverrig ville være i stand til at kaste strejflys over dette isolerede danske fund.

Zercon hammerae, nov. spec., eine neue Milbenart aus Ost-Grönland *(Acarina, Zerconidae).*

Von
Max Sellnick
Hoisdorf, Kreis Stormarn, Deutschland.

Von Herrn Dr. Tuxen, Kopenhagen, erhielt ich vor längerer Zeit eine Anzahl von Zercon-Präparaten. Eines davon enthielt 3 Exemplare einer neuen Art. Sie waren von der bekannten dänischen Milben- und Collembolen-Forscherin Frau Dr. Marie Hammer 1933 am Mikis-Fjord in Ost-Grönland gesammelt worden. Ich erlaube mir, die Art nach meiner verehrten Kollegin zu benennen, die sich mir stets hilfsbereit gezeigt hat.

Es befanden sich 2 Nymphen I und eine Larve im Präparat. Die Nymphen I der Zercon-Arten sind daran zu erkennen, dass sie am Rande des Notocephale keine, am Rande des Notogasters nur Andeutungen der Zähnelung aufweisen, welche für die Gattung so charakteristisch ist. Ferner ist das Peritrema immer nur eine kurze breite Rinne (Abb. 1). Es ist meist etwas weiter nach hinten gestellt als beim adulten Tiere und nicht fragezeichenähnlich gebildet wie bei diesem. Die Nymphe II hat, wie ich schon beschrieb [1] ein Peritrema, das vom hinteren Teile der Unterseite des Notocephale bis fast zur Vertikalborste reicht. Sie ist daran sofort zu erkennen.

Zercon hammerae nov. spec.

Das Exemplar von 390 μ Länge und 270 μ Breite, dessen Notogaster 180 μ lang ist, bestimme ich zum typischen Exemplar der Art. Es zeigt keinerlei Darminhalt, doch ist der Körperinhalt nicht genügend zerstört, um alle Einzelheiten der Oberfläche klar erkennen zu

lassen. Die weiter unten folgenden Messungen der Haare sind an diesem Exemplar ausgeführt.

Das zweite Exemplar ist 360 μ lang und 255 μ breit, der Notogaster 165 μ lang. Durch Darminhalt ist ein Teil

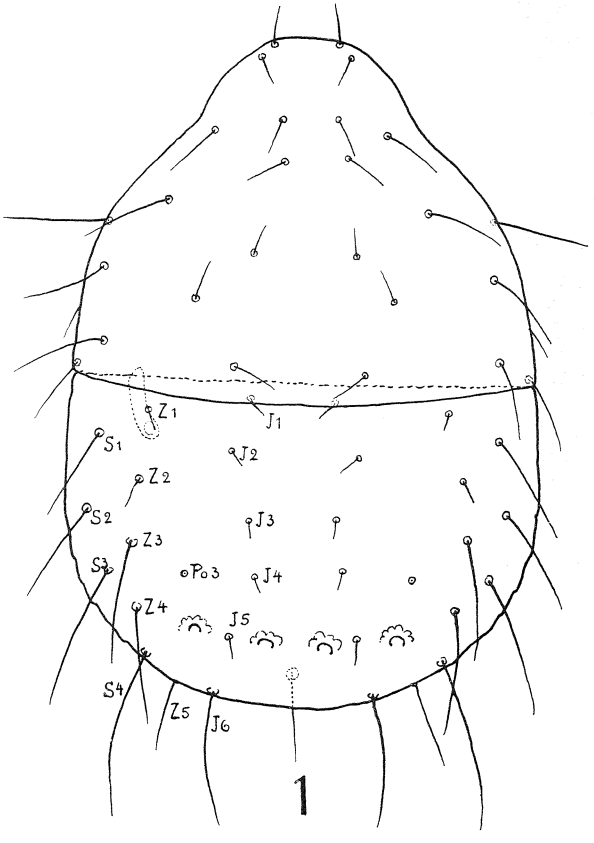


Fig. 1. *Zercon hammerae,* nov. spec. Rückenseite von Nymphe I.

der Oberflächenbeschaffenheit verdeckt. Bei beiden Exemplaren ist weder auf dem Notocephale noch auf dem Notogaster die Spur einer Skulptur zu erkennen. Es gibt weder Grübchen noch Linien einer Felderung.

Die Borsten J 1 bis J 5 sind ziemlich gleich kurz, 12—16 μ. J 5 steht zwischen der äusseren und der nächstinneren Rückengrube, ist also recht weit nach hinten gestellt, was aber auch bei einigen anderen Arten vorkommt. J 6 ist 80 μ lang. Der Abstand J 6—J 6 beträgt 92 μ. Die Borste Z 5 steht 20 μ aussenseits J 6.

Von der Z-Reihe sind die Borsten Z 1 und Z 2 kurz, 17 und 15 μ. Z 3 ist 60 μ lang, Z 4 72 μ. Z 5 misst 64 μ, was auch eine ungewöhnliche Länge ist.

Die Borsten der S-Reihe sind auch sehr lang. Gewöhnlich ist die Borste S 1 weit kürzer als die anderen der Reihe. Bei unserer Art hat sie eine Länge von 56 μ und bleibt damit wenig hinter den anderen der Reihe zurück. S 2 ist 64 μ lang, S 3 misst 68 μ und S 4 ist mit 84 μ die längste Borste der Art.

Z 3, Z 4 und S 4 stehen in einer Längsreihe. S 1 ist fast doppelt so weit vom Vorderrande des Notogasters entfernt wie Z 1.

Die Pore Po 3, die ja bei der Bestimmung der Arten eine wichtige Rolle spielt, befindet sich bei *Z. hammerae* weder zwischen Z 4 und Z 3, noch dicht über oder unter der Verbindungslinie von Z 4 und J 5. Sie liegt über der Verbindung von Z 4 und J 4, wohl, weil J 5 so weit nach hinten gerückt ist. Man könnte sagen, dass die Pore etwa in der Mitte des Dreiecks Z 3—Z 4—J 4 liegt. Ich glaube nicht, dass bei der Nymphe II und beim Adultus die Stellung der Pore eine andere sein wird. Aber vielleicht lässt uns eine neuere Forschungsreise auch einmal diese Entwicklungsformen sehen, sodass man mit Sicherheit entscheiden kann, ob man in meiner Tabelle [1, Seite 327] die eigenartige Stellung der Pore berücksichtigen muss.

Die Rückengruben sind deutlich. Ihr Vorderrand ist von einem Halbkreis von nach hinten geöffneten kleinen Buchten umgeben.

Auch einige Haare des Notocephale (S-Reihe) sind ungewöhnlich lang. Die Postanalborste auf der Unterseite

des Körpers misst 60 μ und reicht mit etwa zwei Dritteln der Länge über den Hinterrand hinaus. Alle Haare des Körpers sind vollkommen glatt.

Die Larve ist 300 μ lang und 240 μ breit. Ihr Notogaster hat eine Länge von 105 μ, ist also viel kürzer als

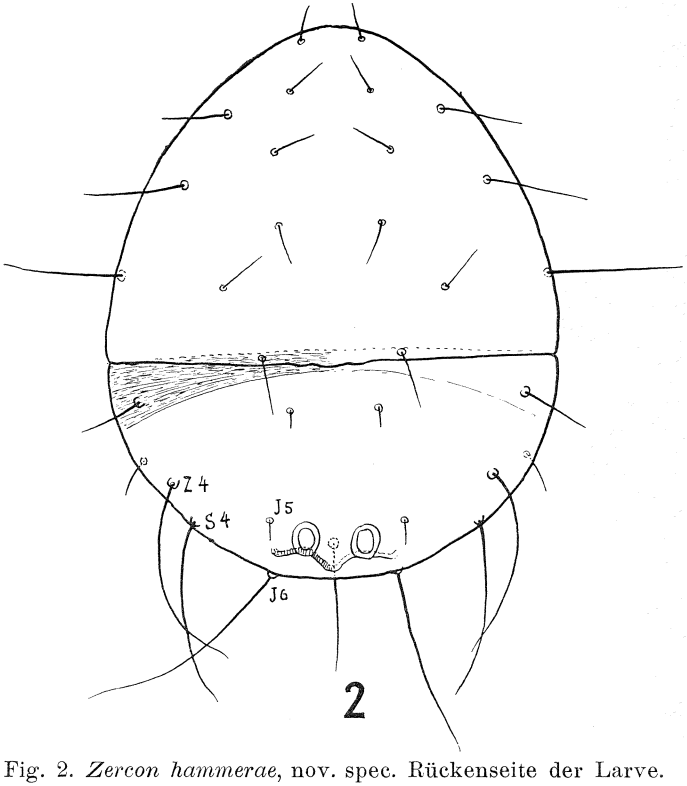


Fig. 2. *Zercon hammerae*, nov. spec. Rückenseite der Larve.

das Notocephale. Zwischen beiden gibt es eine Hautpartie, an den Seiten breiter als in der Mitte, die sehr fein quergerippt ist (Abb. 2). Der Hinterrand des Notocephale ragt in der Mitte etwas über diese weiche Haut hinweg.

Nahe am Hinterrande sehen wir die bei den Zercon-Larven stets vorhandenen 4 Rückengruben in ihrer von den anderen Entwicklungsformen abweichenden Stel-

lung: 2 nebeneinander und dahinter wieder 2 nebeneinander, sodass die vier die Ecken eines Quadrats bilden. In unserem Präparat sind die vorderen als zwei in einiger Entfernung voneinander liegende Chitinringe zu sehen, die hinteren dagegen, da sie mit ihrer Seitenkante zum Beschauer stehen, nur durch einen bogigen Chitinbalken als Vertiefung angedeutet.

Ich kann nicht mit Sicherheit sagen, welche der Borsten von Notocephale und Notogaster, die wir bei Nymphe I finden, bereits bei der Larve vorhanden sind. Bei den 3 grossen Borsten des Notogasters handelt es sich wahrscheinlich um Z 4, S 4 und J 6. Ihre Längen sind auffallend, denn sie sind grösser als bei der Nymphe I. J 6 misst 128 μ, S 4 ist wenig kürzer und Z 4 ebenfalls. Die kleine Borste in Höhe des Vorderrandes der Grubenringe dürfte J 5 sein.

Das Präparat befindet sich in der Sammlung des Zoologischen Museums in Kopenhagen.

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The function of some remarkable crane-fly ovipositors.

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1. Introduction.

The function of typical ovipositors for superficial deposition of eggs, as found in the majority of crane-flies and of the atypical deep-boring ovipositors with shovel-shaped cerci of the subgenus *Vestiplex* Bezzi and of the *Tipula juncea*-group (= subgenus *Odonatisca* Savchenko 1956) were explained in a previous paper (Hemmingsen, 1956, p. 282 seqq.). Briefly, the function of the cerci (upper or tergal valves) of a typical tipulid (fig. 1) is to open the soil by abduction (opening) of the two valves, whereas the function of the hypovalves (= hypogynal, lower, or sternal valves) is to receive and hold the egg which has been thrown out from the genital orifice, to penetrate into the slit created by the opening of the cerci and there to squeeze out the egg into the substrate. In the deep-boring species the soil-opening function of the cerci has been extended. They have become shovel-

shaped, and by alternate abductions and adductions both in the frontal and sagittal planes produce a boring canal in which the eggs are laid. There is no need having any hypovalves to guide the eggs into the soil, and they are accordingly strongly reduced. It is to be expected, on the other hand, that if there were species which (1) laid the eggs on the surface of the substrate or (2) in water, where there would be no need for having the substrate opened, both the cerci and the hypovalves might be re-

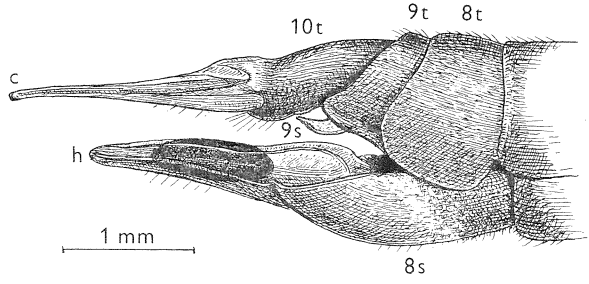


Fig. 1. Ovipositor of *Tipula oleracea* "L. 1758". Cerci slightly lifted. The segment numbers apply to the undoubtedly visible segments. c: cerci; h: hypovalves; s: sternite; t: tergite. Drawn by Mr. H. Bülow-Hansen from preserved specimen. Reproduced from Hemmingsen, 1956, fig. 15 on p. 284.

duced. Perhaps species of the *Tipula fascipennis*-group represent possibility (1); *Tipula saginata,* possibility (2).

We shall in this paper also study some other lines of specialization of ovipositors in tipulids. First we shall study some ovipositors (of *Limoniinae*) which may perhaps represent more original stages; next we shall study representatives of the *T. fascipennis*-group (*T. vernalis* and *T. fascipennis*) and *T. saginata,* in which both the cerci and the hypovalves are reduced; *T. livida* in which not the cerci but the hypovalves are somewhat reduced, possibly representing a stage in the evolution of the deep-boring species; and finally three species of *Cylindrotominae,* in which either the substrate-opening function of

the cerci has been modified into cutting slits in the epidermis of leaves by means of sawing movements (*Cylindrotoma distinctissima*); or, movements reminiscent of these sawing movements, though performed during oviposition, have no substrate-opening function (*Diogma glabrata* and *Phalacrocera replicata*).

Unless otherwise stated the actual mechanism of egg extrusion from the ovipositor was studied under the stereomicroscope by holding the wings of a gravid female fly with the left fingers and placing her ovipositor onto wet cotton (cf. fig. 9). In some cases the process could be started, if necessary, by gently pressing the abdomen with a finger or a pair of pincers.

2. *Limoniinae* with egg-guiding lid.

It was demonstrated (Hemmingsen, 1956, p. 285—286) that in some *Tipula* species a small projection above the genital orifice, supposed to be the reduced 9th sternite (see fig. 1), assists the downward pressure of the base or "stalk" of the cerci in guiding the egg in between the hypovalves, and it was mentioned that in some *Limoniinae* this projection is much longer and constitutes a sort of lid to the "hypovalvular boat" in which the egg is led before being squeezed out by the hypovalves into the soil.

Besides in the species already mentioned in the previous paper I have seen the lid in *Limonia (Dicranomyia) chorea* Meigen, *Limonia (Limonia) tripunctata* Fabr. (fig. 2), *Limonia (Metalimnobia) elegans* Zett. and *L. (M.) quadrinotata* Meig. (cf. Tjeder, 1958, p. 143 and figs. 15—17 on p. 149, where for the latter two species and *L. (M.) quadrimaculata* the lid is called vaginal apodeme).

The actual process was studied in *L. (D.) chorea*. The movements accompanying the ejection of the egg into the hypovalvular boat could be seen, though the egg could not be seen, being hidden in the container formed by the hypovalves and the lid. Thereafter the egg was

squeezed out by the hypovalves as in other tipulids, with cerci opened.

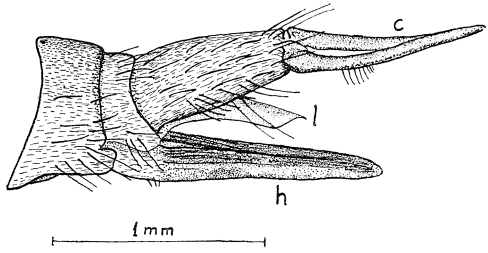


Fig. 2. Ovipositor of *Limonia (Limonia) tripunctata* Fabr. Strødam, beginning of July, 1956. c: cerci; h: hypovalves; l: lid (9th sternite). Drawn by Mr. Kay W. Petersen from the preserved specimen.

In such ovipositors there is no need having the egg pressed into the hypovalvular boat by assistance on the part of the cerci. In the species of *Limonia (Metalimnobia)* above mentioned (and also in *L. (M.) bifasciata* Schrank) the cerci are remarkably short.

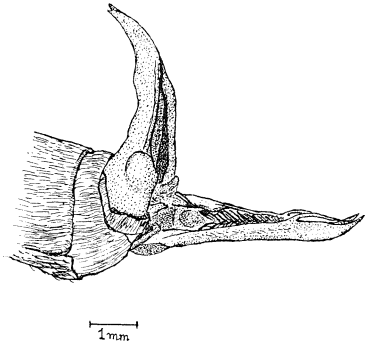


Fig. 3. Ovipositor of *Pedicia (Pedicia) rivosa* L. Strødam, August 1955. The cerci are bent strongly upwards in order to show the hairs at the edge of the "hypovalvular boat". Drawn by Mr. Kay W. Petersen from the preserved specimen.

Some *Limoniinae* have no such lid, e.g. *Epiphragma ocellaris* L., *Limnophila (Elœophila) maculata* Meigen, *Limnophila (Limnophila) punctata* Schrank, and *Pedicia (P.) rivosa* L. But in these four species the upper edge of the hypovalves — at least in part — is provided with hairs which point obliquely inwards-backwards and which — at least in two of these species aided by an inward bending of the edge — con-

stitute a cover, more or less replacing the lid (fig. 3). They are indicated for *Pedicia rivosa* by Grünberg (1910, fig. 64 on p. 60). If one tries to squeeze out the egg, the hairs are seen to hold about it. In all four species the two hypovalves are fused underneath; in the three first mentioned species in the shape of a membrane; in *P. rivosa* along a seam which is visible only below the line of fusion, but not above in the bottom of the "hypovalvular boat".

To the category without lids belongs also *Limnophila (Idioptera) macropteryx* Tjeder (as judged from Tjeder, 1958, p. 133—134, figs. 1—4 on p. 135). According to Tjeder the hypovalves of *L. (I.) macropteryx* are composed of three pairs of "valves". The dorsal pair which on the posterior half of their inner edges have hairs that point obliquely inwards-backwards, correspond to what above was described as an inward bending of the upper edge of the hypovalves. According to Tjeder only the hypovalves form the ovipositor. As, however, in tipulids in general both the cerci and the lid, when present, aid in oviposition, such restriction of the term ovipositor seems unfortunate. It would mean, for instance, that the *Vestiplex* and *Odonatisca* species had no (or rather extremely reduced) ovipositors.

I looked in vain for a lid in one species of *Ptychoptera* and one of *Trichocera*.

3. *Tipula (Lunatipula) vernalis* Meigen.

In this and the following species both the cerci and the hypovalves are reduced (figs. 4—5); and the eggs have a peculiar shape compared with other tipulid eggs (fig. 6). They are black like the eggs of other *Tipulinae*. A rounded edge around the egg divides it into an upper and a lower part. There is a transverse rounded edge on the flatter upper side and a longitudinal rounded keel-like edge on the lower side, the former usually

situated about above the highest point of the latter (up and down defined from the position of eggs in the ovipositor). The micropyle (fig. 6) is on the lower side near

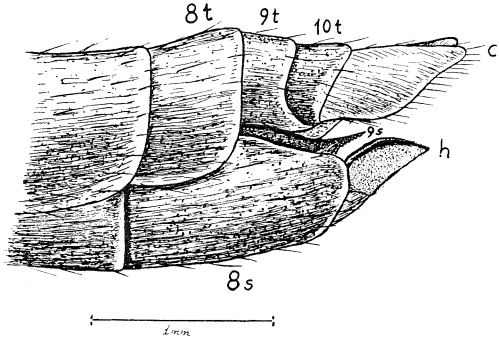


Fig. 4. Ovipositor of *Tipula (Lunatipula) vernalis* Meigen. Collected by the author at Vedersø Klit (dunes), West Jutland, 17—24/VI. 1956. c, cerci; h, hypovalves; s, sternite; t, tergite. Drawn by Mr. O. Dybkjær from the preserved specimen.

the end from which the distance to the transverse keel is shortest (when this distance could at all be ascer-

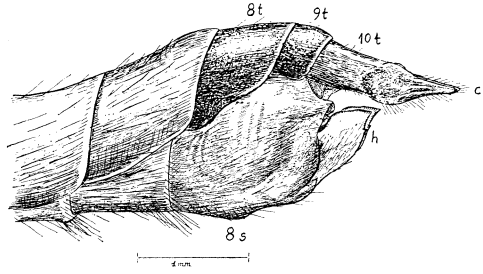


Fig. 5. Ovipositor of *Tipula (Lunatipula) fascipennis* Meigen. c, cerci; h, hypovalves; s, sternite; t, tergite. Drawn by Mr. O. Dybkjær from preserved specimen.

tained to be shorter from one end than from the other). This micropylar end comes out last. Also in an ordinarily shaped tipuline egg the micropyle is on the lower side near the end that comes out last, so that it is easy

to homologize the various parts of these keeled eggs with those of ordinarily shaped tipuline eggs. The peculiar shape apparently makes the eggs in question more resistant to shriveling than tipulid eggs of the ordinary shape,

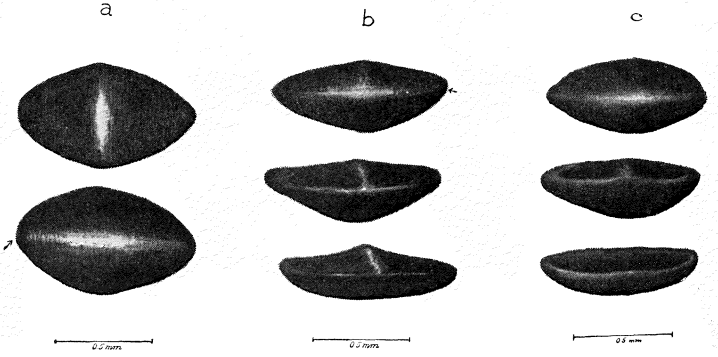


Fig. 6. Eggs of *Tipula (Lunatipula) vernalis* Meigen and *Tipula (Lunatipula) fascipennis* Meigen. Dorsal view: *T. vernalis* in left row (a) above. Ventral view: *T. vernalis* in left row (a) below. Lateral views: *T. vernalis* in middle row (b); *T. fascipennis* in right row (c). The two lower eggs in each of these rows (b and c) are in progressing degrees of desiccation. Arrows point to site of micropyle. Drawn by Mr. O. Dybkjær from preserved eggs.

though as seen in the figure desiccation produces one depression on either side of the transverse (upper) keel and, at least in some *T. vernalis* eggs, two on either side of the longitudinal (lower) keel. In cross section the recently laid egg is approximately triangular, as stated by De Jong (1925, p. 43) for *T. vernalis*.



Fig. 7. Micropylar area of the egg of *Tipula (Lunatipula) vernalis* Meigen. Drawn by Mr. Kay W. Petersen from preserved egg.

The reduction of the ovipositor and an atypical egg shape characterize also other species of the *Tipula fascipennis*-group. Thus, eggs similar in shape to those here described, though with less pronounced transverse and longitudinal keels, so that the shape approaches that of an oblong lens, are found in *T. (L.) mellea* Schummel and *T. (L.) affinis* Schummel. Eggs of a different shape, more rounded

and on one side with a longitudinal depression lined by a wall and reminiscent of the neural groove of a frog embryo, are found in *T.* (*L.*) *truncata* Loew (fig. 8 b), *T.* (*L.*) *trunca* Mannheims and *T.* (*L.*) *caudatula* Loew (fig. 8 c). The micropyle is in the crater-like knob seen at one end of the eggs in the figures. Also the eggs of *T.* (*L.*) *helvola* Loew are of this type (fig. 8 a) though the groove is quite shallow. This species has a reduced ovipositor as in the *T. fascipennis*-group, but does not possess the spines in the

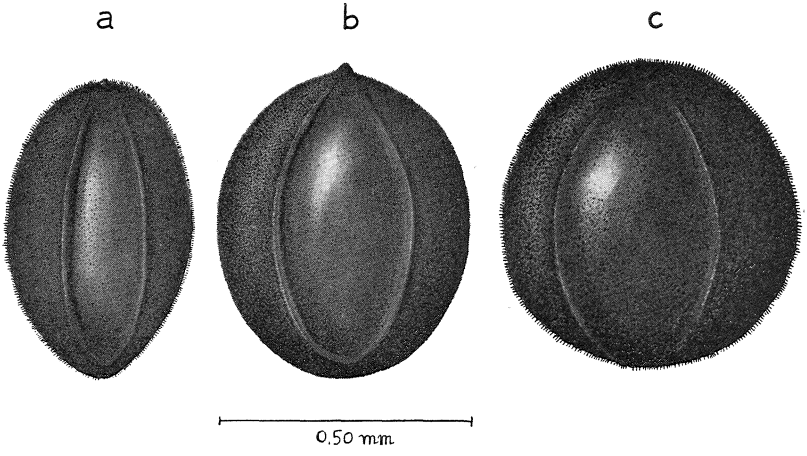


Fig. 8. Eggs of *Tipula* (*Lunatipula*) *helvola* Loew (a), *Tipula* (*Lunatipula*) *truncata* Loew (b), and *Tipula* (*Lunatipula*) *caudatula* Loew (c). As to exaggerated details see text. From preserved flies collected in Greece, June 1952, by Dr. B. Mannheims, Museum Koenig, Bonn, Germany. Drawn by Mr. Kay W. Petersen (a and b) and Mr. Ole Dybkjær (c).

hypopygium characteristic of the group *Spinosae* to which the *T. fascipennis*-group belongs. In fig. 8 the protrusion and distinctness of the wall limiting the groove has been for clearness somewhat exaggerated, especially in a. Furthermore, the closed end of the grove is in many eggs apparently as open (wall-less) as the other end (nearest to the knob). The eggs studied of these non-Danish western-palaearctic species were obtained by dissection of females very kindly presented by Dr. B. Mannheims, Museum Koenig, Bonn.

T. vernalis was very common in a sandy heather (*Calluna vulgaris*) area on Venusberg near Bonn, Germany,

15., 16. and 23. V. and 5. VI. 1953, while only few were seen there 12. VI. 1953. At Vedersø Klit (= dune), West coast of Jutland, it was common on *Salix repens* on the eastern side of the dune ridge about 10.—23. VI. 1956.

When placed in small glasses with sand and with or without small twigs or plants, no pricking in the soil as in ordinary superficially ovipositing species was seen, but the flies shot out the eggs from the ovipositor in all directions so that they came to lie on the sand or on the plants or on the glass wall. The flies thus "ovipositing" were evidently excited: for about 10 seconds restless, then for about 5 seconds completely quiet, then again for about 10 seconds restless, etc. The eggs could be seen in the ovipositor, but whether they were preferably shot out in the restless or in the quiet phase, could not be ascertained. Though this was repeatedly observed in many flies, it is hard to believe that it could be the normal method of oviposition. So female flies were placed in a very large glass container filled up with plant material (earth, dry grass, willow twigs, roots) from the ground below the *Salix repens* bushes. Two of the females penetrated to the bottom, where they behaved like ordinary tipulid females in ovipository mood: probed by inserting the ovipositor down or horizontally in between the material, and also assumed the ordinary tipulid ovipository posture with the abdomen vertical and wings pointing obliquely backwards. But real egg-laying was not seen, nor were any eggs recovered from the sites of probing by pouring saturated $MgSO_4$ over the material and stirring (cf. Hemmingsen, 1952, p. 387).

The actual mechanism of egg extrusion was seen to be as follows. Coming out from the genital opening the egg is brought to rest between the lower and upper valves by a ventrally directed movement of the hypovalves which are somewhat opened to hold it (as in fig. 10). The cerci either do not participate in the movement or

a slight upward movement of cerci plus their stalk (10th tergite) is seen. When lying in the ovipositor a smaller or greater part of the egg may be visible from above between the cerci.

At the directly observed extrusions of the egg from the ovipositor, the cerci were opened (abducted) and at the same time moved upwards; that is, in the opposite direction to the bending downwards of the substrate-opening cerci in the typically built ovipositor. The opening of the cerci in *T. vernalis* might seem to be a "rudimentary soil-opening". Their upward movement presumably takes place merely in order to allow the egg to pass. The eggs are squeezed out of the hypovalves. The 9th rudimentary sternite is rather large relative to the hypovalves (see fig. 4) and no doubt serves to guide the egg into the hypovalves. Whether it also contributes to the final extrusion of the egg is uncertain.

To all appearances, then, the cerci do not function as soil- or substrate-openers and are accordingly reduced and fleshy. Also the comparatively reduced state of the hypovalves and the apparent resistance of the eggs to shrivelling suggest oviposition without much insertion into a substrate. A direct observation of the actual natural oviposition is, however, highly desirable.

4. *Tipula (Lunatipula) fascipennis* Meigen.

The species was extremely common at Strødam, North Zealand, in July 1955 and 1956, but I never succeeded in seeing the actual posture of oviposition in nature or in glasses. It was comparatively easy, however, to witness the mechanism of egg extrusion by holding the ovipositor of a gravid female onto wet cotton (fig. 9), if necessary pressing the abdomen gently. The eggs (fig. 6 c) and their position in the ovipositor have been described under *Tipula vernalis*. *In situ* the egg reaches only the cerci-furcature, nearly as the subanal plate, so that it is

not visible from above as in *T. vernalis*. And its longitudinal axis which is parallel to the sagittal plane of the fly, is not parallel to the frontal plane with which it forms an angle of perhaps about 45°, the caudal end

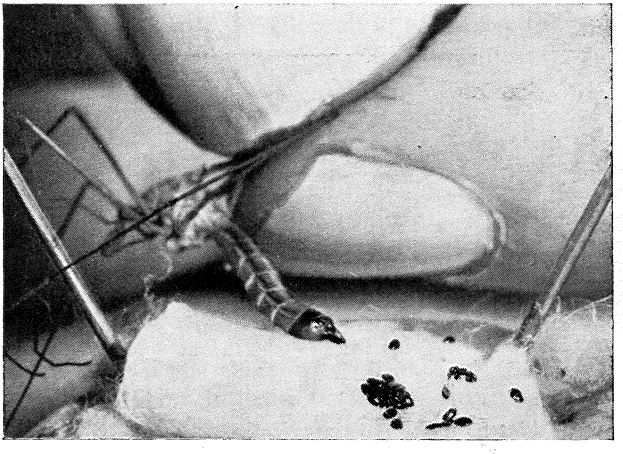


Fig. 9. Studying the mechanism of egg extrusion in *Tipula* (*Lunatipula*) *fascipennis* Meigen by holding the wings between the fingers and placing the ovipositor on wet cotton. Photograph by Mr. A. Nørrevang.

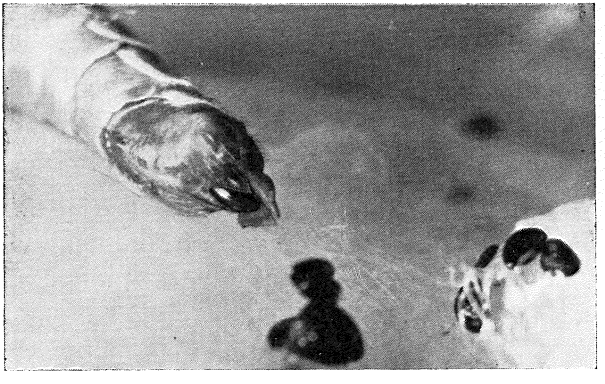


Fig. 10. Ovipositor of *Tipula* (*Lunatipula*) *fascipennis* Meigen seen obliquely from below. The egg is seen between the diverging hypovalves. Photograph by Mr. A. Nørrevang.

pointing upwards. The tip of the rudimentary sternite 9 reaches the transverse keel. From below the egg is distinctly seen between the diverging hypovalves (fig. 10). These also diverge somewhat when there is no egg between them (fig. 5). If cerci, stalk (tergite 10) and the rudimentary sternite 9 are lifted during egg extrusion it is revealed that the egg is squeezed out exclusively by the hypovalves pressing against one another (as in ordinary tipulids). The two cerci do not in any way move relative to one another. But stalk-cerci move a little upwards when the egg is ejected from the genital orifice in between the hypovalves and thereafter a little downwards whereby the egg is aided down between the hypovalves. Also when the egg is squeezed out from the hypovalves the cerci move a little upwards, presumably to create room for the passing egg. By comparison with the process described for *T. vernalis* it will be seen that the opening of the cerci at the extrusion of the egg is not seen in *T. fascipennis* though in other details, for instance the upward movement of cerci, the process of egg extrusion is much the same. Thus, in this species the cerci appear to function still less as soil-openers. And as in *T. vernalis* also the reduced hypovalves and the peculiar type of eggs suggest oviposition without or with little insertion into a substrate. But in both species direct observations in nature appear difficult to attain.

5. *Tipula saginata* Bergroth.

Along the idyllic stony streams which wind through forest and lead away the water from the rocky hills at Skäralid and at Klöva Hallar in Scania, some species of larger tipulids are associated with the water in early summer. Most of them oviposit at the river side but one is always seen ovipositing in the stream proper, on wet moss on rocks protruding from the stream. This is *Tipula saginata* Bergroth of uncertain subgenus. The ovipositor

(fig. 11) reminds by its reduced state of the *T. fascipennis*-group. But the eggs are of such ordinary tipulid shape besides having a particularly well developed terminal filament, that if not by other criteria, as for instance the male hypopygium, it is clear from the eggs even to a non-taxonomist that the species cannot belong to the *T. fascipennis*-group with its peculiar egg shapes. I have seen and caught it 25. V.—14. VI. 1954 and 1956 at Skäralid and Klöva Hallar.

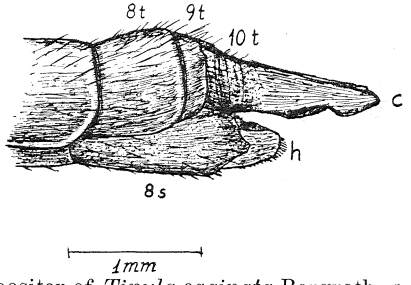


Fig. 11. Ovipositor of *Tipula saginata* Bergroth. c, cerci; h, hypovalves; s, sternite; t, tergite. Drawn by Mr. O. Dybkjær from preserved specimen.

In the early part of its flying period, it may when on wing be confused with *Tipula vittata* Meigen and later with *T. (Acutipula) maxima* Poda. But both these species are seen to oviposit at the beach of the stream or at least in less soaked places preferably not in midstream, whereas *T. saginata* invariably keeps away from the beach proper for oviposition.

A peculiar trait about the *T. saginata* females was that (Skäralid 25. V. 1954) they appeared preferably or sometimes exclusively to fly upstream in search for sites of oviposition. During the whole afternoon now and then a female was seen thus flying upstream, dipping down to the water surface, even where there were minor rapids. When the moss cushion on the side of one of the many protruding stones was hit, she remained there pricking in the moss cushion with the ovipositor.

The actual act of oviposition can be observed through glasses. The flies, unlike certain other tipulids, are not very shy until they discover they are pursued. Then they are very shy and quick. Each ovipository insertion is accompanied by quivering of forelegs and wings, and after each insertion the ovipositor is withdrawn and then thrust backwards-downwards in the air, whereafter the procedure is repeated. The wings are seen to quiver now and then. Judging from the similar behaviour which has been observed at close range in glasses in a number of other superficially ovipositing species (Hemmingsen, 1956, p. 283) the egg might be supposed to be emitted into the ovipositor at this backward movement in the air and to be extruded from the ovipositor at each insertion into the moss. However, in a female of *T. saginata* ovipositing on moss in a glass, the same behaviour was seen but no egg was seen to come out at the backward-downward thrust in the air. Eggs taken from the moss at the site of oviposition could be easily identified, because the chorion of the eggs of this species has a specific microscopic meshy sculpture, reminding of some limoniids and visible as shallow depressions. Besides, I know of no other eggs with terminal filaments which are as large as these.

The mechanism of egg extrusion was studied on wet cotton (cf. fig. 9) by means of a magnifying glass immediately after capture (2 flies at Klöva Hallar 12.—13. VI. 1956; 1, at Skäralid 14. VI. 1956), because flies brought home in glasses like many other species would have laid the eggs during transport. When the egg comes out of the genital orifice the cerci are moved upwards. When in the ovipositor, the egg extends with $^2/_3$ behind the hypovalves which are opened a little to hold about it, while $^1/_3$ extends beyond the ends of the cerci. The egg is laid by being squeezed out of the hypovalves + sternite 9, the cerci being again moved in dorsal direction;

that is, opposite to what is "normal" in most tipulids. They are fused at their base, so there is no question of opening them. If the cerci are held lifted, it is clearly ascertained that they do not participate in the squeezing, while on the other hand their presence is necessary to keep the egg in its position. The egg may be squeezed out a fair distance. The particularly well developed coil of terminal filament comes out first and is fixed by its tip. The large micropyle is near the other end; as usual, at the curved underside of the egg. The part of the coil of filament nearest to the egg is brown, while the distal part is yellowish. If the egg is pulled away from the point of fixation the thread is uncoiled at its egg end, so that the rest of the coil remains at the point of fixation.

The reduced state and function of the ovipositor must be interpreted on the same grounds as for the two preceding species: As the eggs are laid on moss in water, the cerci need not be moved downwards and opened to create in any substrate a passage for the insertion of the hypovalves, and the latter need be only short. The upward movement of the cerci may facilitate for the egg the passage out of the hypovalves.

6. *Tipula (Lunatipula) livida* v. d. Wulp.

A number of females but not so many males of this species were collected in the Bonn area at the end of May 1953 and at Strødam in July 1956 and 1957.

The stalk of the hypovalves is remarkably long and so is the reduced 9th sternite (fig. 12). The hypovalves themselves are reduced so as to consist each of only two tine-like branches, forming a sort of "hay-fork". When in position in the ovipositor, the egg is held between these two forks (fig. 13).

The mechanism of egg extrusion was studied by placing the ovipositor on wet cotton. Segment 8 is rather transparent so that an egg about to be emitted from the

genital orifice can be seen through the cuticle already when in the foremost part of the segment. When it gets out it is pressed down between the two forks by the long

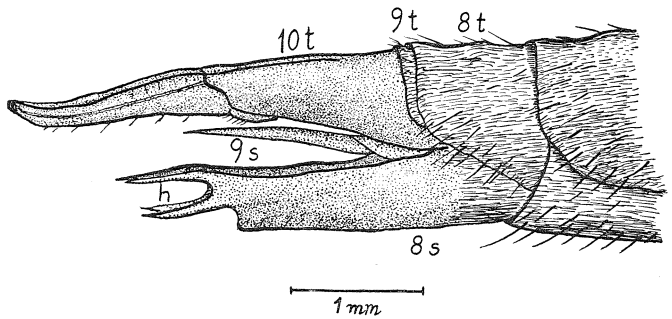


Fig. 12. Ovipositor of *Tipula* (*Lunatipula*) *livida* v. d. Wulp. c, cerci; h, hypovalves; s, sternite; t, tergite. Drawn by Mr. Kay W. Petersen from preserved specimen.

rudimentary sternite 9 and the cerci. Sternite 9 rests on the cephalic, most pointed part of the dorsal, flat side of the egg. The tiny micropyle is on the ventral, most curved side of the egg near its cephalic, most pointed end.

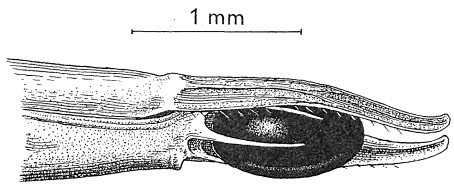


Fig. 13. Ovipositor of *Tipula* (*Lunatipula*) *livida* v. d. Wulp. The fork-like hypovalves hold the egg between them. Drawn by Mr. H. Bülow-Hansen from sketch by the author of dried specimen still holding an egg. Reproduced from Hemmingsen, 1956, fig. 16 on p. 288.

Now, while in most tipulids the egg is squeezed out from its position between the hypovalves by the latter being pressed inwards against one another, such movements, though they can be seen also in this species, are insuf-

ficient. If an ovipositor with the egg in its position between the forks is held free in the air, nothing happens. But when the ovipositor is placed on wet cotton the egg is pushed out of the forks by the cerci in the following way. The cerci are opened (abducted) and bent slightly downward, just as in most tipulids when the egg is extruded. Ordinarily the egg extrusion is brought about by the hypovalves pressing inwards towards one another, while the movements of the cerci do not contribute to this. But in *T. livida* the furcature between the bent abducted cerci presses down in front of the egg and by repeated hindward jerks presses it out of the forks. This was seen in both of the two flies studied. In one of them the posterior half of the stalk (tergite 10) with cerci was removed by a cut. Then, every time an egg came out from the genital orifice I had to help it down between the forks by a slight pressure. And it stayed there in spite of the fact that movements of the remaining part of the stalk (tergite 10) and tergite 9 were made just as before the cut, and even when the ovipositor rested on the cotton. That the egg thus could not be laid in the absence of the furcature constituted by stalk and abducted cerci, was established repeatedly in this fly.

As previously established (Hemmingsen, 1956, p. 285) the egg is squeezed out of an ordinary tipulid ovipositor by the hypovalves also in the absence of the cerci or when they are lifted. Also cinematographic pictures reveal that during the bending and opening of the cerci of such an ovipositor with an egg ready to be extruded, the cerci have not been bent so much as to get before the egg when the latter is shot out, so that there can be no question of a sort of aiding the hypovalves in shooting out the egg by any pushing — even of short duration — in the manner seen in *T. livida*.

Flies of *T. livida* (Bonn area, end of May, 1953) placed in sand in glasses oviposited by thrusting the ovipositor

hard into it, especially in the wet parts, and eggs were seen in the ovipositor before the thrust, and to have disappeared after it. But the actual mechanism was not seen. The eggs recovered afterwards from the soil were covered all over with tiny soil particles difficult to remove, and it seems possible that detachment of the egg from the thread-like hypovalvular forks may be aided by this surface sticking to the soil.

Flies placed on earth (Strødam, July 1957) were seen sometimes to thrust $^1/_3$ of the abdomen into it, and to withdraw hesitatingly presumably when an egg had been laid. Afterwards the tip of the abdomen was thrust backwards as if to sweep soil over the spot, but this was repeated as the fly moved along, so that it may also serve as preparation of a new oviposition site. When placed on glass balls of sand particle size (ballotini nr. 7; cf. Hemmingsen, 1956, with reference to Agarwala, 1951) in narrower glasses (4 cm in diameter) the flies (2 specimens) would often thrust the abdomen down between ballotini and glass wall to depths from a few mm to maximally 8 mm corresponding to $^1/_4$-$^1/_3$ of the abdomen. Even when then the thrust was made further away from the glass the ovipositor would sometimes reach the glass wall. And in this light transparent substrate the process could be distinctly observed. The cerci were continuously opened and closed during the thrusts, the egg remaining all the time between the hypovalvular forks. It seemed to be difficult for the fly to get rid of the egg, but several times an egg was seen to be pushed out by the cerci in the manner observed on cotton. It thus seems that also during the actual oviposition of *T. livida* in soil the egg is pushed out in the way observed on cotton. The ovipositions were preferably performed towards the evening or in the dark.

Both in structural and in functional respects the oviposition of *T. livida* may be said to be intermediary be-

tween (1) the typical superficial oviposition of most tipulids and (2) the deep-boring oviposition in the *Vestiplex* species and the *T. juncea*-group. The cerci are more shovel-shaped than in the former (1) but less so than in the latter (2). The ovipository diggings performed by them are deeper than in the former (1) but not so deep as in the latter (2). The hypovalves are so much reduced relative to the typical ovipositors that, unlike these, they are unable to squeeze out the egg by their own effort. But though they are reduced into forks with tine-like branches they are not so much reduced as in the deep-boring species, and they are still large enough to hold the egg between them.

In several *Vestiplex* species each hypovalve still retains the shape of a tine, in *T. (V.) pallidicosta* Pierre even with a lobe representing the base of a missing second tine, thus being the most *T. livida*-like of them (cf. Mannheims, 1953, fig. 70 on p. 122).

This does not, however, mean necessarily that the *T. livida*-oviposition in all its details actually represents a stage in the evolution of the present-day deep-boring species. These have been thought to show affinities to the subgenus *Oreomyza* rather than to *Lunatipula*. Still Savchenko (1956, p. 130) finds that the *T. juncea*-group (subgenus *Odonatisca* Savchenko) shows special affinities to *Arctotipula* and *Yamatotipula*, and Theowald (1957, p. 296, 302—303) actually suggests close affinities between *Vestiplex*, the *T. juncea*-group, and the *T. livida*-group (and other *Lunatipula* groups).

In another species of the *T. livida*-group, *Tipula* (*Lunatipula*) *lesnei* Pierre 1921, one of the branches of the hypovalvular fork has an extra small branch, and its ovipository mechanism is very much like that of *T. livida* (Hemmingsen, 1958, p. 223 with fig. 10).

In *T.* (*L.*) *circumdata* Siebke 1863 (fig. 14), also of the *T. livida*-group, there is only a slight incision near the end of the hypovalves though they possess ribs that appear likely to correspond to the hypovalvular tines of *T. livida*. In other species of the group the end of the hypovalves is divided into three short tines, shorter in *T.* (*L.*) *urania* Mannheims 1954 and *T.* (*L.*) *erato* Mannheims 1954 from Greece, than in *T.* (*L.*) *bimaculata* Riedel 1913 (cf. Mannheims, 1954, p. 178—179).

7. *Cylindrotoma distinctissima* Meigen.

Flies of this species were caught at Klöva Hallar, Scania, and at Strødam in June 1954, and at Gurre Aa, Langesø Plantage, North Zealand, 22. VIII. 55.

The oviposition was observed on leaves of *Caltha palustris* placed in glasses. The fly placed herself on the upper side of the leaf and by turning the abdomen 180° about its longitudinal axis managed to place the toothed upper side of the cerci against the underside of the leaf near its edge. The forked dorsal appendage, which this species possesses proximally to the cerci, was placed on the upper side of the leaf edge, which was thus pressed between the cerci and the fork. By a special arrangement the process could be observed from below. The cerci, which were kept closely to one another, were then seen to move alternately parallel to one another cutting a slit in the leaf epidermis, the tip of the abdomen thereby moving a little from side to side. The teeth of both edges of the cerci point forwards in the basal half, backwards in the distal half of the cerci, so that each saw operates in either direction. In some cases the cerci were seen to be opened a little before the ovipositor was removed so that the egg could be seen. The egg was covered with a sticky fluid when the ovipositor was withdrawn, and the slit in the leaf epidermis closed. As long as it is moist the egg can easily be removed by bending the edges of the leaf epidermis. There was no attachment as in *Diogma* and *Phalacrocera*. After the slit has become drier the egg gets easily crushed when one tries to remove it, the covering edges of the epidermis sticking to it.

The cutting parallel movements of the cerci are also seen during copulation.

The oviposition of the American *Cylindrotoma splendens* Doane (from Vancouver Island, British Columbia) has been described by Cameron (1918) and that of *C.*

distinctissima Meig. (from Germany) by Lenz (1921) and Peus (1952).

None of these authors have described the alternate parallel movements of the cerci. Cameron (1918, p. 73) writes that "the blades are then moved to and fro". Lenz (1921, p. 131) and Peus (1952, p. 43) believed that the edges of the cerci by being kept narrowly together constituted one single saw.

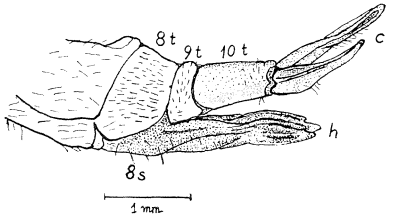


Fig. 14. Ovipositor of *Tipula* (*Lunatipula*) *circumdata* Siebke. c, cerci; h, hypovalves; s, sternite; t, tergite. Specimen collected by the author at Schwarzensee, Sölktal, Steiermark (Styria), 28. VIII. 1953. Drawn by Mr. Kjay W. Petersen from preserved specimen.

8. ***Diogma glabrata* Meigen.**

This species was caught at Gurre Aa, Langesø Plantage 28. VIII. 55 and at Strødam 20-21. VII. 57. Female flies were placed in glasses with the moss *Rhytidium squarrosum*. The ovipository behaviour started with the vertically held abdomen being moved forwards in jerks without movements of the cerci. The ovipositor, which was turned backwards, that is in dorsal direction relative to the abdomen more or less perpendicular to the latter, was placed under a leaf so that the upper side of the cerci faced the underside of the leaf. Then the cerci were moved rapidly alternately and parallel to one another. Shortly afterwards the cerci were removed a little from the hypovalves, between which the egg appeared, the cerci moving all the time in the way described. Though the moving cerci rested against the leaf, the egg did not come out between them but be-

hind them. They appeared to hold on to the egg end a little before being withdrawn. The egg was wet and remained on the underside of the leaf. When an egg was torn from the leaf a thready or meshy substance was seen on the egg, where it had stuck, but nothing like the club-like structures found in the *Phalacrocera* eggs (Hemmingsen, 1952, p. 407—408). Already in eggs removed from the fly by dissection a special area is seen on the flat side of the eggs just where at oviposition the egg is to be attached to the leaf. So just as in *Phalacrocera* the attachment of the egg is confined to an area of the egg which has a special structure. The difference in specialization of this area may be correlated with the fact that *D. glabrata* oviposits in air where the evaporation of a sticky fluid may perhaps aid in the attachment, whereas *Ph. replicata* oviposits in water where further attaching structures may be required and are in fact present.

Between the actual ovipositions the flies move about jerkwise between the plants, and it was far from every time when the ovipositor was placed below a leaf that an egg was laid.

The alternate parallel movements of the cerci are also seen during copulation as in *Cylindrotoma distinctissima*.

9. *Phalacrocera replicata* L.

Certain details in the oviposition of this species have already been published (Hemmingsen, 1952, p. 404—408). With a special view to studying the cerci during copulation and oviposition, 25 larvae were collected 4. IV. 1958 in the same locality, Gribsø, North Zealand, and copulation and oviposition studied in the emerged flies in glasses. As ascertained in several flies the cerci did not move during copulation as in *Cylindrotoma* and *Diogma*. But at oviposition the cerci are moved in the same

way as in these species, both when the flies walked about and oviposited in the submerged moss, and when their ovipositors were placed in wet cotton; that is, alternately and parallel to one another with quick movements. The upper edges of the cerci are placed where the egg is going to be attached, and the egg is squeezed out of the lower valves in an obliquely backward-upward direction, whereby the cerci are opened (presumably by mere pressure) when the egg passes between them. Under the stereomicroscope the pale, sticky area by means of which the egg is attached (cf. 1952, fig. 6 on p. 408) is distinctly visible on the upper side of the egg when it comes out. When the cerci are lifted or removed by cutting, the hypovalves work in exactly the same way as else; occasionally also in the intact fly in the absence of the movements of the cerci. In other words, the alternate parallel movements of the cerci do not serve to assist in the extrusion of the eggs, but may perhaps serve in probing for a site for the eggs.

In all three species of *Cylindrotominae* studied the dorsal edges of the cerci are placed where the egg is going to be attached and it comes out in upward direction between or behind the cerci. The movements of the cerci at oviposition are alike in the three species and no doubt of a similar nature genetically, even though they are present at copulation only in two of the species. Whether in *Diogma* and *Phalacrocera* these movements represent an evolution (preadaptation) toward leaf-cutting or the later stages in a reduction, is difficult to decide.

The same applies to the fact that in *Phalacrocera* the upper edges of the cerci possess rudimentary teeth though the eggs are fixed to the surface of the leaves by a special area, and that there is a short unforked process at the site corresponding to the dorsal fork in *Cylindrotoma*. Thienemann (1919) and Lenz (1921, p. 134—135) are inclined to consider *Diogma, Triogma* and *Phalacrocera*

as descendents of *Cylindrotoma*. Alexander (1927, p, 6) is of the opinion that *Diogma* (by him called *Liogma*) and *Triogma* have been derived from an ancestor that was very close to our recent *Cylindrotoma*, and that *Phalacrocera* came off the main stem before or almost coincidently with *Cylindrotoma*. Peus (1952, p. 58) cannot accept the highly specialized *Cylindrotoma* as the more original form, because the direction of evolution among *Tipuliformia* is from moister to drier biotopes; and he is inclined to think that the genera of *Cylindrotominae* have evolved quite independently of one another.

10. Summary.

In some *Limoniinae* sternite 9 is not so much reduced as in most tipulines and functions as a lid to the "boat" constituted by the two hypovalves, between which the egg rests when in the ovipositor. The egg thus gets from the genital opening into this closed chamber without any aid from the cerci or their stalk and without being directly visible from the outside. It is not visible until it has been squeezed out of the ovipositor by the hypovalves.

In other *Limoniinae* the lid in question is absent, but is replaced, so to speak, by inward-backward directed hairs at the upper edge of the hypovalves, which are in addition fused below.

The mechanisms of egg extrusion from the reduced and rather uniform ovipositors of *Tipula* (*Lunatipula*) *vernalis* Meigen, *T.* (*L.*) *fascipennis* Meigen and *T. saginata* Bergroth were found to be much alike. The cerci are bent upward not only at the emission of the egg from the genital opening into the ovipositor but also at the extrusion of the egg from the ovipositor (accompanied by a rudimentary opening (abduction) in *T. vernalis*). In both these phases the upward movement of the cerci seems to be made to better permit the egg to pass. The upward movement at the extrusion of the egg from the ovipositor is the opposite of the downward bending accompanied by opening (abduction) which opens a slit for the egg in the substrate, seen in most tipulids.

In *T. saginata* this reduction in structure and function of the ovipositor is ascribed to the oviposition on moss in running water, where there is no need for any substrate to be opened by the cerci and no need for well-developed hypovalves to insert the egg into it. It is an obvious guess then that the similarly built and functioning reduced ovipositors of *T. vernalis* and *T. fascipennis* are

also adapted to oviposition without much insertion into a substrate, but decisive observations of the actual ovipositions under natural conditions are lacking.

In *Tipula* (*Lunatipula*) *livida* v. d. Wulp and *T.* (*L.*) *lesnei* Pierre the downward bent and opened cerci push out the egg from the forks (reduced tine-like hypovalves) which hold it; that is, in contrast to the function of ordinary tipulid ovipositors, the cerci and not the hypovalves are active in the egg extrusion. This mechanism functions also under natural conditions (more or less deep-boring ovipositions).

The method of oviposition in *T. livida* and *T. lesnei* is considered intermediate between superficial and deep-boring ovipositions both as regards the development of the cerci and their digging, and as regards the partial reduction of the hypovalves into forks.

In *Cylindrotoma distinctissima* Meig. the upper toothed edges of the cerci cut a slit in the epidermis of a leaf by alternate parallel sawing movements. These movements are also seen during the oviposition of *Diogma glabrata* Meig. and *Phalacrocera replicata* L. though the sawing teeth are rudimentary or absent and the eggs are fixed onto the leaf surface by a specially developed sticky area on the upper egg surface. In *C. distinctissima* and *D. glabrata,* but not in *Ph. replicata*, the movements in question are seen also during copulation.

The leaf-cutting function of the cerci in *Cylindrotoma distinctissima* is thought to be, at least formally, a modification of the substrate-opening function of the cerci in typical tipulids. Whether the corresponding movements in *Diogma glabrata* and *Phalacrocera replicata*, where they have no substrate-opening (though, as it seems, a substrate-probing or -finding) function, represent the beginning of an evolution or the later stages in a reduction of an original leaf-cutting, is difficult to decide.

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11. Acknowledgements.

I wish to express my sincere gratitude to Dr. B. Mannheims, Museum Koenig, Bonn, Germany, for some specimens and some determinations of *Tipulinae*, to Chief Librarian Peder Nielsen, Silkeborg, for the determination of the *Limoniinae*, to Mr. Ole Dybkjær, Mr. Birger Jensen, Mr. Arne Nørrevang and Mr. Kay W. Petersen for assistance in collecting and in producing drawings and photographs, to Dr. G. W. Byers, University of

Kansas, Lawrence, Kansas, Dr. S. L. Tuxen, Zoological Museum, Copenhagen, and Mr. Birger Jensen, for going through the manuscript, and to the Carlsberg Foundation, the Danish State Research Foundation, and the Nordisk (Scandinavian) Insulin Foundation for financial support.

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Denne Bog er i Virkeligheden en Slags Lærebog bygget over de forhaandenværende zoologiske Haandbøger, der jo er Opslagsværker og ikke direkte til at lære. Det betones paa Titelbladets Bagside, at den er autoriseret som Lærebog ved Universiteter og "Højskoler" i Øst-Tyskland. Det vil jo altid bero paa et Skøn, hvor meget man synes, Studenterne "bør vide"; men hvis de tyske zoologiske Studenter kan denne Bog til Examen, saa har de et solidt Grundlag — Anm. vil mene solidere end nødvendigt. Det er godt at have Viden; men det er nyttigere at kunne slaa op, og paa det Punkt svigter Lærebogen; forsaavidt som den ingen Litteraturhenvisninger giver i Teksten, og blot efter hvert Afsnit en ret spartansk Litteraturliste efter Stikord og uden fulde Titler. Man vilde ofte gerne vide: hvor har Du det fra? Men man maa altsaa som Student bygge paa Autoriteten.

En Mængde værdifulde Oplysninger er samlet i Bogen; Lærebogsprincippet gør ganske vist, at Siderne er en urolig Blanding af almindelige Typer og Petit (som Studenten vel kan gaa lettere henover); men tilsammen er en meget stor Viden ført op til den allersidste Tid. Som særlig instruktivt bør maaske Afsnittet om Facetøjet i Indledningen til Lief. 4, Indledningen til samtlige Mandibulata, fremhæves, hvor der er gjort meget fint Rede for baade Øjets Morfologi og Grænserne for dets Anvendelighed. Men talrige andre Afsnit kunde nævnes. At Bogen som Lærebog betragtet er omfattende, vil fremgaa af, at Cheliceraterne fylder 183 Sider, Krebsdyrene 320. Figurerne er desværre ofte omtegnede (hvad der er en Uskik) og det i den af Weber saa yndede Stil med meget sort i; de forekommer mig ikke altid lige anskuelige, og hvor jeg har sammenlignet med Originalfiguren, finder jeg faktisk denne bedre, saaledes f. Ex. Trombicula-Larven p. 626. Men alt i alt er Bogen et værdifuldt Supplement til de almindelige zoologiske Lærebøger, en Slags moderniseret og stærkt udvidet Claus-Grobben, som den, der specialiserer sig, absolut bør gøre sig fortrolig med. Og saa er den utroligt billig.

S. L. Tuxen

Synonymy and lectotype selection for two Fabricius species of *Eurytoma* (Hym., Eurytomidae)

by M. F. Claridge[1])
(Hope Department of Entomology, University Museum, Oxford, England).

In all groups of parasitic Hymenoptera it is essential that the identities of the species described by early authors be established and lectotypes for them be selected. Only in this way can stability of nomenclature be attained. It is often difficult to investigate old collections, but Mr. Børge Petersen, Zoologisk Museum, Copenhagen, has very kindly helped me to investigate two badly known Fabricius species for long thought to belong to the family *Eurytomidae*. I should like to thank Mr. Petersen here for his great help.

Eurytoma verticillata (Fabricius)

1798 *Ichneumon verticillatus* Fabricius, Suppl. Ent. Syst.: 232.
1848 *Eurytoma costata* Ratzeburg, Ichn. Forst., 2 : 177.
1878 *Eurytoma appendigaster* Mayr (nec Swederus), Verh. zool.-bot. Ges. Wien, 28 : 320—321.

In a previous paper (1959) I had erected *Eurytoma costata* Ratz. as the valid name for *E. appendigaster* Mayr. (nec Swed.). After completing the manuscript I found that *Ichneumon verticillatus* F. was synonymous with *E. costata* and mentioned the synonymy in a footnote (p. 2).

Mr. Petersen has informed me (in litt., 1958) that there are two conspecific males of a *Eurytoma* standing as *verticillatus* in the Fabricius collection in Kiel, at present in the Zoologisk Museum, Copenhagen. One of these he lent me for examination. It is mounted on a long pin which carries a handwritten label — "verticillata". That specimen I here designate as lectotype.

[1]) Present address: Department of Zoology, University College, Cardiff.

***Eurytoma serratulae* (Fabricius) comb. nov.**

1798 *Cynips serratulae* Fabricius, Suppl. Ent. Syst.: 214.
1878 *Eurytoma tristis* Mayr, Verh. zool.-bot. Ges. Wien, 28: 312—313, syn. nov.

Cynips serratulae was described from material in the Bosc collection which is now housed in the Museum National d'Histoire Naturelle, Paris. Dr. J. R. Steffan and Mr. H. von Rosen have both very kindly searched the collections in Paris and have found only a true Cynipid standing as *serratulae*. However, Mr. Petersen tells me (in litt., 1958) that there are two specimens in the Kiel collection of Fabricius, now in Copenhagen, one a true Cynipid and the other a male *Eurytoma*. The *Eurytoma* bears a label "serratulae "in the original handwriting of Fabricius, according to Mr. Petersen, who has compared it with some of my named specimens of *E. tristis* and considers them conspecific.

In describing *C. serratulae,* Fabricius (1798 : 214) gave an important biological note — "Habitat in Galla lignea, rotundata, utrinque attenuata, polythalama caulis Serratulae arvensis - - -". *Serratula arvensis* is what is now known as *Cirsium arvense* (L.) Scop. and the description of the galls leaves little doubt that they were caused by *Urophora cardui* (L.) (Diptera, Trypetidae). *E. tristis* is a common and probably specific parasite of *U. cardui.* Thus I consider that the biological information makes it certain that *C. serratulae* is synonymous with *E. tristis* and I designate the specimen in Copenhagen as lectotype.

Fabricius (loc. cit.) mentions a variety of *C. serratulae.* It is possible that the Cynipids standing under the same label in both Copenhagen and Paris represent this supposed variety.

References.

Claridge, M. F., 1959, The identity of *Eurytoma appendigaster* (Swederus, 1795) (Hym., Eurytomidae), together with descriptions of some closely allied species bred from Gramineae. Ent. mon. Mag., 95 : 2—13.

Fabricius, J. C., 1798, Supplementum Entomologiae Systematicae. Hafniae.

Three New Subspecies of Aphids from Iceland (Hem., Hom.).

By
H. L. G. Stroyan
Plant Pathology Laboratory, Harpenden, England.

1. *Hyperomyzus boerneri* Prevost, ssp. *thorsteinni* ssp. n.

The name *boerneri* has recently been given by Prevost (1959) to a species of *Hyperomyzus* Börner living on *Euphrasia* species without host alternation. Börner (1952) gave the name *euphrasiae* Walker to this species, but erroneously. Miss Prevost's account of the species is based on material collected in Austria and Switzerland. A recent collection of aphids made in Iceland includes samples close to *H. boerneri* taken on *Euphrasia frigida* in two localities. By good fortune comparable material of apterous viviparae and sexual morphs is available. It appears from this that the Icelandic population is distinct from the continental European form, at least at the subspecific level, although further investigation is certainly desirable. The following account is based on morphological comparison of Icelandic aphids with the type material, kindly made available by Mr. J. P. Doncaster of the British Museum (Natural History) and Miss C. A. Prevost.

I have pleasure in naming the subspecies after Mr. Thorsteinn Bernhardsson of Reykjavík, whose kindness in helping my colleague Mr. Prior to smooth out administrative details contributed greatly to the success of his stay in Iceland.

Apt. viv. ♀.

Similar to *H. boerneri* Prev. s. str., except as follows: Mean body length somewhat smaller, ranging from 1.49 mm. to 2.00 mm. (1.83 to 2.14 mm. in type material of

boerneri). Antennal flagellum (i. e. joints III—VI inclusive) always shorter than body, with processus terminalis 4.04 to 5.83 times as long as basal part of joint VI (6.21 to 7.33 times base of VI in types of *boerneri*); joint III with 21—37 secondary rhinaria arranged in 1—3 irregular rows all along the joint, and joint IV with 0—7 secondary rhinaria (comparable figures for *boerneri* s. str. are 11—25 on III and none on IV). Apical segment of rostrum[1]) 1.09 to 1.20 times as long as second segment of hind tarsus[2]) (1.24 to 1.35 times as long in *boerneri* s. str.). Dorsal body hairs on mid-abdominal segments very short, those on the third tergite maximally from 8 μ to 12 μ long (16 μ to 25 μ in *boerneri* s. str.).

Alate ♂.

Similar to males of *boerneri* s. str., but smaller than the two available specimens of the latter, 1.49 mm. to 1.63 mm. long. Processus terminalis 5.15 to 6.80 times as long as basal part of joint VI of antenna (8.00 to 8.13 times as long in *boerneri* s. str.). Apical segment of rostrum 0.98 to 1.19 times as long as second segment of hind tarsus (1.27 to 1.36 times as long in *boerneri* s. str.). Rhinarial numbers on joints III to V inclusive smaller than in type material of *boerneri,* but this is probably a size effect and not of taxonomic significance.

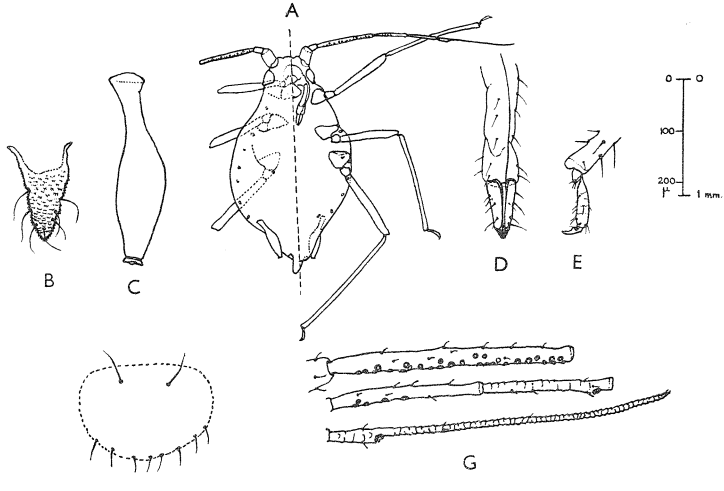
Oviparous ♀.

The single specimen available differs from oviparae of *boerneri* s. str. in the same way as the viviparous apterae. The processus terminalis is shorter relative to base of antennal joint VI (3.70 to 3.92 times as long, against 4.46 to 6.21 times as long in typical oviparae of *boerneri* s. str.); antennal joint III bears more rhinaria (18—19, as against 9—15 in *boerneri* s. str.), and joint IV bears 2—3 rhinaria, which are always absent in *boerneri* s. str.

[1]) Measured from insertion of retractor apodemes to apex.
[2]) Measured without claws and their articular sclerites.

Biology.

From the occurrence of oviparae on *Euphrasia frigida* it appears that the entire life cycle is passed on this host, as is the case in *boerneri* s. str. on *Euphrasia* species in Europe. The Icelandic host plant was identified by Mr. Geir Gígja.



Text figure 1. *Hyperomyzus boerneri* Prevost, ssp. *thorsteinni* ssp. n. A, apt. viv. ♀ (holotype); projector drawing from cleared and mounted specimen, to right-hand scale. B, detail of cauda; C, detail of siphunculus; D, detail of apical rostral segments; E, detail of hind tarsus; F, detail of subgenital plate chaetotaxy; G, detail of antenna; B—G all to left-hand scale.

Taxonomic discussion.

The status of the Icelandic form of *H. boerneri* is considered to be not more than subspecific. This opinion is based partly on the fact that *boerneri* and *thorsteinni* are apparently allopatric vicariant forms having the same biology, and partly on the fact that the characters in which they differ are already known, in a number of other cases, to differ in the same way between pairs of aphid taxa in which one is more boreal in distribution

than the other. The present instance might be held to be exactly parallel with that of *Nasonovia compositellae* (Theob.) and *N. nigra* (H. R. L.), were it not that in the latter the two forms overlap spatially in the British Isles, but are there still isolated from one another by apparent differences in the method by which they overwinter; it has proved so far impossible to rear sexual forms from British strains of *N. nigra,* even under the same conditions in which *N. compositellae* becomes entirely sexual. Therefore for the moment these two species are given full rank, though it must be suspected that the division between them is fundamentally no different from that between *Hyperomyzus boerneri* and its subspecies *thorsteinni.*

Type material.

Holotype, apterous viviparous female from *Euphrasia frigida,* Selfoss, Iceland, 5. viii. 1958 (R. N. B. Prior leg.); paratypes and morphotypes, seven apt. viv. females, five alate males and one oviparous female, same data. Additional material, one apterous viviparous female and larvae, near Reynivellir, Hvalfjörður, Iceland, 25. vii. 1958 (R. N. B. Prior leg.). The holotype is deposited in the Zoological Museum, Copenhagen. Paratypes and/or morphotypes are in the British Museum (Natural History) and in the author's collection.

Biometric data.

For measurements of specimens of *H. boerneri thorsteinni,* see Table I.

2. ***Schizaphis geijskesi*** **Hille Ris Lambers, ssp. *priori* ssp. n.**

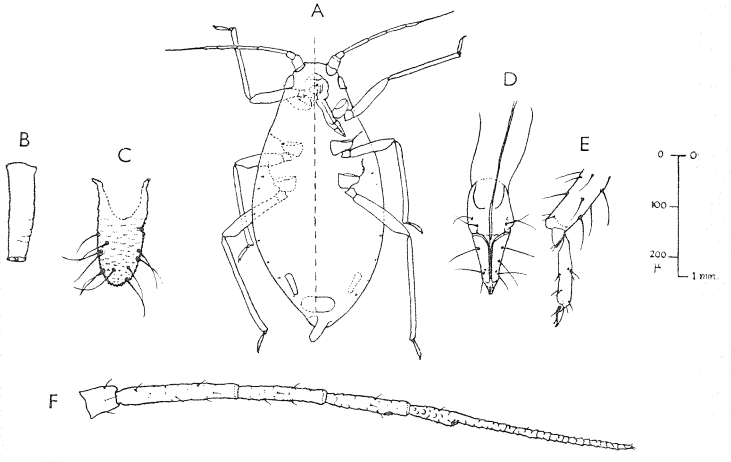
Schizaphis geijskesi was first described by Hille Ris Lambers (1939) from *Ammophila arenaria,* and a key was given in which western European species of *Schizaphis* Börner were separated. Later, the same author (1947)

Table I: Biometric data for *Hyperomyzus boerneri* Prev., ssp. *thorsteinni* ssp. n.

Morph	Body length	Ant. flag.	Joint ratios (III—VI incl.) of antennal flagellum	Siph.	Cauda	Cdl. hrs.	Ap. rost. segment		2nd seg. hd. tars.	Secondary rhinarial no.			Hair length maxima		
							Length	Sec. hrs.		III	IV	V	III	3T	8T
Apt. v. ♀	1.74	1.65	110:62:50:23+125	0.36	0.17	7	0.109	8	0.092	33/30	7/7	0/0	17	12	32
„	1.49	1.44	90:49:50:26+107	0.29	0.14	6	0.108	6	0.090	22/25	2/3	0/0	19	8	28
„	1.87	1.76	108:67:59:27+133	0.37	0.18	7	0.117	7	0.105	37/32	5/5	0/0	20	12	36
„	2.00	1.91	120:78:60:27+143	0.39	0.19	7	0.122	8	0.104	29/28	5/4	0/0	17	10	?
„	1.88	1.74	100:66:60:24+140	0.37	0.19	6	0.116	9	0.104	24/23	6/7	0/0	16	10	32
Ovip. ♀	1.56	1.39	83:52:48:26+102	0.31	0.14	6	0.106	7	0.088	19/18	3/2	0/0	16	9	36
Al. ♂	1.61	1.82	108:60:56:27+157	0.28	0.13	7	0.100	7	0.102	34/32	13/12	4/5	18	13	40
„	1.63	1.84	118:61:55:26+152	0.29	0.13	7	0.105	7	0.099	29/36	10/11	5/6	16	12	40
„	1.55	1.70	107:54:53:27+139	0.28	0.12	6	0.107	7	0.100	30/32	9/9	5/5	19	15	36
„	1.49	1.48	92:47:40:20+132	0.26	0.10	6	0.095	7	0.087	31/34	9/10	4/3	16	13	36
„	1.56	1.55	99:49:44:20+136	0.26	0.12	6	0.101	5	0.085	35/36	13/10	6/5	16	10	38

Nos. 1—4 and 6—11 from Selfoss, 5. viii. 58; No. 5 from Hvalfjörður, 25. vii. 58. No. 3 is the holotype.
All length measurements are in millimetres, except hair length maxima which are in microns.
III = Third antennal joint. 3T = Third abdominal tergite. 8T = Eighth abdominal tergite.

extended his treatment of the genus, but without adding to his account of *geijskesi.* Eastop (1956) gave a key to British species, and added a note on *geijskesi* in which he wrote "This species is easily recognised by the long ultimate rostral segment". The data given in the key show that the ultimate rostral segment of the apterae varies from 1.10 to 1.33 times as long as the second



Text figure 2. *Schizaphis geijskesi* H. R. L., ssp. *priori* ssp. n. A, apt. viv. ♀ (holotype); projector drawing from cleared and mounted specimen, to right-hand scale. B, detail of siphunculus; C, detail of cauda; D, detail of apical rostral segments; E, detail of hind tarsus; F, detail of antenna; B—F all to left-hand scale.

segment of the hind tarsus. The host is quoted as *Ammophila (Elymus) arenarius* (L.) Link, a statement which overlooks the fact that *Ammophila (Psamma)* and *Elymus* are different genera, each with a species *arenarius* or *arenaria,* and that both species of grass, the marram and the sea lyme grass, are hosts of *S. geijskesi.*

A sample of *Schizaphis* collected in Iceland in 1958 from *Elymus arenarius* was at first identified on the general facies as *S. geijskesi,* until a closer examination revealed that it fell out under the wrong half of Eastop's

key (1956). This is because all the material available has the apical rostral segment distinctly shorter than the second segment of the hind tarsus. Closer examination, and comparison with samples of *geijskesi* from various localities and from both *Ammophila* and *Elymus,* revealed that this short rostral segment was an idiosyncrasy of the Iceland sample alone, and that two other slight differences from typical *geijskesi* could be detected. Icelandic aphids have the antennae slightly longer relative to the body, there is a greater tendency towards the expression of alatiform characters (typified by such features as rudimentary lateral ocelli, secondary rhinaria on joint III and deeper pigmentation) and the body is a little broader relative to its length than in specimens of *S. geijskesi* s. str. On the basis of these differences, which are more fully tabulated below, I think it is justifiable to regard the Icelandic material as belonging to a distinct subspecies, which I have much pleasure in naming after my colleague Mr. R. N. B. Prior, whose enthusiasm in the collection of Icelandic aphids has materially increased our knowledge of the country's fauna.

Apt. viv. ♀

Characters as in *S. geijskesi* s. str., except as follows: There is, as in *S. geijskesi* s. str., a tendency to the production of intermediate or alatiform apterae, in which the antennae bear a few secondary rhinaria. In *priori,* however, the tendency is rather stronger than in the typical subspecies, joint III bearing up to 5 secondary rhinaria, and joint IV occasionally having one, while in my material of typical *geijskesi* joint III bears 0—2 only, and joint IV is apparently always without rhinaria; this character may be liable to breakdown when more material is examined, but is based on examination of specimens from six different collections of *geijskesi* s. str. Irrespective of alatiformity as measured by the presence of rhinaria, the antennae of *priori* are also longer rela-

tive to the length of the body than those of *geijskesi* s. str. The value of the ratio Body length/Antennal flagellum for normal summer apterae ranges from 2.18 to 2.52 (mean 2.30) in *priori,* and from 2.76 to 3.12 (mean 2.96) in *geijskesi* s. str. Comparable figures for alatiform apterae are 2.06 to 2.31 (mean 2.20) in *priori,* and 2.58 to 2.87 (mean 2.72) in *geijskesi* s. str. There is a slight separation in values of the ratio Body length/Maximum width, measured in specimens mounted in slides (and therefore to some extent flattened). In *geijskesi* s. str. the ratio varies from 2.10 to 2.25, with a mean of 2.15, while in *priori* the range is from 1.88 to 2.10, mean 2.00. This character is more distinctly visible than the figures suggest, but as aphids flattened on slides are liable to vary considerably in degree of flattening according to the quantity and viscosity of mountant used it is not to be trusted as a discriminant.

The principal character on which *priori* is distinguished from *geijskesi* s. str. is, as has been mentioned above, the relative proportions of the apical rostral segment and the second segment of the hind tarsus; the latter is consistently longer relative to the size of the individual, and the former both absolutely and relatively shorter, than in *geijskesi* s. str.; the ranges of variation are: *geijskesi* s. str., 0.142—0.156 mm. and 0.116—0.136 mm. respectively, *priori* 0.120—0.124 mm. and 0.132—0.149 mm. respectively (apical rostral segment given first in each case). The ratio of these two lengths given by dividing the apical rostral segment by the second hind tarsal segment varies in *priori* from 0.82 to 0.94, as against values of 1.10 to 1.24 in *geijskesi* s. str. (Eastop quotes 1.10 to 1.33 in his 1956 key to apterae).

Apt. ♂ (from three specimens).

Characters as in *S. geijskesi* s. str., except in the same respects as seen in the apterous viviparous female, i. e. in the relative proportions of (a) body length to antennal

flagellum and (b) apical rostral segment to second hind tarsal segment. The ratio B/AF for the Icelandic males is from 1.41 to 1.59, against not much less than 2 in *geijskesi* s. str.; while the A. r. s./2. h. t. ratio ranges from 0.87 to 0.90 in *priori*, against 1.17 in one male of *geijskesi* s. str. How reliable these differences are cannot be accurately assessed without seeing more extensive material of both subspecies. The range of rhinarial numbers on the antennal joints in *priori* is: III 16—21, IV 15—19, V 14—18, basal part of VI 0—3.

Biology.

The presence of apterous males may be taken as evidence that the entire cycle is passed on *Elymus*. This plant is also one of the hosts of *geijskesi* in Britain and continental Europe; but the other main host, *Ammophila arenaria*, is absent from the Iceland flora. *Elymus*, however, is widespread throughout the island, occurring even in sandy desert areas where angiosperms can hardly exist (Thoroddsen, 1914, 308); and it is used also to perform the function often discharged by *Ammophila* in Britain: the stabilisation of loose blown sand in coastal areas.

Taxonomic discussion.

As in the case of *Hyperomyzus boerneri* ssp. *borealis*, the status of the present form is probably not more than subspecific, though it might perhaps be considered not less distinct from *geijskesi* s. str. than is *Myzus (Nectarosiphon) polaris* H. R. L. from *M. (N.) certus* (Wlk.). However, in the absence of any known overlap in geographical distribution, or of any biological information on host preferences, it is clearly unwise to make *priori* a full species on the strength of a single collection. The origin of a distinct subtaxon of *geijskesi* in Iceland might well have been due to long isolation from the main centres of distribution of the species, coupled with the absence from Iceland of one of the main hosts of *geijskesi*,

Ammophila arenaria. The latter is a highly specialised plant whose leaf morphology has very probably influenced the evolution of the long, acute apical rostral segment of *Schizaphis geijskesi,* which is very different from the short, blunt or rounded segment typical of many aphids living above ground on grasses. The absence of *Ammophila* may therefore be directly linked with the evolution of a shorter, or perhaps the failure to evolve a longer, rostral segment among the Iceland population. It is noteworthy that specimens from *Elymus* in other parts of the range of *geijskesi* are not distinguishable from *Ammophila* material in the length of the apical rostral and second hind tarsal segments.

Type material.

Holotype, apterous viviparous female from *Elymus arenarius,* Akranes, Iceland, 25. vii. 1958 (R. N. B. Prior leg.); paratypes and morphotypes, 26 apterous viviparous females and 3 apterous males, same data. The holotype is deposited in the Zoological Museum, Copenhagen. Paratypes and/or morphotypes are in the British Museum (Natural History) and in the collections of Dr. D. Hille Ris Lambers, Bennekom, and the author.

Biometric data

For measurements of specimens of *S. geijskesi priori,* see Table II.

3. *Schizaphis graminum* (Rondani), ssp. *gigjai* ssp. n.

Hitherto no member of the complex now classified (Eastop, 1956) under *S. graminum* (Rond.) has been recorded from Iceland. A single collection taken near the Great Geysir in 1958 appears to belong in *graminum,* but differs from the hitherto described subspecies (*graminum* s. str., *holci* H. R. L. and *agrostis* H. R. L.) in western and southern Europe sufficiently to make it seem desirable to give it a name, at least pending op-

Table II: Biometric data for *Schizaphis geijskesi* H. R. L., ssp. *priori* ssp. n.

Morph	Body length	Ant. flag.	Joint ratios (III—VI) of antennal flagellum	Siph.	Cauda	Cdl. hrs.	Ap. rost. segm.	2nd seg. hd. tars.	Secondary rhinarial no.				Hair length maxima		
									III	IV	V	VIb	III	3T	8T
Apt. v. ♀	2.33	1.00	52:38:36:23+76	0.19	0.21	12	0.120	0.142	—	—	—	—	16	17	36
„	2.57	1.02	58:35:37:21+77	0.19	0.24	8	0.124	0.144	—	—	—	—	15	15	35
„	2.25	1.01	56:38:37:23+72	0.18	0.18	11	0.124	0.132	—	—	—	—	15	13	31
„	2.53	1.16	70:46:44:24+76	0.21	0.22	8	0.120	0.143	—	—	—	—	16	16	40
„	2.54	1.13	64:40:42:23+84	0.21	0.22	6	0.122	0.142	—	—	—	—	17	15(2T)	40
Alatifm.	2.64	1.15	66:41:44:24+82	0.23	0.24	9	0.124	0.149	1/1	0/0	0/0	0/0	16	16	36
„	2.41	1.17	(70:44):42:24+81	0.21	0.23	7	0.122	0.138	2/3	0/1	0/0	0/0	18	16(2T)	36
„	2.57	1.18	68:47:46:24+80	0.20	0.23	10	0.122	0.148	4/1	0/0	0/0	0/0	16	19	29
„	2.84	1.23	72:52:44:23+84	0.21	0.25	7	0.122	0.148	4/5	0/1	0/0	0/0	18	20	33
„	2.55	1.18	68:48:44:24+80	0.21	0.22	8	0.124	0.146	2/4	0/0	0/0	0/0	17	20	35
Apt. ♂	1.63	1.16	58:50:48:23+80	0.10	0.15	10	0.111	0.128	19/18	19/18	14/18	3/0	16	16	40
„	1.80	1.26	68:49:53:24+88	0.13	0.15	11	0.120	0.134	21/17	17/19	18/18	2/1	17	21	52
„	1.78	1.12	63:43:44:24+76	0.10	0.15	10	0.120	0.135	17/16	15/16	16/17	1/1	20	20	52

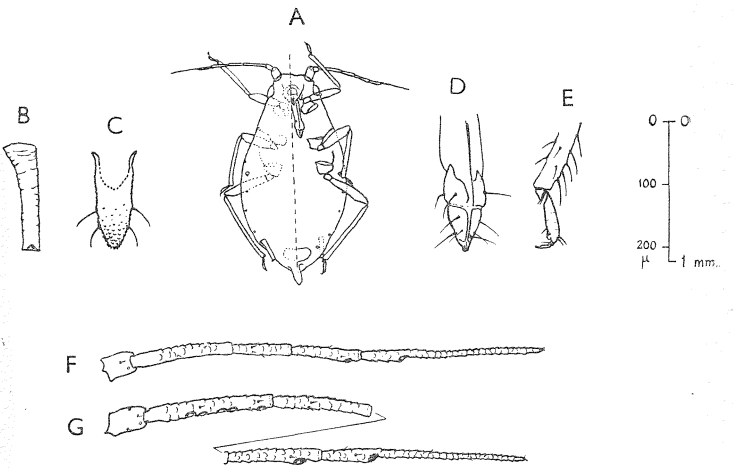
All specimens from Akranes, 25. vii. 58. No. 1 is the holotype.

Antennal joint ratios within parentheses indicate partial fusion of such joints.

The addition of (2T) after hair length maxima indicates that these were measured on the second tergite where the hairs on the third could not be measured accurately.

Other particulars as in Table I.

portunities to investigate its status more thoroughly. I take pleasure in naming the subspecies after Mr. Geir Gigja, who has contributed largely to the faunistic and floristic exploration of Iceland, and who kindly assisted my colleague Mr. R. N. B. Prior by determining plants on the occasion of the latter's collecting expedition to the country in 1958.



Text figure 3. *Schizaphis graminum* (Rond.), ssp. *gigjai* ssp. n. A, apt. viv. ♀ (holotype); projector drawing from cleared and mounted specimen, to right-hand scale. B, detail of siphunculus; C, detail of cauda; D, detail of apical rostral segments; E, detail of hind tarsus; F, detail of antenna; G, detail of antenna of al. viv. ♀; B—G all to left-hand scale.

Apt. viv. ♀.

Colour recorded as dark green, about the same as that of *Hyperomyzus rhinanthi* (Schout.); not pruinose. Body small, from 1.30 to 1.68 mm. long. Morphologically closer to sspp. *holci* and *agrostis* than to *graminum* s. str., and agreeing with them in most respects. Differing from all other subspecies in the complete absence of marginal tubercles from all abdominal segments; from *graminum* s. str. in the short rather cylindrical siphunculi with

slight or no apical constriction and expansion (a not very positive character, but rather distinctive in the material I have seen); and from *holci* and *agrostis* in the shortness of the processus terminalis (2.50 to 3.46 times as long as basal part of VI, against 3.33 to 4 times in the other two subspecies (Eastop, 1956)). In other characters there is no positive separation between *gigjai* and the other subspecies.

Al. viv. ♀ (from three specimens).

Very similar to apterae in characters used for separation of subspecies. Marginal tubercles absent. Processus terminalis 2.60 to 2.90 times as long as basal part of VI. Joint III of antennae with 3—6 secondary rhinaria in a single row; joint IV usually without rhinaria, but with a single one on the right side of one specimen. Siphunculi not or hardly longer than cauda.

Biology.

The type sample was collected from an unidentified grass growing in tufts on moist warm ground near the margin of the Great Geysir. The grass is described as rather narrow bladed, but with the blades broader than in *Festuca*. This description would appear not to exclude *Agrostis canina* or *A. stolonifera*. There were no sexual forms present in the type sample, and it is therefore not possible to be precise about the kind of cycle prevailing in the subspecies. Hille Ris Lambers (1955) has drawn attention to the survival of *Rhopalosiphum padi* (L.) in Iceland by means of a few specimens overwintering viviparously near hot springs, and this type of cycle is not excluded for *S. graminum gigjai*, although a monoecious cycle with sexuales on grasses is the normal biology of *Schizaphis graminum agrostis* and *S. g. holci*.

Taxonomic discussion.

The exact relationship of the present form to ssp. *agrostis* H. R. L. requires further investigation. *Holcus*

lanatus is apparently a very rare grass in Iceland (Stefansson, 1924), and does not in any case agree with the account given of the host of ssp. *gigjai*. The original description of *agrostis* suggests that it is a less regularly myrmecophilous subspecies than *holci*, which also increases the probability that the Icelandic aphids were near *agrostis* rather than *holci*. The colour in life of *gigjai* is apparently rather darker than that of *agrostis* as originally described. The value of the absence of marginal tubercles as a discriminant is perhaps less than one might wish, since these tubercles are very small in the other subspecies, and ssp. *gigjai* is itself a rather small form, although overlapping to some extent with small specimens of *agrostis*. The short processus terminalis of *gigjai* could be environmentally determined by the low temperatures of the Icelandic climate, but the fact that this character persists in a sample living under warm moist conditions near a geysir suggests the possibility of genetic fixation, such as is seen in *Nasonovia compositellae* (Theob.) and *N. nigra* (H. R. L.) when these two species are reared in the insectary under the same conditions of temperature (to within the limits obtainable without constant temperature equipment).

Type material.

Holotype, apterous viviparous female from unidentified grass, Great Geysir, Iceland, 4. viii. 1958 (R. N. B. Prior leg.). Paratypes and morphotypes, 24 apterous and 3 alate viviparous females, same data. The holotype is deposited in the Zoological Museum, Copenhagen. Paratypes and/or morphotypes are in the British Museum (Natural History) and in the collections of Dr. D. Hille Ris Lambers, Bennekom, Dr. F. Ossiannilsson, Uppsala, and the author.

Biometric data.

For measurements of specimens of *S. graminum gigjai* see Table III.

Table III: Biometric data for *Schizaphis graminum* (Rond.), ssp. *gigjai* ssp. n.

Morph	Body length	Ant. flag.	Joint ratios (III—VI) for antennal flagellum	Siph.	Cauda	Cdl. hrs.	Ap. rost. segm.	2nd seg. hd. tars.	Secondary rhinarial no.			Hair length maxima		
									III	IV	V	III	3T	8T
Apt. v. ♀	1.52	0.67	37:22:25:18+49	0.17	0.15	4	0.080	0.086	—	—	—	8	12	22
„	1.68	0.79	44:29:29:20+54	0.20	0.16	3	0.080	0.085	—	—	—	11	9	?
„	1.52	0.72	39:24:28:18+53	0.16	0.14	4	0.076	0.085	—	—	—	8	11	20
„	1.63	0.78	42:26:28:19+60	0.18	0.15	4	0.080	0.092	—	—	—	8	11	24
„	1.56	0.78	44:27:28:19+56	0.18	0.16	4	0.078	0.088	—	—	—	8	8	24
„	c. 1.52	0.79	46:27:27:20+56	0.18	0.15	4	0.080	0.084	—	—	—	8	9	32
„	1.46	0.68	36:28:22:17+49	0.16	0.15	4	0.073	0.085	—	—	—	8	7	14
„	1.30	0.67	38:19:24:16+52	0.15	0.13	4	0.072	0.084	—	—	—	8	9	16
„	1.51	0.71	40:26:26:18+50	0.17	0.14	5	0.078	0.088	—	—	—	7	9	17
„	1.50	0.71	42:22:26:18+51	0.17	0.14	4	0.072	0.081	—	—	—	8	8	21
Al. v. ♀	1.48	0.79	50:26:29:19+52	0.14	0.13	4	0.070	0.088	3/4	0/0	0/0	8	9	21
„	c. 1.50	0.90	56:32:36:20+58	0.14	0.13	4	0.072	0.089	6/4	0/0	0/0	8	9	24
„	1.55	0.83	46:36:33:20+52	0.13	0.13	4	0.072	0.087	4/5	1/0	0/0	8	9	20

All specimens from Great Geysir, 4. viii. 58. No. 1 is the holotype.

Antennal joint ratios as shown were measured with a $^2/_3$ inch objective. Ratios as quoted in the text were calculated from measurements under a $^1/_6$ inch objective.

Particulars of abbreviations and units of measurement as in Table I.

Acknowledgements.

I am much indebted to my colleague Mr. R. N. B. Prior for the opportunity to describe these three subspecies from the material collected by him in Iceland. Also to be thanked for very helpful information and discussion are Drs. Hille Ris Lambers, Bennekom, and F. Ossiannilsson, Uppsala; and for access to British Museum material and other help Mr. J. P. Doncaster, Dr. V. F. Eastop and Miss C. A. Prevost, all of the Department of Entomology, British Museum (Natural History).

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On a New Collection of Aphids from Iceland.

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Introduction.

Hille Ris Lambers (1955) summarised existing knowledge of the Icelandic Aphid fauna in Volume 3, Part 52a, of The Zoology of Iceland. He examined earlier records by Mohr and Lindroth, corrected some of these, and gave an account of 27 species known from the island.

From July 24 to August 8, 1958, a visit was paid to Iceland by one of us (R. N. B. P.) during which aphids were collected whenever opportunity occurred. The following account presents the results of this collecting, which provided records of nine species not hitherto known from Iceland, and augmented existing data on some others that were known already.

We are much indebted to Dr. Hille Ris Lambers, Bennekom, Netherlands, for helpful discussion of the material, and for checking identifications of certain species against type specimens. We also gratefully acknowledge the loan of specimens for comparison by Mr. F. H. Jacob, Harpenden, and Miss C. A. Prevost, Mr. J. P. Doncaster and Dr. V. F. Eastop of the British Museum (Natural History). Miss Prevost also kindly lent us the draft manuscript of her description of a new *Hyperomyzus* species. Dr. F. Ossiannilsson, Uppsala, Sweden, kindly compared type material of *Schizaphis graminum,* ssp. *gigjai* Stroyan, with material of *Schizaphis* in his collection. For help in checking the identity of *Cavariella konoi* Tak. we are indebted to Drs. R. Takahashi, Kuroyama, and C. Chia-chu Tao, Taipeh. During Prior's stay in Iceland valuable help was received from Mr. Geir Gigja, Reykjavik, in the naming of plants, and we are happy that this is commemorated in the naming of an endemic subspecies of *Schizaphis graminum* (Rond.) after him. Prior was also greatly helped over administrative details of his visit by Mr. Thorsteinn Bernhardsson of Reykjavik, to whom a new subspecies of *Hyperomyzus boerneri* Prevost has been dedicated in recognition of his

kindness. We offer our thanks to all these colleagues for their invaluable help in the preparation of this paper.

Material of the species discussed has, when possible, been deposited in the collections of the Zoological Museum, Copenhagen, and the British Museum (Natural History). The main part of the collection remains at the Plant Pathology Laboratory, Harpenden, England.

1. Topographical and Ecological Notes.

The area worked was confined to the south-western quarter of the country, bounded by latitudes 63° 55' N and 65° 05' N, and by longitudes 20° W and 24° W. A total mileage of 750 miles (1200 km.) was covered by motor bicycle. By cycling slowly, and stopping to collect whenever new species of plants, or areas appearing different from the terrain already explored, were seen, it was possiple to cover a widely varying range of plant associations, and to amass a collection of aphid samples representing most of these associations. A rough classification of the types of habitat worked has been made, and is as follows:

(1) Basalt mountains with marginal scree. Characteristic of the road between Reykjavík and Borgarnes, which runs at the base of the scree and follows a much indented coastline along the sides of the fjords. Vegetation mainly confined to the narrow strip between road and sea, and to patches of grass and occasional alpine plants among the scree.

(2) River-cut ravines with abundant rock crevices. Such ravines, encountered at the Laxá waterfall 20 miles from Reykjavík, and at one point on the Vegamót-Stykkishólmur road, provided sheltered habitats for many plants such as *Hieracium* species, *Saxifraga ?caespitosa, Sedum villosum* and *Cerastium alpinum*. A somewhat similar habitat was provided by a rocky gorge at the outfall of Þingvallavatn, where very abundant *Rho-*

diola rosea harboured a very few specimens of *Thuleaphis ?acaudata* H. R. L.

(3) Seashore. A sand and pebble beach at Akranes carried two large stands of *Elymus arenarius* from which

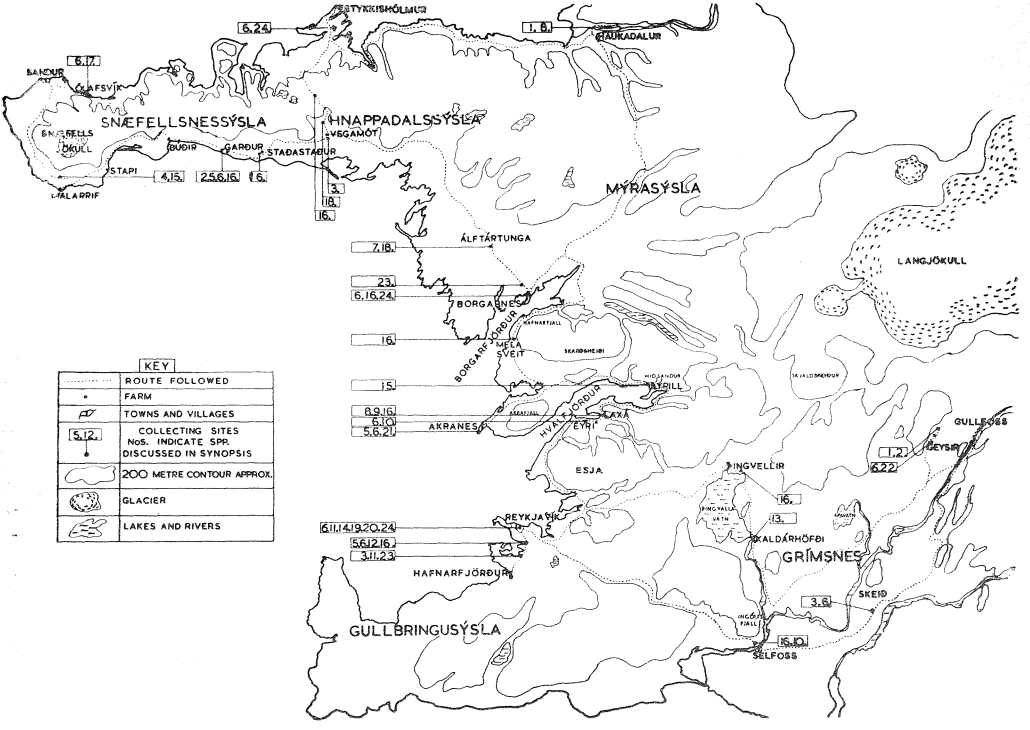


Fig. 1. Map of south-west Iceland showing itinerary followed and sites of aphid collections.

a new subspecies of *Schizaphis geijskesi* H. R. L. was obtained. A stretch of shore in Skerjafjörður near Reykjavík yielded aphids from grass, *Matricaria* and *Stellaria media,* and at Ólafsvík grass growing under old planks and stones on the shore produced *Jacksonia papillata* Theob.

(4) Flat sandy terrain with dominant willow

scrub. An area traversed by the road from Borgarnes to Staðastaður was characterised by much willow scrub dominated by *Salix phylicifolia* and *S. lanata*. In this area aphids were taken on the willows and on *Carex* in roadside ditches, *Potentilla crantzii* and *Silene maritima*.

(5) Lava flows and fields. Very extensive lava fields were traversed at the base of the glacier Snæfellsjökull on the north side of the Snæfellsnes Peninsula between Stykkishólmur and Haukadalur, and smaller ones between Borgarnes and Staðastaður. These areas are practically barren apart from lichens and mosses, and only one collection of aphids was made from such an area, from a plant not identified at the time, but now deduced, from the identities of the aphids collected, to have been perhaps *Vaccinium uliginosum*.

(6) Cultivated farmland. Characterised by a number of rather characteristic weed species absent from the poorer natural soils. Several such farms were visited at Staðastaður, and aphids were collected on *Vicia cracca, Stellaria media* and *Capsella bursa-pastoris*.

(7) Banks of lakes and streams. A rather varied assemblage of habitats, characterised by different plants in different localities. *Filipendula ulmaria* was only found in one locality beside a lake in Haukadalur, and another near the Great Geysir; but yielded aphids in both places. *Alectorolophus minor* and *Euphrasia frigida* grew among grass near Hafnarfjörður and Selfoss respectively, and produced two hitherto unrecorded species of *Hyperomyzus*. Two species of *Hieracium* grew with *Filipendula* near Haukadalur, and *Nasonovia compositellae* (Theob.) was collected from these.

(8) Margins of hot springs. In the Great Geysir area such hot springs are typically surrounded at a distance of a few feet by a growth of an unidentified grass, which grows in warm, almost perpetually moist soil. In this specialised habitat occurred two species of aphid,

one an apparently new subspecies of *Schizaphis graminum* (Rond.).

(9) Urban parks and gardens. These habitats in Reykjavík contained planted *Salix* species and *Ribes rubrum*; both of these were inhabited by mixtures of aphid species, all of which could apparently be heteroecious, i. e. with host alternation to other plants in the Icelandic summer.

The flora of Iceland contains 411 species of Pteridophyta and Spermatophyta, according to the Flóra Íslands of Stefánsson (2nd Ed., 1924). Of these, 45 identified species were examined during the fortnight available for collecting, and aphids were collected from 31 species. The data available to Hille Ris Lambers for his account of Icelandic aphids contain records of a bare dozen identified host plants, apart from unspecified grasses. While it is certainly not possible to extrapolate from figures such as those quoted above, the very small number of Icelandic plants so far examined for aphids gives some idea of the work still required to produce a satisfactory list of the Icelandic aphid fauna, and to fill in the gaps in our knowledge of the biology of those species already known.

2. Synopsis of the Species.

Figures in parentheses quoted in locality data refer to the rough habitat classification given in the last section.

1. *Macrosiphum cholodkovskyi* Mordv.

Hille Ris Lambers, 1955, p. 2.

Additional locality records: near Great Geysir (7), 3. viii. 58; Haukadalur (7), 31. vii. 58; both collections from *Filipendula ulmaria*.

2. *Acyrthosiphon pisum* (Harris).

Hille Ris Lambers, 1955, p. 3.

Additional locality record: near Garður (6), 28. vii. 58; from *Vicia cracca* and *Capsella bursa-pastoris*.

These host records confirm Hille Ris Lambers' supposition that *V. cracca* should be an important host of this aphid in Iceland, with *Capsella* as an alternative host in summer.

3. *Acyrthosiphon boreale* Hille Ris Lambers.
Hille Ris Lambers, 1952, p. 5; 1955, p. 3.

Additional locality records: Vegamót (6), 27. vii. 58, on *Potentilla crantzii* (det. G. Gígja); near Hafnarfjörður (7), 8. viii. 58, from mixed herbage by stream; near Skeið, east of Selfoss, 5. viii. 58, 3 apterae thrashed from grass, perhaps with some admixture.

Host records for *A. boreale* have hitherto not been available. The association of one of the samples collected with *Potentilla crantzii* is consistent with the morphological relationships of the species, which is close to *A. agrimoniella* (Ckll.) from *Agrimonia* and *A. rogersii* (Theob.) from *Fragaria*, both of these hosts belonging to the same subfamily of herbaceous Rosaceae as *Potentilla*. The mixed herbage from which the second sample of *A. boreale* was thrashed also contained a yellow-flowered plant which, while not at the time identified, was probably *P. crantzii*.

4. *Acyrthosiphon brachysiphon* Hille Ris Lambers.
Hille Ris Lambers, 1952, p. 6; 1955, p. 4.

Additional locality record: Snæfellsjökull (5), 29. vii. 58, on an unidentified host.

These aphids occurred together with *Ericaphis latifrons* (Börner) (see Hille Ris Lambers, 1955). This suggests that the unidentified host should be Ericaceous, and was quite probably *Vaccinium uliginosum*. The same host was thrashed in various other localities, but yielded no aphids. Colour notes describe the aphids as waxy green when alive. The identity of the only two adult apterae obtained has kindly been checked by Dr. Hille Ris Lambers.

5. *Acyrthosiphon auctus* (Walker)

syn. *A. silenicola* H. R. L., *A. shawi* Stroyan.

Walker, 1849, p. xxxiii, part; Hille Ris Lambers, 1955, pp. 1, 4, fig. 1; Stroyan, 1957, p. 313, fig. 1, pl. III; Heie, 1958, p. 214.

Additional locality records: Akranes (3), 25. vii. 58, 1 apt. and 2 larvae from *Gentiana* sp.; near Reykjavik (3), 6. viii. 58, 1 apt. from *Stellaria media*; near Garður (6), 28. vii. 58, from *Stellaria media, Capsella bursa-pastoris* and *Silene maritima* (a total of 5 apt.).

The host records for *A. auctus* show that the species is rather polyphagous; to the hosts quoted above must be added *Honkenya peploides* (the type host) and *Cakile maritima,* on which it has been found in Scotland. It appears at least possible that the *?Aphis* sp. listed by Lindroth from *Cakile,* and referred to by Hille Ris Lambers (1955), was *auctus.* The morphological characters given by Stroyan (1957) for separation of *shawi* from *silenicola* have been found to be unsatisfactory when the material from the 1958 collections is taken into account. The caudal shape, length of siphunculi and cuticular rugosity of adult apterae are all more variable than seemed to be the case when only the original heavily potashed material of *silenicola* and the Scottish aphids from *Cakile* and *Honkenya* were available for study. The synonymy of *shawi* with *auctus* was demonstrated by Heie (1958). Dr. Hille Ris Lambers has notified us in a letter of his agreement that *silenicola* is a further synonym. We are indebted to Dr. Heie for a loan of Danish material of *auctus.*

Known distribution outside Iceland: Great Britain, Denmark.

6. *Metopolophium festucae* (Theob.).

Hille Ris Lambers, 1955, p. 7.

Additional locality records: Ólafsvík (3), 29. vii. 58, on *Poa* sp.; near Borgarnes, from ditch side, 26. vii. 58; Staðastaður (6), 28. vii. 58; near Garður (6), 28. vii.

58, on *Festuca* sp.; near Reynivellir, Hvalfjörður (1), 25. vii. 58; near Stykkishólmur (7), 30. vii. 58; near Reykjavík (3), 6. viii. 58; Akranes (3), 25. vii. 58, on *Elymus arenarius*; Great Geysir (8), 4. viii. 58; near Skeið, east of Selfoss (7), 5. viii. 58. Hosts unidentified grasses, except where indicated. Reykjavík (6), 24. vii. 58, on grass among Carex near the University.

Next to *Myzus polaris* H. R. L., *M. festucae* was recorded more frequently, and from a wider range of habitats, than any other species of aphid. It occurred in almost all localities where aphids could be collected on grasses. Unfortunately most of the grass hosts were not identified; but *Elymus arenarius* appears to be a new host record for *festucae*.

7. *Metopolophium dirhodum* (Walker).

Walker, 1849a, p. 43; Hille Ris Lambers, 1947, p. 277, 281.

Occurrence in Iceland: Alftártunga (4), 27. vii. 58, thrashed from mixed herbage including grasses and *Calluna* among rocks. 1 apt. and 4 larvae.

From the morphology and chaetotaxy of the adult aptera we can only place this sample in *M. dirhodum*, to which it comes down in the key of Hille Ris Lambers (1947). The pigmentation character of the antennal joint apices is somewhat obscured by a general slight darkening, as is rather typical of aphids developing in low temperatures, but the dusky apices are still just visible, particularly with a hand lens. The antennae, and especially the processus terminalis, are rather long, an unusual feature in Icelandic representatives of species whose main distribution lies further south; but apart from this there seems no reason to doubt the identity. This is a new species record for the Icelandic fauna. Whether or not *M. dirhodum* can complete a migratory (heteroecious) cycle in Iceland is not clear from the record, but there are indigenous *Rosa* species in Iceland which might serve as primary hosts.

8. *Nasonovia compositellae* (Theob.).

Stroyan, 1953, pp. 109—118; Hille Ris Lambers, 1955, p. 8.

Additional locality records: Haukadalur (7), 31. vii. 58; Laxá Waterfall (2), 1. viii. 58; both records on *Hieracium* spp.

The material collected included many apterae and some sexual morphs. A further study of *compositellae* from many localities in Britain and in Norway, and of material of *N. nigra* (H. R. L.) from Britain and from the Alps and Pyrenees, makes it appear that the Icelandic population falls clearly into *compositellae,* and is not intermediate between *compositellae* and *nigra* as Stroyan suggested to Dr. Hille Ris Lambers after seeing the original Icelandic specimens. The total variability of the species is considerable, as might be expected from its type of distribution in small isolated colonies persisting from year to year on small localised populations of *Hieracium* apomicts. Discrimination of viviparae from those of *nigra* is not always a simple matter, and the relationship of the two forms to one another cannot be regarded as solved. However, such evidence as has accrued in Britain from the study of insectary populations points to a biological discontinuity as well as a morphological one; since it appears that populations attributable to *nigra* on morphological characters also overwinter by means of viviparae on the basal rosettes of *Hieracium,* while *compositellae,* in five populations so far kept in culture from England, Scotland and Wales, overwinters only as eggs. Hopes of obtaining cross-pairings between *nigra* and *compositellae* were entirely frustrated by this characteristic of southern English *nigra* populations, which produced no sexual morphs at all when reared in the same cold greenhouse as the colonies of *compositellae.* Field collections of viviparae made in December and January confirmed viviparous overwintering as occurring also in the wild state. On the other hand sexuales of *nigra* oc-

cur in the Alps, and it is possible that they may be found to occur in more northerly latitudes as further collecting and rearing is done.

It appears that the differences in rhinarial distribution and antennal joint proportions recorded between *nigra* and *compositellae* (Stroyan, 1953), which were perhaps originally climatically induced (Hille Ris Lambers, 1955), are now genetically fixed. The various colonies reared together in the experiments mentioned above, and belonging to both species, have over more than a year shown no significant changes which could be interpreted as a damping down of the morphological differences between the two species, although they have been kept in the same environment, and could have been expected to show such a damping down had the differences between them been purely phenotypic.

As sexual morphs of *compositellae* have not yet been described, some morphological notes from Icelandic and British material are given below.

Apterous ♂. Slender in build, body from 1.27 to 2.13 mm. long in specimens measured, Icelandic males being on the average rather the larger (1.41—2.13 mm., against 1.27—1.75 mm. in British males). Morphologically similar to apterous female morphs, but with more elongate appendages; a marked tendency, particularly in small specimens, for the dorsal sclerotic "carapace" to become broken up or perforated by membranous fenestrae; and a shorter, more tapering cauda, the caudal hairs being concentrated towards the apex more than in the apterous females. Antennae rather uniformly dark, the flagellum subequal to or longer than the body; processus terminalis from just over 4 to $6^1/_2$ times basal part of joint VI ($4^3/_7$ to $5^1/_2$ times as long in Icelandic specimens); secondary rhinarial distribution as follows: joint III 10—27 (British), 23—30 (Icelandic); joint IV 4—10 (British), 6—10 (Icelandic), joint V 1—7 (British), 5—8 (Icelandic),

base of joint VI 0—1 (British and Icelandic). Legs with the basal two-thirds of femora and most of tibiae palish sclerotic, the tarsi and the apices of femora and tibiae darkened. The hind tibiae occasionally bear a few (up to 10) pseudosensoria of the type found normally in oviparae. Tarsal joint 1 of hind leg with typically 2 hairs, fore and mid tarsi with 3. The hind tibia in British material varies from 0.61 to 0.77 of the length of the body and from 1.68 to 1.90 times as long as the hind femur; the same figures for Icelandic males are 0.70 to 0.79 of the body length and 1.77 to 1.86 times the length of the hind femur (the latter measured from the trochantro-femoral suture to the apex).

For measurements of specimens see Table I.

Oviparous ♀. Very similar to the apterous vivipara. Small specimens may show a reduction of the dorsal sclerotic "carapace", as in small males and viviparae. The hind tibiae are somewhat incrassate over the proximal two-thirds to three-quarters, and bear a variable number of pseudosensoria. Icelandic specimens so far seen have a consistently much smaller number than British specimens: 40 being the maximum recorded, and the mean number being about 18, against 59 to 108, with a mean of about 84. The antennae and legs are pigmented as in the viviparae, and the former bear secondary rhinaria as follows: joint III 6—19 (British), 13—19 (Icelandic); joint IV 0—4 (British), 0—2 (Icelandic). First tarsal joint chaetotaxy typically 3, 3, 2.

For measurements of specimens see Table I.

It is possible that the small differences noted above between British and Icelandic sexuales of *compositellae* are indicative of an incipient local subtaxon in Iceland; but as the biology of the Icelandic population is apparently not in any way different from that of the British colonies studied, and the viviparae agree very closely in their morphology, we at present regard the Icelandic

Table I: Biometric data for sexuales of *Nasonovia compositellae* (Theob.)

Morph	Body length	Ant. flag.	Joint ratios (III—VI) of antennal flagellum	Siph.	Cauda	Cdl. hrs.	Ap. rost. segm.	2nd seg. hd. tars.	Secondary rhinarial no.				Hair length maxima		
									III	IV	V	VIb	III	3T	8T
Apt. ♂	1.64	1.86	124:68:72:28+124	0.30	0.14	6	0.139	0.116	28/28	9/6	6/6	1/0	28	40	40
„	1.64	1.65	108:60:64:24+114	0.27	0.13	5	0.136	0.112	30/30	9/7	8/7	0/0	26	40	60
„	1.50	1.69	108:60:62:24+124	0.27	0.13	5	0.138	0.117	25/23	7/8	6/5	0/0	32	40	52
„	1.57	1.62	108:60:58:23+114	0.26	0.12	5	0.136	0.110	23/23	8/7	7/7	1/0	22	38	40
„	1.75	1.79	116:72:60:26+126	0.29	0.16	7	0.142	0.110	25/23	7/10	6/6	1/1	28	40	56
„	1.36	1.46	100:56:48:24+98	0.23	0.12	6?	0.125	0.098	13/11	4/4	1/3	0/0	22	32	50
„	1.30	1.39	84:64:54:20+130	0.21	0.13	5	0.132	0.107	17/20	6/8	5/5	0/0	25	35	40?
Ovip. ♀	2.13	1.79	110:72:68:28+122	0.37	0.23	8	0.152	0.124	19/17	0/0	0/0	0/0	28	40	60
„	1.85	1.47	94:56:54:24+102	0.30	0.19	9	0.136	0.120	13/14	1/2	0/0	0/0	25	40	58
„	1.41	1.38	84:48:48:24+105	0.31	0.18	9	0.140	0.118	14/16	0/0	0/0	0/0	28	38	48
„	1.78	1.44	92:55:51:24+100	0.30	0.20	8	0.142	0.112	14/12	3/4	0/0	0/0	35	52	56
„	1.59	1.21	70:42:40:20+100	0.23	0.16	8	0:128	0.101	- / 6	- /0	- /0	- /0	20	35	60
„	1.87	1.48	95:56:48:22+110	0.32	0.20	7	0.138	0.108	15/14	0/0	0/0	0/0	37	40	60
„	2.02	1.66	106:64:61:24+116	0.39	0.21	8	0.157	0.115	16/15	1/2	0/0	0/0	32	36	53

No. 1—3, 8—10 from Laxá Waterfall, 1. viii. 58; No. 4 from Haukadalur, 31. vii. 58; Nos. 5, 11, from Armathwaite, Cumberland, England, Sept. 1957; No. 6 from Tobermory, Mull, Scotland, Sept. 1957; Nos. 7, 12, from Ambergate, Derbyshire, England, Oct. 1957; No. 13 from Pontrhydygroes, Cardigan, Wales, 3. x. 58; No. 14 from Pwll Peiran, Cardigan, Wales, 3. x. 58.

All length measurements in millimetres, except hair length maxima which are in microns.

III = Third antennal joint. 3T = Third abdominal tergite. 8T = Eighth abdominal tergite.

aphids as falling within the limits of *compositellae* s. str.

Known distribution outside Iceland: Great Britain, Norway.

9. *Nasonovia (Neokakimia) saxifragae* (Doncaster & Stroyan).

Doncaster & Stroyan, 1952.

Occurrence in Iceland: Laxá Waterfall (2), 1. viii. 58, on *Saxifraga ?caespitosa* (det. G. Gígja); 2 apt., 4 ♂♂, 6 ovip. ♀♀.

This species is hitherto only known from the type material, a single damaged aptera (perhaps a fundatrix?) and a few larvae from Jan Mayen Island. The following morphological details are given to supplement the original description.

Apterous viviparous ♀. The Icelandic specimens are smaller than the holotype. In both the body length is 1.71 mm. General facies as described for holotype. Antennal flagellum relatively rather longer, about $^{11}/_{17}$ of body length (little over half in holotype); joint proportions about as in holotype, processus terminalis a little shorter than joint III and from $2^{3}/_{4}$ to just over $3^{1}/_{4}$ times basal part of VI; joint III with 12—16 secondary rhinaria irregularly arranged along whole joint; IV and V without secondary rhinaria. Apical rostral segment as in holotype but a little shorter, 0.144—0.146 mm. long, or about $1^{4}/_{5} \times$ second joint of hind tarsus; with 14—16 secondary hairs besides the three subapical pairs. Antennal hairs as in holotype, on joint III maximally from $^{2}/_{3}$ to $^{3}/_{9}$ of the articular diameter of the joint in length. Mid-dorsal abdominal hairs (3rd tergite) maximally 24 μ to 28 μ long; those on 8th tergite 4 in number and maximally 40 μ long. Hairs of typical Nasonoviine spear shape apically (the original description by an unfortunate printer's error reads "pear-shaped" for the holotype). Siphunculi and cauda as in holotype. Distribution of dorsal pigmentation about as in holotype or a little less extensive (dorsal

carapace not fusing laterally with marginal sclerites in one specimen). Chaetotaxy of first tarsal joints 3, 3, 3.

Apterous ♂. Body length about 1.20 to 1.33 mm. Facies rather as in *N. compositellae* (Theob.) but not so slender, legs more uniformly pigmented (only apices of tibiae a little darker and bases of femora paler than the remainder) and antennae distinctly shorter (flagellum about $^5/_6$ of body length) and stouter. Joints III—V (but not base of VI) bearing secondary rhinaria, the numbers in the specimens available being: III 20—29, IV 7—13, V 5—8. Processus terminalis $\pm$ 3 times as long as basal part of VI. Rostrum with apical segment as in apterae, bearing 14—15 secondary hairs. Tarsi with second joints short, about $^6/_{11}$ to $^3/_5$ length of apical rostral segment; chaetotaxy of first tarsal joints 3, 3, 3. Hind tibiae and femora very similar in proportions to those of *N. compositellae*; the hind tibiae being from 0.62 to 0.70 of the body length, and 1.80 to 1.88 times as long as the hind femora.

Oviparous ♀. Generally similar to apt. viv. ♀, but rhinaria on antennal joint III fewer in number (3—10), and dorsal sclerotic pattern reduced. The individual spinal, pleural and marginal hairs stand on separate sclerites of varying size. Fusion between neighbouring sclerites on the same tergite may occur, but apparently not fusion across segmental boundaries. Antennae and legs rather uniformly darkish, the latter with the femoral bases somewhat paler. The somewhat swollen hind tibiae bear about 40—55 pseudosensoria in the six specimens available for study. Apical rostral segment with 14—15 secondary hairs. Chaetotaxy of first tarsal joints 3, 3, 3.

For measurements of all morphs see Table II.

10. *Hyperomyzus boerneri* Prevost, ssp. *thorsteinni* Stroyan.
Syn. *H. euphrasiae* (Wlk.) Börner, 1952, nec Walker, 1849.
Prevost, 1959; Stroyan, 1960, p. 250.

Occurrence in Iceland: near Reynivellir, Hval-

Table II: Biometric data for *Nasonovia (Neokakimia) saxifragae* (Donc. & Str.).

Morph	Body length	Ant. flag.	Joint ratios (III—VI) of antennal flagellum	Siph.	Cauda	Cdl. hrs.	Ap. rost. segm.		2nd seg. hd. tars.	Secondary rhinarial nos.			Hair length maxima		
							Length	Sec. hrs.		III	IV	V	III	3T	8T
Apt. v. ♀	1.71	1.12	72:43:46:24+66	0.24	0.18	5	0.144	16	0.080	12/13	0/0	0/0	21	24	40
„	1.71	1.14	80:42:40:22+72	0.27	0.18	5	0.146	14	0.084	16/16	0/0	0/0	24	28	40
Apt. ♂	1.33	1.17	80:48:46:22+66	0.21	0.12	5	0.125	14	0.076	26/23	13/9	7/8	20	25	33
„	1.20+	1.06	72:40:40:22+64	0.20	0.09	5	0.126	15	0.074	22/21	9/9	5/6	20	25	32
„	1.23	1.03	72:40:38:20+60	0.20	0.11	5	0.132	15	0.072	21/20	8/7	5/6	20	24	36
„	1.26	1.08	73:42:42:20+64	0.19	0.11	5	0.132	15	0.076	29/29	12/11	6/7	17	20	33
Ovip. ♀	1.60	1.02	64:38:38:22+66	0.25	0.17	5	0.140	15	0.079	9/10	0/0	0/0	22	25	38
„	1.55	0.97	63:35:40:20+60	0.23	0.18	5	0.134	14	0.078	6/9	0/0	0/0	17	28	44
„	1.47	0.95	58:33:37:21+63	0.23	0.16	6	0.129	14	0.074	8/8	0/0	0/0	20	26	36
„	1.37	0.82	48:28:32:19+56	0.20	0.14	5	0.124	15	0.072	3/3	0/0	0/0	15	24	44
„	1.39+	0.98	58:37:40:20+64	0.24	0.16	5	0.132	14	0.073	7/8	0/0	0/0	17	22	38

All specimens from Laxá Waterfall, 1. viii. 58.

Abbrevations and units of measurement as in Table I.

fjörður (1), 25. vii. 58, 1 apt. and larvae; Selfoss (7), 5. viii. 58, 8 apt., 5 ♂♂, 1 ovip. ♀; both collections from *Euphrasia frigida* (det. G. Gígja).

This species has recently been described by Prevost (1959) from Austrian and Swiss material. The name replaces Börner's misinterpretation of *Aphis euphrasiae* Wlk. (Börner, 1952). The Icelandic population appears to be at least subspecifically distinct, and has been described as ssp. *thorsteinni* Stroyan; the description is cited above. This is the first member of the subgenus *Hyperomyzus* Börner, s. str., to be recorded from Iceland.

Recorded distribution outside Iceland: Thuringia, France (Börner); Austria (Prevost); Switzerland (Hille Ris Lambers).

11. *Hyperomyzus (Hyperomyzella) rhinanthi* (Schout.).
Hille Ris Lambers, 1949, p. 298.

Occurrence in Iceland: Hafnarfjörður (7), 7—8. viii. 58, from calyces of *Alectorolophus minor;* Reykjavík (9), 8. viii. 58, from *Ribes rubrum.*

This is a new species for the Icelandic fauna. Hille Ris Lambers (1955, p. 23) mentioned only two Icelandic aphid species which can, at least in theory, complete a heteroecious cycle: *Cavariella archangelicae* (Scop.) and *C. aegopodii* (Scop.). The possibility has already been alluded to in the present paper that *Metopolophium dirhodum* (Wlk.) may have such a heteroecious cycle in Iceland. It now appears certain that *H. rhinanthi* is a further species which can also complete such a cycle, since material from both secondary and primary hosts was collected, that from *Alectorolophus* including nymphs with wing pads, from which alate males and gynoparae could be reared, while the aphids from red currant included alate gynoparae and some adult oviparae. Icelandic specimens are quite typical morphologically.

12. *Brachycaudus helichrysi* (Kaltenbach).

Occurrence in Iceland: near Reykjavík (3), 6. viii. 58, from *Matricaria ambigua* growing among stones; 3 immature apt.

This is a new species record for Iceland. *B. helichrysi* is a very abundant and widely distributed species in Europe, with a typical heteroecy between *Prunus* species and many species of Compositae, Scrophulariaceae etc. The present find may represent a small colony founded by a wind-blown migrant; in the absence of the primary hosts it is unlikely that *B. helichrysi* can establish itself permanently in Iceland (cf. Hille Ris Lambers, 1955, p. 24, on *Rhopalosiphum padi* (L.) and *Myzus (Nectarosiphon) persicae* (Sulz.)).

13. *Thuleaphis ?acaudata* Hille Ris Lambers.

Hille Ris Lambers, 1960, p. ?.

Occurrence in Iceland: Grímsnes, near outfall of Þingvallavatn (2), 3. viii. 58, from *Rhodiola rosea*; 1 al. and sexuales.

This is a new species record for Iceland. The generic identity for the Icelandic specimens has kindly been checked by Dr. Hille Ris Lambers. We are not sure that the Icelandic material from *Rhodiola rosea* is conspecific with *T. acaudata* H. R. L. Aphids from *Rhodiola* found in Wales by Mr. F. H. Jacob agree with our specimens in having longer tarsi and a longer apical rostral segment than cotypes of *T. acaudata* kindly lent by Dr. Hille Ris Lambers. If the *Rhodiola* aphids should prove to be distinct, the right of description will belong to Mr. Jacob, who took his material in Wales in 1953. At present, in view of the paucity of available specimens and absence of biological data, judgment on the question must be suspended, and we record the species, with reservations, under *T. acaudata*.

14. *Cryptomyzus galeopsidis* (Kaltenbach), s. lat.
Hille Ris Lambers, 1955, p. 9.

Additional locality record: Reykjavík (9), 8. viii. 58, from *Ribes rubrum*; 6 apt., 1 al., 1 ovip. ♀, 1 larva.

Hille Ris Lambers (1955) discussed the taxonomic status of Icelandic *galeopsidis*, but as he could only examine an ovipara, an alate and a few larvae he was only able provisionally to refer the material to ssp. *citrinus* H. R. L. The present collection contains six apterae in addition to an alate and an ovipara, and some colour notes are available. These notes are inconclusive, the apterae collected being either 'yellowish with green markings' or 'whitish'. It is possible that the biology of *galeopsidis*, s. lat. in Iceland may be different from the biology in Europe, at least so far as the division into subtaxa with differing cycles is concerned; but the available sample offers no basis for an opinion on this point. Since *Galeopsis* is found in Iceland there would seem to be a reasonable probability that a heteroecious cycle from *Ribes* to *Galeopsis* could take place, and this probability is rendered more credible by the increasing evidence of successful heteroecy in other Icelandic aphids.

15. *Ericaphis latifrons* (Börner).
Syn. *E. empetri* Ossiannilsson
Myzodium lagarriguei Remaudière.

Börner, 1942, p. 262; Remaudière, 1952, p. 242; Ossiannilsson, 1954, p. 18; Hille Ris Lambers, 1955, p. 9.

Additional locality records: Snæfellsjökull (5), 29. vii. 58, from unidentified host (see also *Acyrthosiphon brachysiphon* H. R. L.); Þyrill, Hvalfjörður (1), 1. viii. 58, from *Calluna vulgaris*.

This species has not previously been recorded from *Calluna vulgaris*, the known hosts being *Vaccinium uliginosum* and *Empetrum nigrum*. Icelandic material seen by us differs slightly from British *Empetrum* samples in its smaller size, shorter antennae and shorter, stouter siph-

unculi. Slight differences observable in the original descriptions of *empetri* Oss. and *lagarriguei* Rem. suggest a tendency for the species to form morphologically distinguishable races in different parts of its markedly discontinuous range (Alps, Pyrenees, Sweden, North Wales, Scottish Highlands and Iceland). But as variation in the direction of shorter appendages may occur in a number of other species living in arctic regions (see Hille Ris Lambers, 1955, p. 8), no reliable taxonomic conclusions can be drawn from these slight characters without more adequate material and some biological investigation.

16. *Myzus (Nectarosiphon) polaris* Hille Ris Lambers.
Hille Ris Lambers, 1952, p. 11, pl. III; 1955, p. 10.

Additional locality records: Laxá Waterfall (2), 1. viii. 58, from *Silene maritima* and *?Draba* sp.; Þingvellir (4), 2. viii. 58, on *Silene maritima*; near Borgarnes, in quarry, 26. vii. 58, on *Silene maritima* and *S. acaulis*; near Garður (6), 28. vii. 58, from *Capsella bursa-pastoris, Silene maritima, Stellaria media, Cerastium caespitosum* and *Gentiana aurea*; Melarsveit, near Borgarnes, from *Silene maritima* growing in sand and gravel desert, 26. vii. 58; road between Vegamót and Stykkishólmur (2), 30. vii. 58, from *Sedum villosum* and *Cerastium alpinum*; near Selfoss (7), 5. viii. 58, from *Stellaria media* and an unidentified host, believed to be *Polygonum aviculare* s. lat. from fragments present in the sample tube.

M. polaris heads the list of species collected in 1958 in terms of general abundance. The principal hosts appeared to be *Silene maritima* and *Stellaria media*, but the type host, *Cerastium alpinum*, was infested in one locality, and various other Caryophyllaceae, Cruciferae, Crassulaceae, Polygonaceae and Gentianaceae can also serve as hosts. Sexuales were found on *Sedum villosum*.

After examining representative samples of our material, Dr. Hille Ris Lambers has kindly supplied the fol-

lowing comments: "(The) type material is by its thick siphunculi and their shortness greatly different from *M. certus*. However, later samples from Greenland and certainly the material from Iceland has slightly longer siphunculi than the type material and one might wonder whether there is a reason to separate *polaris*, and whether *polaris* is a good species at all. Now the Iceland specimens have a shorter processus terminalis than West European material and they are rather between the types of *polaris* and European *certus* morphologically. I saw in Washington D. C. typical *polaris*, intercepted from Denmark, animals about the identification of which I have no doubt. Therefore I believe that there is a *polaris* and I am inclined to consider all the *Myzus* material that you submitted to be *polaris*."

It is interesting to note that in Iceland, where the very polyphagous *M. (N.) persicae* (Sulz.) has not been recorded, *M. polaris* exhibits a wider degree of polyphagy than does its very close relative *M. (N.) certus* (Wlk.) in continental Europe or in Britain, and that some of its hosts (e. g. *Capsella, Sedum, Polygonum(?)*) are recorded as hosts of *persicae* in areas where that species is the dominant *Nectarosiphon*.

17. *Jacksonia papillata* Theobald.

Hille Ris Lambers, 1955, p. 11.

Additional locality record: Ólafsvík (3), 29. vii. 58, on etiolated grass under stone and wooden plank; two samples, apt. only.

18. *Cavariella aegopodii* (Scop.).

Hille Ris Lambers, 1955, p. 11.

Additional locality records: Vegamót (2), 27. vii. 58, from *Salix lanata*: Álftártunga (4), 27. vii. 58, from *Salix phylicifolia*. Both collections consisted only of apterae.

19. *Cavariella archangelicae* (Scop.).

Hille Ris Lambers, 1947a, p. 310; 1955, p. 12.

Additional locality record: Reykjavík (9), 8. viii. 58, on *Salix* sp. (?hybrid) planted in park; 1 al. gynopara and apterae.

The single alate vivipara collected proved from a rhinarial count to be a gynopara of the type produced normally on *Angelica* (but perhaps also on *Salix*?), these having a smaller number of secondary rhinaria than the spring migrants, almost without overlap. A single plant of a large white-flowered Umbellifer, almost certainly *Angelica* or *Archangelica,* was seen heavily infested with green aphids in the umbels on a plot of waste land in Reykjavík, but could not be reached to collect the aphids, which were believed to be *Cavariella,* probably belonging either to this species or the following one.

The name *archangelicae* is here interpreted in a sense derivable from the key of Hille Ris Lambers (1947a). This ascribes to the alatae "numerous rhinaria, 8—16 in number" on ant. IV, a character that eliminates nearly all alatae of the following species, *C. konoi* Takah., in which the rhinarial number on IV does not exceed 8 in any specimen seen by us. On this interpretation of *archangelicae,* the records from Aðalból and Laugarvatn (Hille Ris Lambers, 1955) are referable to *konoi,* according to slides kindly lent by Dr. Hille Ris Lambers. Further evidence, e. g. from topotypical (Carniolan) material, is desirable to establish with greater certainty the true identity of Scopoli's *archangelicae,* and our usage here is therefore to be regarded as a tentative one.

20. *Cavariella konoi* Takahashi.

Takahashi, 1939, p. 117.

Occurrence in Iceland: Reykjavík (9), 8. viii. 58, on *Salix* sp. (?hybrid) planted in park; many alate and apterous viviparae and immature forms. Also (see above)

records from Aðalból and Laugarvatn (Hille Ris Lambers, 1955).

The existence in Iceland of a third species of *Cavariella* became apparent when the Reykjavík collection was examined. Subsequently material of the same species was found, identified as *C. archangelicae,* in collections from Britain, Norway, Austria and North America. Hosts included various *Salix* species, *Angelica* and celery. *C. konoi* Takahashi was described from Japan, and the description, referring to the presence of two small dark spots on the mid-dorsum of abd. 6 (where *C. archangelicae* has a transverse bar) fits the present species very well. The type material of *konoi* was kindly lent for study by Dr. Chia-chu Tao of Taiwan, following information of its whereabouts from Dr. Takahashi. Apart from a slightly longer processus terminalis (up to 2½ times base of VI, against up to twice base of VI in European material) no important differences could be found between European and Japanese specimens, and we accordingly use the name *konoi* for the Icelandic aphids at the present time. It appears not improbable that *Rhopalosiphum salicis* Monell, 1879, from the United States, is an earlier name for the species, but a slide labelled "9845, *Siphocoryne salicis* (Monell) Oestl., on *Salix lucida* (Cotypes), Minneapolis, Minn., June 26", kindly lent by Dr. L. M. Russell, Washington, is not in a condition permitting certainty on this synonymy; and is in any case a subsequent designation, the original material having been from St. Louis, Mo. The description of *Cavariella gigliolii* Del Guercio, 1911, does not permit a firm decision as to which of the two *Cavariella* species from *Angelica* Del Guercio had before him, since both species may have five-jointed antennae on *Angelica*; but the character is rather commoner in *archangelicae* than in *konoi,* and the ratio of 4 : 1 for siphuncular to caudal length lies somewhat nearer to *archangelicae* than to material of *konoi* seen by us. There-

fore in the absence of type material we do not wish to use *gigliolii* to replace *konoi* without further evidence. It is hoped to prepare a further account of the matter for publication at a later date.

21. *Schizaphis geijskesi* H. R. L., ssp. *priori* Stroyan.
Stroyan, 1960, p. 253.

Occurrence in Iceland: Akranes (3), 25. vii. 58, from *Elymus arenarius*; apt. viviparae and ♂♂.

This subspecies, which lies close to *S. geijskesi* s. str. and is known at present only from Iceland, has been described as indicated above.

22. *Schizaphis graminum* (Rondani), ssp. *gigjai* Stroyan.
Stroyan, 1960, p. 259.

Occurrence in Iceland: Great Geysir (8), 4. viii. 58, from unidentified grass; apt. and al. viviparae only.

This small *Schizaphis* is also new to the fauna of Iceland, and the single collection appears to represent an endemic subspecies of the very widely distributed *S. graminum* (Rond.), sensu Passerini, ?nec Mordvilko. For the original description and taxonomic discussion see the citation above.

23. *Thripsaphis (Trichocallis) cyperi* (Wlk.),
ssp. *arctica* Hille Ris Lambers.
Hille Ris Lambers, 1955, p. 19; 1960, p. ?.

Since Hille Ris Lambers gives the distribution of this species in Iceland as universal, it is unnecessary to detail our records, the identities of which have been checked by Dr. Hille Ris Lambers. In his letter he adds: "It is a question of taste whether one wants to consider the subspecies of *vibei* [Hille Ris Lambers, 1952, p. 25] or of *cyperi*." Since the name *cyperi* is used in his paper on Iceland aphids we retain it here. The literature citation in "Zoology of Iceland" is incorrect, in as much as the publication of "Additions to the Aphid Fauna of Greenland" did not take place in 1955, but is due in 1960.

24. *Thripsaphis (Trichocallis) thripsoides* H. R. L.
Hille Ris Lambers, 1955, p. 19.

Additional locality records: near Borgarnes, 26. vii. 58, from grass by roadside ditch; near Stykkishólmur (7), 30. vii. 58, from *Carex* sp.; Reykjavík (6), 24. vii. 58, from *Carex* sp. in damp meadow.

The record of *T. thripsoides* from grass, while unexpected, is confirmed to some extent by the presence in the sample of an aptera of *Metopolophlum festucae* (Theob.). But as the sample was thrashed, and the aphids were not seen sitting on the blades of the host, the possibility of an admixture of *Carax* with the grass in the ditch is not excluded.

3. General Discussion.

A. Biology.

Perhaps the most important addition to our knowledge of the biology of Icelandic aphids arising from the 1958 collection is the strong circumstantial evidence that *Hyperomyzella rhinanthi* completes a migration to and from a secondary host during the Icelandic summer. Hille Ris Lambers (1955) recorded this possibility for *C. archangelicae* and *C. aegopodii,* but was not able to state with certainty if the heteroecy played an important role for the survival of the species in Iceland. The finding of return migrants of *H. rhinanthi* makes it clear that heteroecy is by no means a mere relic of the condition prevailing in regions with a longer summer. The single record of *Metopolophium dirhodum* from grass is also of considerable interest, since this species is typically heteroecious from *Rosa* to Gramineae, and there is a possibility of its completing its cycle in Iceland. *Cryptomyzus galeopsidis* raises the number of potentially host-alternating species to six, one sixth of the present recorded total of 36 Icelandic aphid species.

Another interesting feature of the present collection

is the light shed on the biology of *Myzus polaris,* which emerges as the most abundant Icelandic aphid in 1958 in those localities and habitats where collecting was done. *M. polaris* is evidently capable of a wide-ranging polophagy, as sixteen samples from hosts belonging to five different plant families testify. Whether a complete cycle can be passed on all the hosts utilised during the summer, it not known, but it seems likely that Caryophyllaceae are the typical hosts, as they are for the closely related *M. certus.*

The finding of further samples of *Acyrthosiphon auctus* (Wlk.) on a number of different hosts has provided biological links between *auctus* and *silenicola* H. R. L., confirming earlier suspicious based on the morphological similarities between the two, that only one species was involved (Hille Ris Lambers, 1959). The species is apparently rather polyphagous, with a somewhat similar host range to that of *Myzus polaris:* the families Caryophyllaceae, Cruciferae and Gentianaceae are common to both, and mixed colonies of the two have occurred in three instances.

Other host records of importance are that of *Acyrthosiphon boreale* on *Potentilla,* linking the species biologically as well as morphologically with the Rosaceae-inhabiting members of the *A. malvae* group, and the occurrence of *Acyrthosiphon pisum* on *Vicia cracca* and *Capsella bursa-pastoris,* confirming the prediction of Hille Ris Lambers (1955). Also of interest are the records of *Ericaphis latifrons* on *Calluna* and *Metopolophium festucae* on *Elymus.*

B. Endemism.

Hille Ris Lambers (1955) discribed two new species from Iceland: *Acyrthosiphon silenicola* and *Aphis atuberculata.* Of these the first is now known to occur also in Britain and Denmark as *A. auctus.* The present collec-

tion suggests that endemism in the Icelandic aphid fauna is somewhat more frequent than the material available for the earlier account revealed. Three of the species collected in 1958 differed sufficiently from their counterparts in the rest of Europe to justify description as new subspecies. Apart from these, two other species, *Ericaphis latifrons* and *Nasonovia compositellae,* differ slightly from British and continental material, although not sufficiently to warrant treatment as distinct subtaxa without further evidence.

C. Zoogeography.

The additions to the Icelandic fauna recorded in 1958 may be assigned to the categories used by Hille Ris Lambers (1955, pp. 25—26) in the following way:

a. Endemic subspecies.
Hyperomyzus boerneri Prev., ssp. *thorsteinni* Stroyan.
Schizaphis geijskesi H. R. L., ssp. *priori* Stroyan.
S. graminum (Rondani), ssp. *gigjai* Stroyan.

b. Cosmopolitan species.
Brachycaudus helichrysi (Kltb.).

c. Holarctic species.
Cavariella konoi Takah.
Metopolophium dirhodum (Wlk.).

d. Boreal species.
Hyperomyzus (Hyperomyzella) rhinanthi (Schout.).

e. Atlantic species.
Thuleaphis ? acaudata H. R. L.

This might be considered an arctic species, had it not occurred in North Wales as well as Greenland and Iceland, on which account it is placed here.

f. Arctic species.
Nasonovia (Neokakimia) saxifragae (Donc. & Stroy.).

This species is known only from Iceland and Jan Mayen. The distribution of the subgenus is boreal, and related species are known from the Alps and from Britain.

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Anmeldelse.

T. E. Hughes: **Mites, or the Acari.** London (Athlone Press) 1959, 225 pp., 53 plates. 42 shill.

Denne Bog er nærmest at opfatte som en "Imms" over Mider og er et fortræffeligt, helstøbt og afrundet Værk. Dets Opdeling er lidt usædvanlig, begyndende med Biologi og endende med Morfologi og Anatomi; den omvendte Rækkefølge synes mig at give bedst Mulighed for Forstaaelsen af Biologien. De biologiske Afsnit — fritlevende Mider, Miders Forbindelse med andre Dyr, Ecto- og Entoparasitisme, Sygdomsoverførere — giver et Væld af Oplysninger, vel ordnede, et godt Grundlag for yderligere Studier. Det undrer dog, at Trombicula-Larven betragtes som ren Pattedyr-Parasit, medens den jo herhjemme saa overvejende plager Fugle (foruden Mennesker!).

Morfologien optager 114 af Siderne og er meget omhyggeligt fremstillet, ikke mindst i Forbindelse med Systematik og Fylogeni (f. Ex. Mesostigmat-Fylogeni p. 101); (at Pedipalpen betegnes som to-grenet med en "exite, being the palp, [and] the endite or inner ramus" (p. 135) er dog en lidt ulykkelig Distraktionsfejl). En saa klar og velskreven Oversigt har jeg ikke tidligere læst, og dertil kommer det meget fine Illustrationsmateriale; alle 53 Tavler bringer Originaltegninger af Forf. og hans Hustru, der begge er højt anskrevne Acarologer og aabenbart ogsaa meget fine Tegnere af baade rene Habitusbilleder og Detail-Tegninger.

Der er med denne Bog givet et førsteklasses Grundlag for et Studium af Miderne; i Betragtning af deres store Artsrigdom ogsaa herhjemme, deres Forekomst overalt og deres økologiske Betydning, maa man haabe at denne Bog ogsaa her i Landet maa virke inciterende.

S. L. Tuxen

Ergänzendes über die von Silvestri und Berlese beschriebenen Proturen.

Von
S. L. Tuxen.

I. Die Arten von Silvestri.

Als ich 1956 (b) schrieb, die erstbekannte aller Proturen, *Acerentomon doderoi* Silv., sei so gut bekannt, dass eine Neubeschreibung sich erübrige, war es eigentlich gegen besseres Wissen; aber ich hatte keine Möglichkeit gehabt, diese Art zu untersuchen. Diese Möglichkeit wurde mir jetzt dank einer Unterstützung durch die Kopenhagener Universität gegeben, wofür ich meinen Dank aussprechen möchte; auch den Herren Prof. Dr. G. Russo und Dr. G. Zinna, die mir während meines Portici-Aufenthaltes hilfreich beistanden, gebührt mein herzlicher Dank. Ich werde im folgenden diese Art neubeschreiben, was glücklicherweise nur eine Bestätigung des schon vermuteten bedeutet, aber doch im Rahmen meiner Richtigstellung der alten Arten und Namen notwendig war, und noch dazu ergänzendes über die anderen Silvestri'schen Arten bringen.

Acerentomon doderoi Silv.

Acerentomon doderoi Silvestri 1907 p. 297, fig. passim.

Obwohl die erste Protura, die bekannt wurde und als Grundlage des Ordens diente, ist diese Art erstaunlich eingehend von Silvestri beschrieben worden, und zwei Jahre nachher sind noch viele Einzelheiten von Berlese hinzugefügt (1909). Selbst auf die Angaben über die Chätotaxie, obgleich deren systematischer Wert noch nicht erkannt war, kann man sich fast ganz vertrauen. Das Exemplar, das ich als Lectotypus erwählt habe (Silvestri gibt keinen Holotypus an, dagegen bezeichnet er

4 Präparate als Cotypus) trägt die Etikette in Silvestris Hand: "Acerentomon Doderoi Silv. ♂ Cotypus! Genova" und ist von Luftbläschen etwas gedrängt, was die Lage der Borsten sowie der Klaue und des Labrums erheblich beeinflusst.

Der Vordertarsus (Abb. 1—2) sieht dem von *A.*

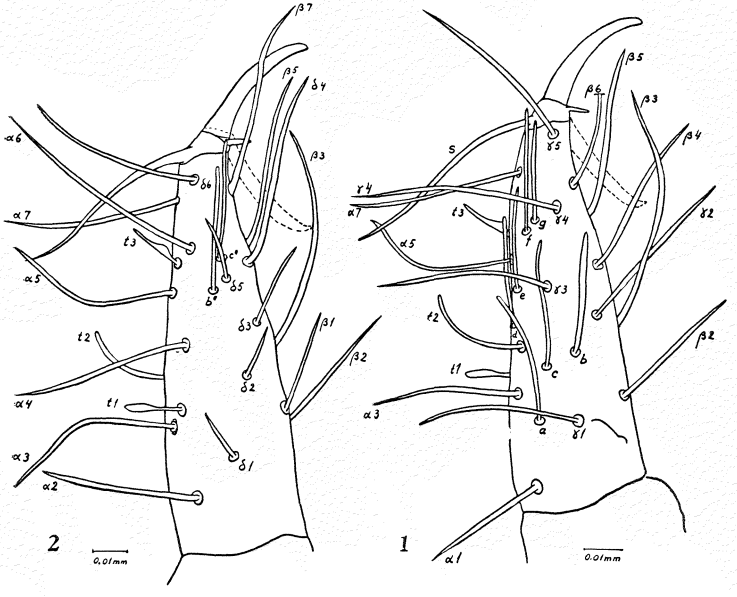


Abb. 1—2: *Acerentomon doderoi* Silv. Lectotypus. Vordertarsus von aussen und innen. Die punktierte Linie gibt die faktische Stellung der Klaue an.

microrhinus Berl. (Tuxen 1956 a) sehr ähnlich. (Nur der eine Tarsus ist vorhanden, weshalb die eine Seite durch die andere gesehen werden musste). b ist dicker als die übrigen Sensillen. TR = 2.7, soweit es beurteilt werden konnte, da die Klaue in eine schiefe Stellung verdrängt worden ist (siehe die punktierte Linie in den Abbildungen). e:u (Empodium:Klaue) = 1:8.

Das Filamento di sostegno wie bei *A. microrhinus*. LR = 3.7.

Der Abdominalkamm VIII (Abb. 3) ist abweichend von dem bei *microrhinus* Berl. vorhandenen gebaut, mit gegen 22 schmalen, langen und gleich langen Zähnen auf einem recht grossen Lappen, der dem neunten Abdominaltergit überragt. Wichtig ist, dass die Zahnreihe vorne am Abd. VIII von langen, schlanken, spitzen Zähnen besteht, bei *microrhinus* von kurzen, stumpfen. Das Pleuron VIII mit 5 recht langen Zähnen am Hinter-

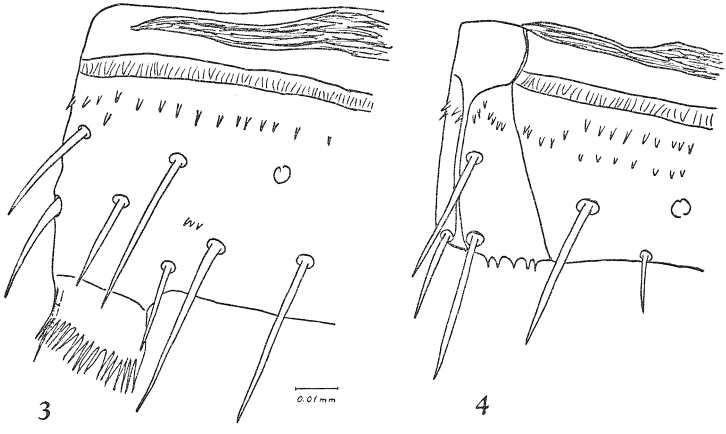


Abb. 3—4: *Acerentomon doderoi* Silv. Lectotypus. Abb. 3: Tergit VIII mit Abdominalkamm. Abb. 4: Sternit und Pleuron VIII.

rande (Abb. 4). Pleura VI und VII mit Zahnkämmen in der vorderen Hälfte, wie Abb. 5 zeigt; dies wird in Verbindung mit den Ionescu'schen Proturen näher erörtert werden.

Die Chätotaxie ist wie folgt:

	I	II	III	IV-VI	VII	VIII	IX	X	XI	XII
t	6/14	10/16	10/16	10/16	12/18	8/13	14	10	6	9
s	3/4	5/5	7/5	7/8	5/9	4/2	4	4	6	6

Am Sternit VI trägt die vordere Reihe nur 6 Borsten; das ist abnorm, was die unsymmetrische Unterbringung

zeigt. Sternit XII mit kleinen Zähnen dem Hinterrande entlang zwischen den Borsten "2" an jeder Seite.

Acerentulus travassosi Silv.

Acerentulus travassosi Silv. 1938 p. 441, fig. I, 1—13; Tuxen 1956 b p. 724, fig. IV, 12—14.

Diese Art wurde 1938 beschrieben und von mir 1956 neubeschrieben auf Grund eines der drei bekannten Exemplare (Tuxen 1956 b p. 724). Ich hatte dieses Exemplar damals als Lectotypus gewählt; leider hat es sich gezeigt, dass sowohl dieses wie das eine der anderen Präparate seitdem durch ein Unglück zerstört worden sind und die Tiere verschwunden, nur die Etiketten sind noch da. Das dritte Exemplar, dem leider alle Beine fehlen, muss deshalb jetzt der Lectotypus sein, und ich habe es entsprechend bezeichnet; es trägt die Etikette in Silvestris Hand: "Travassosi Silv. Cotypus! Campinas". Auf diesem Exemplar habe ich die Chätotaxie, die von Silvestri unrichtig angegeben war (Tuxen 1956 b p. 727), untersucht; sie ist wie folgt:



Abb. 5: *Acerentomon doderoi* Silv. Lectotyp. Kämme an den Pleur. VI u. VII.

	I	II-III	IV-V	VI	VII	VIII	IX	X	XI	XII
t	6/12	8/14	8/14	10/14	6/18	6/14	14	12	6	9
s	3/4	3/5	3/8	3/8	3/8	4	4	4	6	6

was ja dem allgemeinen Schema von der *Acerentulus*-Chätotaxie weit besser entspricht.

Acerentulus tristani Silv.

Acerentulus tristani Silvestri 1938 p. 443, fig. II, 1—9; Tuxen 1956 b p. 727, fig. V, 15—17.

Von dieser Art musste die Chätotaxie untersucht werden, weil ich sie 1956 nur nach Silvestri angeben konnte und zwar mit grossem Zweifel. Sie ist wie folgt:

	I	II-III	IV-V	VI	VII	VIII	IX	X	XI	XII
t	$\frac{4}{8}$	$\frac{8}{14}$	$\frac{8}{14}$	$\frac{6}{14}$	$\frac{6}{18}$	$\frac{4}{15}$	12	12	4	9
s	$\frac{3}{4}$	$\frac{3}{5}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	4	4	4	4	6

Eosentomon wheeleri Silv.

Eosentomon Wheeleri Silvestri 1909 p. 8; Eosentomon wheeleri Bonet & Tuxen 1960 (im Druck).

Diese Art wurde 1909 beschrieben, aber nach der Beschreibung war sie nicht zu erkennen. Sie war "nel terriccio dei boschi dei dintorni di New York" gefunden. Als ich 1955 Portici besuchte, war es unmöglich, diese Exemplare zu finden, und sie mussten als verloren betrachtet werden, weshalb Bonet und ich die Art neubeschrieben haben (im Druck) nach Exemplaren, die Ewing als *wheeleri* betrachtet hatte. Seitdem sind die Original-Exemplare von Silvestri aber gefunden worden, und ich habe sie jetzt untersucht. Es handelt sich um 4 Präparate, die alle als "Eosentomon Wheeleri Silv. Fort Lee" in Silvestris Handschrift bezeichnet sind. Ein Präparat enhält eine "Larva", die zwei anderen enthalten erwachsene, aber fast eingetrocknete Tiere; nur das Exemplar im vierten Präparat ist für eine Untersuchung einigermassen geeignet, und ich erwähle es als Lectotypus. Es ist ein Weibchen.

Der Vordertarsus ist leider so eingetrocknet und unklar, dass die einzelnen Sensillen nicht gesehen werden können, nur t 1 ist deutlich, und es zeigt sich, dass sie etwas weiter zurück liegt als bei *transitorium*, d : p = 8 : 7, wie bei der von Bonet & Tuxen als *wheeleri* beschriebenen Art.

Die Squama genitalis ♀ habe ich gezeichnet; sie ist der von *mexicanum* sensu Tuxen 1956b (p. 723 fig. II, 8) sehr ähnlich, und auch derjenigen der von Bonet & Tuxen als *wheeleri* beschriebenen Art.

Die Chätotaxie habe ich auch verfolgen können

mit Ausnahme von Abd. II (das Tier ist in drei Stücken vorhanden); sie stimmt in allem mit der von Bonet & Tuxen als *wheeleri* beschriebenen Art überein. Die accessorischen Borsten sind weit länger als die prinzipalen; eine Abbildung von Tergit IV hätte genau dasselbe Bild gegeben wie bei *E. boneti* Tx. (Tuxen 1956b p. 725, fig. III, in der Mitte); siehe auch Bonet & Tuxen fig. 10.

Also kann aus alledem geschlossen werden, dass die Beschreibung von *E. wheeleri,* die Bonet & Tuxen gegeben haben, auch mit dem jetzt gefundenen Typen-Material übereinstimmt, und dass die Art also künftig so aufgefasst werden kann als in unserer Abhandlung über die Ewing-Proturen.

Eosentomon mexicanum Silv.

Eosentomon Wheeleri, var. mexicanum Silvestri 1909 p. 9; Eosentomon mexicanum Tuxen 1956b p. 722, figs. II, 6—10, III, 11.

In meiner Arbeit (1956 b) habe ich geschrieben, das Typen-Exemplar dieser Art sei verlorengegangen; es handelte sich um ein einziges Männchen, das Silvestri in Mexico gefunden hatte. Ich neubeschrieb deshalb die Art auf Grund von zwei Exemplaren, die von Bonet gefunden und als *mexicanum* bestimmt worden waren. Jetzt ist auch dieses Typen-Exemplar gefunden worden; es liegt aber im Präparat wie in einem Nebel eingebettet, ist nicht aufgeklärt, und es ist vollständig unmöglich, Einzelheiten an ihm zu sehen. Nur dass es ein Männchen ist, ist festzustellen. Es kann also keiner Neubeschreibung als Unterlage dienen, und ich glaube, man wird am vorteilhaftesten auch künftig die Art wie in meiner Neubeschreibung 1956 b auffassen.

II. Die Arten von Berlese.

1955 habe ich die ganze Sammlung von Berlese in Firenze durchgesehen und Neubeschreibungen auf Grund mehrerer Exemplare gemacht, sowie angegeben, welches Präparat ich in den verschiedenen Fällen gezeichnet

habe. Es können aber im Präparat mehrere Exemplare vorhanden sein, auch mehreren Arten angehörend; eine Korrektion der Bestimmungen habe ich nicht vorgenommen, und um künftig Verwechslungen zu vermeiden habe ich jetzt, 1960, einen Lectotypus von jeder Art designiert, gleichzeitig mit einer neuen Untersuchung von *Acerentomon microrhinus.*

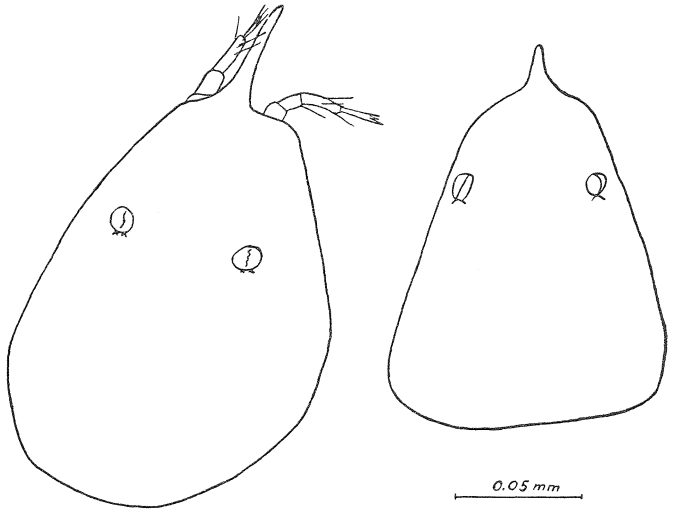


Abb. 6. Kopfumrisse von den Lectotypen von *Acerentomon doderoi* Silv. und *microrhinus* Berl.

Acerentomon microrhinus Berl. Die Abbildung des Vordertarsus, die ich seinerzeits gegeben habe (Tuxen 1956a p. 229 Abb. I), ist nicht ganz genau. Die Sensille b ist dicker als die übrigen (so wie bei *doderoi,* siehe oben p. 295) und reicht fast bis zur ♂ 4, etwas verschmälert gegen die Spitze; c reicht ebenso weit, und auch e reicht ein klein wenig länger als angegeben. Eine neue Abbildung erübrigt sich.

Die Form des Kopfes ist in Abb. 6, mit einer Zeichnung des Typen-Exemplars von *doderoi* zusammen, ab-

gebildet worden. LR = 9.5. Beide Kiefertaster sind eingezogen.

An den Pleuren VI und VII sind deutliche Kämme proximal vorhanden, Pl. VI mit 15—16 kleinen Zähnen, Pl. VII mit zwei grösseren und einem Paar kleinerer Zähne (Abb. 7).

Die Chätotaxie muss auch revidiert werden, wegen Druck- und Beobachtungsfehler; sie ist wie folgt:

	I	II-III	IV-VI	VII	VIII	IX	X	XI	XII
t	$\frac{6}{14}$	$\frac{10}{16}$	$\frac{10}{16}$	$\frac{10}{16}$	$\frac{8}{13}$	12	10	4	9
s	$\frac{3}{4}$	$\frac{5}{5}$	$\frac{7}{8}$	$\frac{5}{9}$	4	4	4	6	6

Der Hinterrand vom Sternit XII ist fein gezähnelt wie bei *doderoi* Silv.

Der Lectotypus ist ein Weibchen aus Casalmonferrato, im Präparat 5·3 der Sammlung Berlese.

Acerentulus confinis Berl. Die von mir auf der Innenseite des Vordertarsus als c'' angegebene Sensille ist keine Sensille, sondern die ganz winzige Borste β 1.

Lectotypus: ♂ aus Firenze, im Präparat 2·13 der Samml. Berlese; es ist dasselbe Tier, das Berlese als Unterlage für seine Abb. 61, Tav. VII gedient hat (siehe Tuxen 1956 a p. 232).

Acerentulus tiarneus Berl. Wie es mir aus den schönen Zeichnungen bei Imadaté & Yosii (1959) klar geworden ist, habe ich die Sensillen der Innenseite des Vordertarsus fehl gedeutet; a' habe ich als b' gedeutet, während diese aber fehlt. Die Stellung im Verhältnis zu t1-t2 macht dies einleuchtend.

Lectotypus: ♂ mit gespreizten Ge-



Abb. 7: *Acerentomon microrhinus* Berl. Lectotypus. Kämme an den Pleuren VI und VII.

nitalien. Aus Tiarno, Präp. 4 · 13 der Samml. Berlese.

Acerentulus cephalotes Berl. Lectotypus: präimaginales Männchen aus Boboli (d. h. Giardino Boboli in Firenze) 1907, Präp. 3 · 5 der Samml. Berlese.

Acerentulus gracilis Berl. Lectotypus: ♀ aus Toiana (Pisa), Präp. 3 · 42 der Samml. Berlese, von Berlese selbst: "tipico" bezeichnet.

Acerentulus minimus Berl. Lectotypus, weil das einzige immer noch vorhandene Exemplar: aus Boboli 1907, "tipico", Präp. 3 · 4 der Samml. Berlese.

Acerentulus perpusillus Berl. Holotypus, weil das einzige Berlese bekannte Exemplar: ♀ aus San Vincenzo (Pisa) 1908; Präp. 2 · 35 der Samml. Berlese.

Eosentomon transitorium Berl. Lectotypus: ♂ aus Firenze, im Präp. 2 · 48 der Samml. Berlese.

Eosentomon ribagai Berl. Lectotypus, weil das einzige immer noch vorhandene Exemplar: ♂ aus Tiarno-Trentino, "tipico"; Präp. 2 · 3 der Samml. Berlese.

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Tuxen, S. L., 1956a: Neues über die von Berlese beschriebenen Proturen. Redia 41 p. 227—58.

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Anmeldelse.

Bertil Gullander: **Nordens Dagfjärilar.** Nordstedt & Söners förlag. Stockholm. 1959. 93 pp., heraf 32 farvetavler. Pris sv. Kr. 15.—.

Kort efter fremkomsten af T. W. Langer's foliant om dette emne (anm. Ent. Medd. bd. 21 p. 41—44) er fra svensk side udsendt denne lille fordringsløse bog (format 13 × 19,5 × 1,2 cm). Alle 133 nordiske dagsommerfugle (imagines) er gengivet i meget smukke og vellignende farvebilleder efter forf.s egne tegninger. Ikke mindst tavlerne p. 27, 30 og 39 er fremragende. Af larverne afbildes 44 arter, af pupper 30. Texten er meget knap, men giver for hver art oplysninger om biotop, biologi og udbredelse indenfor norden (i detailler dog kun for Sveriges vedkommende).

Bogen indledes med bemærkninger af teoretisk og praktisk art såsom systematiske forhold, metamorfose, indsamlingsteknik. Under sidstnævnte findes — aldeles udenfor emnet, men alligevel nyttig for andre end netop "diurnologer", et afsnit om lyslokning(!). Motiveringen er den (p. 18), at "nogle dagsommerfuglearter (f. ex. *Thecla quercus* L.) måske kan fanges i mørke på lys". Skulde man lede efter en motivering for at få dette med, havde det nu været mere nærliggende at nævne *Vanessa cardui*, som faktisk ikke helt sjældent kommer til lyslokning (gerne ved midnatstid). En lille pudsighed fra dette afsnit kan noteres. Det siges (p. 19) om den hvide dug, man bruger til lyslokning: "hvis man har dugen liggende på jorden, bør den være rund". Nu er en rund dug temmelig upraktisk at administrere (man bruger dog en firkantet dug selv til et rundt bord), men motiveringen er vel den, at de dyr, der tiltrækkes af en punktformet lysgiver, formodes at fordele sig regelmæssigt indenfor en cirkel med denne som centrum. Ræsonnementet er imidlertid forkert, da fordelingen er således, at dyrene — der nemlig trækker op mod vinden — i virkeligheden grupperer sig således, at der er flest — og størst afstand til de yderste — på den del af dugen, som vender mod vindretningen. Et almindeligt rektangulært lagen er derfor også af den grund at foretrække. Men slige spekulationer er altså bogens emne ganske uvedkommende.

Hvad systematikken angår, overraskes man glædeligt over, at alle 19 perlemorsfugle igen har fundet sammen i én og samme slægt, som tilmed hedder *Argynnis*, efter at de (f. ex. i T. W. Langer's ovennævnte bog) har været udstyret med 9 forskellige slægtsnavne. Mindre glædeligt er det derimod, at de 21 blåfugle (*Lycaena*) af uudgrundelige årsager fordeles på ikke mindre end 15 "slægter".

Sammenfattende må det siges, at det er en aldeles fortræffelig lille bog, som alle nordiske entomologer vil have glæde af at stifte nærmere bekendtskab med.

Niels L. Wolff.

Aulacorthum knautiae n. sp. (Homoptera: Aphididae).

By Ole Heie
Skive Seminarium
Skive

Description.

Apterous viviparous female.

Morphological characters. — Body about 2½—3 mm long, oval, with largest width between the hind coxae and the siphunculi. Tergum sclerotic, evenly pale brownish, wrinkled. Hairs short, especially those on the dorsum. Head not darker than the rest of the body, ventrally with many small spinules in the front, in the middle, and below the compound eyes, dorsally with only few minute spinules in two bands from the inner corners of the incision between the frontal tubercles to the dorsal border of the compound eyes. Frontal tubercles well developed, parallelous to very slightly diverging. Median frontal tubercle hardly developed, very low and inconspicuos Hairs on head acute and a little shorter than some of the ventral hairs on the front part of the abdomen, about as long as basal diameter of antennal segment III. The antennae about $1^1/_3$ times as long as body, pigmented like the head, a little darker towards apex and at the apices of antennal segments III, IV, and V and at the apex of base of VIth segment. 1st antennal segment on basal half on outer side with 2—4 short hairs. IIIrd segment with 1—3 secondary rhinaria near base. Processus terminalis brown, $1^1/_{10}$—$1^4/_9$ times IIIrd segment, $4^1/_7$—$5^1/_7$ times base of VIth segment. Hairs on IIIrd segment shorter than $^1/_3$ of basal diameter of the segment. Rostrum long, reaching a little longer than hind coxae; apical segment about $1^1/_4$—$1^5/_7$ times 2nd joint of hind tarsi, laterally with 4—5 pairs of hairs. Siphunculus

pale, a litte brownish near the wide flange, about $^1/_4$—$^3/_{10}$ of the length of the body, cylindrical with widened base, the distal third slightly swollen, somewhat attenuated near apex, with imbricated surface, with about 3 rows of hexagonal cells near the flange. Cauda rather pale with numerous minute spinules, blunt, hardly or

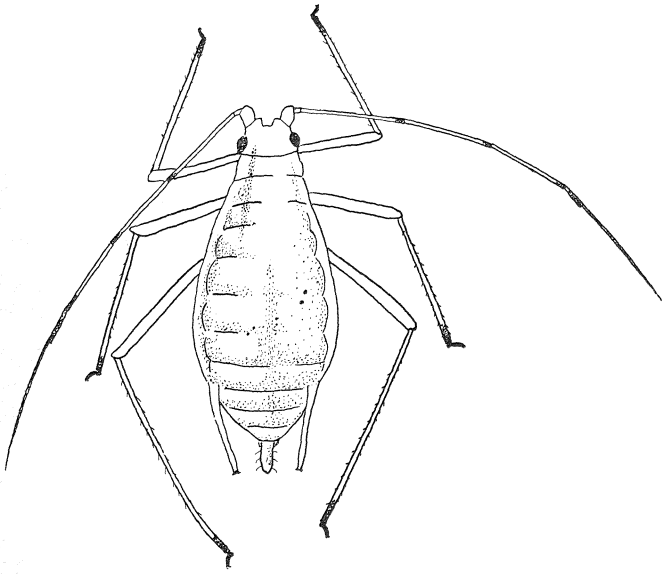


Fig. 1. *Aulacorthum knautiae* n. sp. Apterous viviparous female (× 17).

not constricted, $^1/_3$—$^5/_{11}$ of the siphunculi, with 7 hairs (3 pairs of lateral hairs and one unpaired subapical hair dorsally). Legs long and slender, rather pale, but a little more brownish than the siphunculi, with dark brown tarsi and apices of the tibiae; first tarsal joints with 3, 3, 3 hairs.

Colour. — Yellowish white to pale greenish. The imagines often shiny, the larvae dull. A little more green on the hindmost part of the abdomen than on the rest, but without spots at the bases of the siphunculi. Siphun-

culi and legs pale brownish with dark apices. The antennae pale brownish with dark apices to the segments of the flagellum. Eyes black.

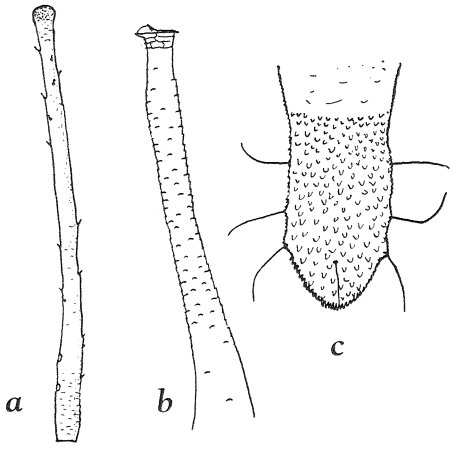


Fig. 2. *Aulacorthum knautiae* n. sp. Apterous viviparous female: a) IIIrd antennal segment (× 70), b) Siphunculus (× 70), c) Cauda (× 100).

Measurements (in mm). —

No.	*Body*	*Ant.*	*Prop. of ant. segments III : IV : V : VIa : VIb*					*Sec. rhin. on III*	*Siph.*	*Cauda*
1	2,82	3,67	100	81	78	24	126	1 + 2	0,76	0,32
2	2,76	3,67	100	81	71	26	108	2 + 2	0,86	0,29
3	2,70	3,76	100	82	74	26	116	1 + 2	0,73	0,29
4	2,69	3,76	100	73	68	24	124	1 + 2	0,76	0,32
5	2,39	3,30	100	82	74	28	144	1 + 2	0,69	0,24
6	2,82	3,67	100	84	69	24	135	2 + 3	0,69	0,27
7	2,66	3,56	100	83	71	24	121	1 + 3	0,67	0,32
8	2,86	3,66	100	78	71	27	112	2 + 3	0,76	0,32

(Nos. 1—3: Addit Forest, 28-6-1959, 4—5: Studsgård, 9-7-1959, 6—8: Brunshåb, 12-7-1959).

Alate viviparous female (based on one specimen).

Morphological characters. — Head and thorax sclerotic and pale brownish. Abdomen with a sclerotic pattern, consisting of brown marginal sclerites on seg-

ments II—IV, pleural intersegmental sclerites irregular of shape between segments I—II, II—III, III—IV, IV—V, and V—VI, and some very irregular dorsal spots on the segments. Some of the spinal hairs are placed on some of these small segmental sclerites. A distinct brownish sclerite is placed laterally before the base of each siphunculus. The area behind the base of each siphunculus imbricated, with a pale postsiphuncular sclerite without distinct margins. Head nearly smooth, with only a few minute spinules on two small ventral areas, one on each side of the base of the mouthparts, and some nearly invisible minute spinules dorsally between the frontal ocellus and the compound eyes. Frontal tubercles rounded, well developed. Antennae about $1\frac{1}{2}$ times as long as body, brownish, the very base of IIIrd segment pale, imbricated. 1st antennal segment on basal half on outer side with 3—4 hairs. IIIrd antennal segment with about 12—13 secondary rhinaria in a single row on basal $^3/_4$. Rostrum reaching hind coxae. Siphunculi and cauda very much like those of the apterous viviparous female, but cauda more distinctly constricted in a distance of about 60 % of the length of the cauda from apex. Wings certainly with normal venation (the specimen here described has 3 branches of media on left fore wing like related aphid species, but only 2 branches on the right one, an abnormity which is not rare among aphids); the veins are pale brown. Hind wings with 2—3 small hooks in the wing coupling apparatus. Legs with the femora brownish with pale base and fuscous apex, tibiae yellow with black apices.

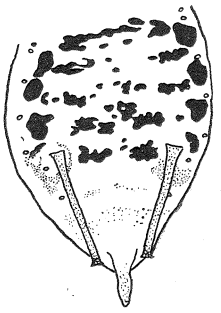


Fig. 3. *Aulacorthum knautiae* n. sp. Alate viviparous female: The dorsum of the abdomen with the sclerotic pattern (× 25). Hairs have not been drawn.

Colour. — Yellowish green with black spots and

transversal bands on abdomen. Head brownish. Thorax brownish yellow with brown scutum. Antennae and legs brownish yellow with darker tarsi and apices of tibiae. Eyes black. The nymph is yellowish white.

Measurements of one specimen. — Length of body: 2,60 mm; antenna: 3,87 mm; siphunculus: 0,60 mm; cauda: 0,30 mm. Proportions of antennal segments III: IV: V: VIa: VIb = 100: 80: 75: 24: 134. Secondary rhinaria on IIIrd antennal segment: 12 + 13.

Oviparous female.

Morphological characters. — Much like apterous viviparous female, but the antennae, siphunculi, and cauda relatively shorter. Tergum pale, not wrinkled. The hind tibiae swollen on basal half, each with about 100—150 small pseudosensoria.

Colour. — As in apterous viviparous female.

Measurements (in mm). —

No.	*Body*	*Ant.*	*Prop. of ant. segments III : IV : V : VIa : VIb*					*Sec. rhin. on III*	*Siph.*	*Cauda*
1	2,34	2,69	100	85	82	31	141	2 + 2	0,50	0,21
2	2,59	2,89	100	83	83	31	143	2 + 2	0,59	0,21

(Nos. 1—2: Dalgas Plantation, 15-10-1959).

Apterous male.

Morphological characters. — Body relatively slender, about 2 mm long. Head sclerotic, often dark brown. Abdomen often with a sclerotic pattern of the same type as in alate viviparous female, consisting of intersegmental sclerites. Frontal tubercles parallelous. Antennae more than 1½ times the length of the body. IIIrd antennal segment with 34—43 secondary rhinaria, IVth segment with 18—29, Vth segment with 13—18. Cauda blunt. Antennae, siphunculi, cauda, and legs coloured as in alate viviparous female.

Colour. — Head brown. Thorax yellow. Abdomen yellowish green with black spots and transversal bands. Antennae and legs rather dark. Siphunculi and cauda greenish. Eyes black.

Measurements (in mm). —

No.	*Body*	*Ant.*	*Prop. of ant. segm. III : IV : V : VIa : VIb*	*Sec. rhin. on III, IV, V*	*Siph.*	*Cau.*
1	2,07	3,03	100 75 71 24 122	34+41, 20+20, 16+13	0,52	0,20
2	2,24	3,51	100 75 69 20 122	42+43, 24+19, 18+17	0,50	0,21
3	1,96	3,39	100 81 75 23 138	41+40, 29+24, 17+15	0,49	0,21
4	1,86	3,04	100 80 80 29 149	39+38, 18+26, 14+15	0,50	0,26

(Nos. 1—3: Dronninglund Great Forest, 22-9-1958, 4: Handbjerg, 27-9-1959).

Type material (apterae viviparae, 1 holotype and 2 paratypes, and one alate morphotype, jr. nr. 1383) from Addit Forest between Silkeborg and Horsens (Jutland), 28-6-1959. Holotype, one paratype, and the alate morphotype in the author's collection, one paratype in the collection of Dr. Hille Ris Lambers.

Host: *Knautia arvensis* (L.) Coult.

Geographical distribution. — The species has been found on several localities in Jutland, Denmark. In my collection following localities are represented: Dronninglund Great Forest (Vendsyssel), Addit Forest (between Silkeborg and Horsens), Haderup (between Skive and Herning), Studsgård (at Herning), Brunshåb (at Viborg), Handbjerg (between Struer and Skive), and Dalgas Coniferous Plantation (between Skive and Viborg). Furthermore it has been seen (but not collected) on two localities: Aulum (between Herning and Holstebro) and Glyngøre (Salling).

Biology. — This aphid lives on the undersides of the basal leaves of its host, usually only few specimens or a single one per leaf. The species has been found from June 28 until October 15, 1959. The populations only consisted of apterous adults and larvae with the exception of the material from Addit Forest, collected on June 28, when one nymph was found, from which I reared an alate viviparous female on June 30.

Sexuales were found on September 22, 1958 (Dronninglund Great Forest, several larvae, from which I rea-

red some males), on September 27, 1959 (Handbjerg, one male reared on October 2), and on October 15, 1959 (Dalgas Plantation, some larvae, from which I reared one male and two oviparous females). In a glass tube some greenish white eggs (size and shape like normal aphid eggs) were laid in October by the oviparous females found at Dalgas Plantation.

Taxonomy. — *Aulacorthum knautiae* n. sp. is easily distinguishable from *A. solani* Kalt. by following characters: 1) Ist antennal segment with 2—4 hairs on basal part on outer side (*A. solani* usually with only 1 hair), 2) No green spots at bases of siphunculi when alive, 3) The head with only few minute spinules dorsally, 4) Rostrum longer (reaching hind coxae), with longer apical segment.

The first of the above-mentioned characters is common to *A. rufum* H. R. L., *A. palustre* H. R. L., and *A. knautiae* n. sp.

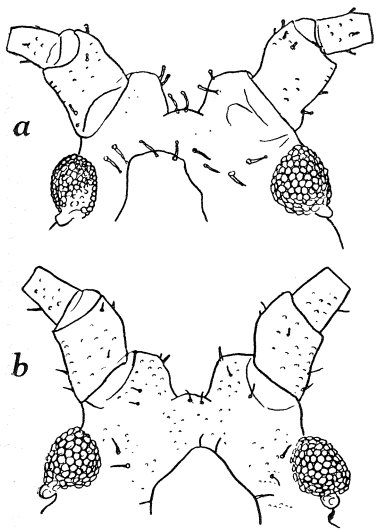


Fig. 4. Head of apterous viviparous female of a) *Aulacorthum palustre* H. R. L. and b) *A. knautiae* n. sp. (× 70). The hairs of *palustre* with swollen apices.

A. rufum, living on *Vaccinium myrtillus*, is apple-green or dirty brown-reddish, with smooth or nearly smoth head, without darker apices to antennal segments III and IV, with fewer secondary rhinaria on segment III, viz. 0—2 in the apterous female, 5—12 in the alate female (Hille Ris Lambers 1947), so it can easily be distinguished from *A. knautiae*.

The hosts of *A. palustre* are *Leontodon* (Hille Ris Lambers 1947), *Taraxa-*

cum (Börner 1952, Stroyan 1955), and *Hypochoeris* and *Picris* (Hille Ris Lambers in litt.). Dr. Hille Ris Lambers most kindly sent me cotypes of *A. palustre* (apt. viv.), so that a comparison with this species could be made. The hairs on the head are distinctly capitate, whereas the hairs on the head of *knautiae* are tapering (fig. 4), and besides the siphunculi of *palustre* are a little shorter ($^2/_9$—$^1/_4$ body length) than those of *knautiae* ($^1/_4$—$^3/_{10}$ body length). According to Hille Ris Lambers (1947) the colour of apterous *palustre* is pink or greenish, with usually a rusty or bright green spot near base of each siphunculus, whereas only yellowish green or yellowish white specimens of *knautiae* have been seen, without spots near bases of siphunculi. The dorsum of the head of *palustre* is completely smooth, whereas *knautiae* has some small spinules, though very few and minute.

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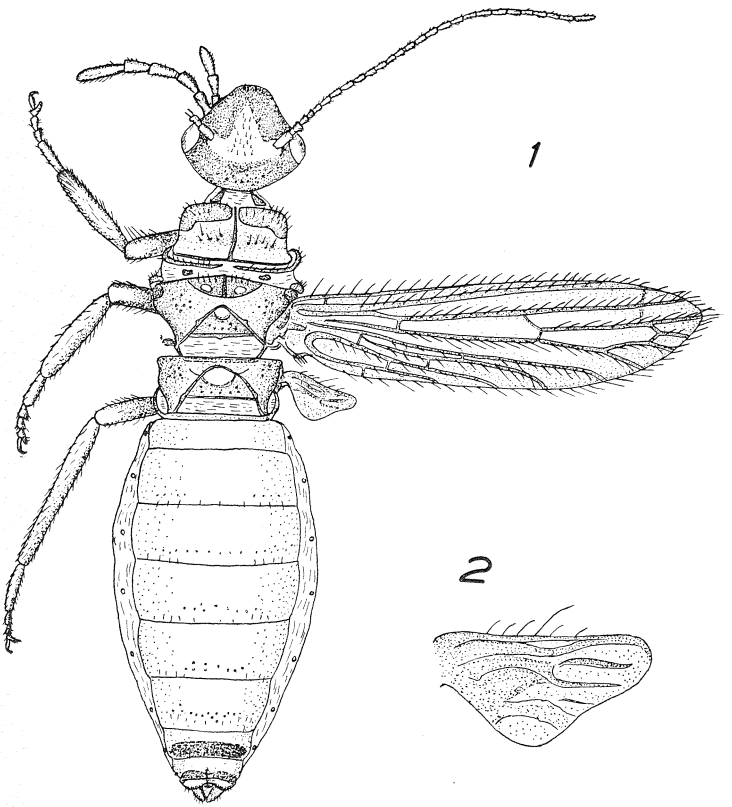
A new subapterous Coniopterygid from Denmark (Neuroptera).

By
Bo Tjeder

Through the kindness of Dr. Anker Nielsen, Copenhagen, I have been privileged to examine and describe a very remarkable lace-wing, discussed in this paper. The specimen has greatly reduced wings and is of unusual interest in several respects. In appearance it is very little agreeing with an average Coniopterygid. Its strongly haired, convex, unpowered forewings and the small, pad-like hindwings make it more suggestive of a *Psectra* than of a Coniopterygid. However, it certainly belongs to the Coniopterygidae. The shape of the galea (with basigalea and apical, round knob) as well as the presence of plicaturae on the abdominal sternites refer it to the subfamily Aleuropteryginae; the definite unpigmented and weak patch on the frons and the general shape of the bursa copulatrix to the genus *Helicoconis* End.

One single species of the genus *Helicoconis* was hitherto known from Europe, *H. lutea* Wallengr. 1871 (with *H. laufferina* Navas, 1913, as a somewhat uncertain synonym). That species is full-winged and of a general coniopterygid appearance, and so is also the S. African *H. capensis* End. 1914. But the other two known species of the genus, *H. maroccana* Carp. and Lest. 1927, from Morocco, and *H. salti* Kimm. 1950, from Mt. Ruwenzori, Uganda, are both brachypterous. *H. salti* has as well the forewings as the hindwings reduced into small pads, while *H. maroccana* has pad-like hindwings and strongly abbreviated forewings which, however, have a rather distinct venation and are coated with white wax as com-

monly in this family. The condition of the Danish specimen agrees best with that of *H. maroccana* but the forewings are more convex, their veins carry long, stiff upstanding hairs, and they are not covered with wax, the stiff hairiness apparently stopping such a covering.



Figs. 1—2. *Helicoconis hirtinervis* n. sp. (holotype ♀). — 1. Sketch of the animal. — 2. Right hindwing.

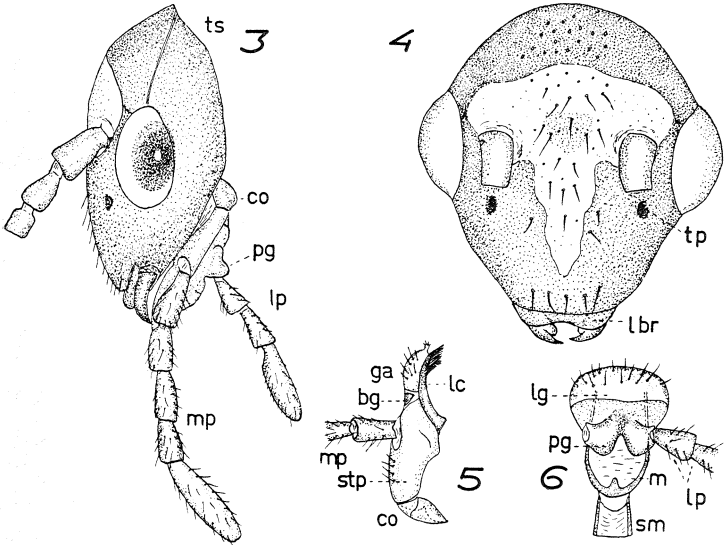
Helicoconis hirtinervis n. sp.

(Figs. 1—14)

Locus typicus: Stensbæk Plantage, Sønderjylland, Denmark. — Holotype: one ♀ in the collections of the Zoologisk Museum of Copenhagen University.

Description.

Holotype ♀. Received dried, gummed to apex of a triangular slip of paper; after clearing in caustic potash now preserved in alcohol. Head, body, legs, and hindwings of the dried specimen covered with a waxy substance of a clayish yellow colour; forewings not powered.



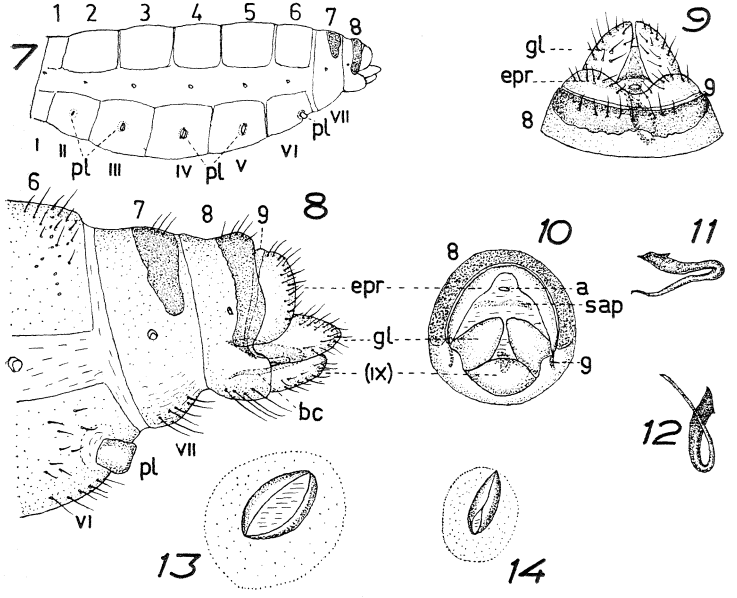
Figs. 3—6. *Helicoconis hirtinervis* n. sp. (holotype ♀). — Head, lateral. — 4. Head, in front. — 5. Right maxilla, ventral. — 6. Labium, ventral.

Abbreviations: bg = basigalea; co = cardo; ga = galea; lbr = labrum; lc = lacinia; lg = ligula; lp = labial palpus; m = mentum; mp = maxillary palpus; pg = palpiger, sm = submentum; stp = stipe; ts = temporal suture; tp = tentorial pit.

Size: Length of body of the dried, shrivelled specimen about 2,8 mm; after clearing nearly 3,5 mm. Length of forewing 2 mm, of hindwing about 0,4 mm.

Head dark brownish with the weak patch of the frons yellowish and of shape as indicated in fig. 4. There is a small yellowish brown spot between the bases of the antennae. Maxillae and labium as in figs. 5 and 6.

Palpi pale yellowish. Mandibles brownish. Eyes small; genae hence very long. Ocular diaphragm conically inwards-backwards directed, black around the very small foramen (fig. 3; in this figure the external part of the eye is drawn transparent in order to show the foramen).



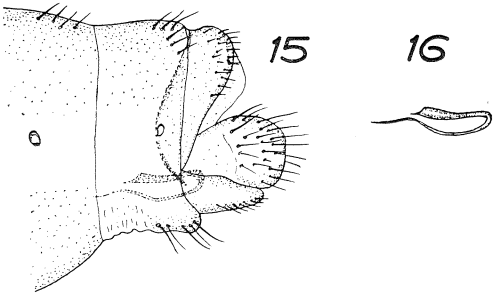
Figs. 7—14. *Helicoconis hirtinervis* n. sp. (holotype ♀). — 7. Sketch of abdomen, lateral, showing the plicaturae. — 8. Apex of abdomen, lateral. — 9. Ditto, dorsal. — 10. Ditto, caudal. — 11. Bursa copulatrix, left lateral view. — 12. Ditto, ventral. — 13. Left plicatura of 4th sternite, open. — 14. Right plicatura of 3rd sternite, partly open.

Abbrevations: a = anus; bc = bursa copulatrix; epr = ectoproct; gl = gonapophyses laterales; pl = plicaturae; sap = subanale; 1—9 = tergites 1—9; I—VII = sternites 1—7; (IX) = secondary 9th sternite.

Antennae pale yellowish, 27-segmented, a little shorter than forewing. First few segments of flagellum as long as wide, others about twice as long as wide.

Pronotum saddle-shaped, pale, with definite yellowish brown side-pieces along the fore-corners and with median

longitudinal and basal transversal ribbon-like lists (fig. 1). Meso- and metanota yellowish brown with pale spots as indicated in fig. 1. Legs yellowish with basal portion of femurs fuscous tinged. Forewings short and narrow, convex (fig. 1). Their longitudinal veins very broad and conspicuous, clothed with stiff, upstanding, long hairs. Wing margin with long fringes. Membrane without macrotrichia, translucent pale brownish. Venation of the common



Figs. 15—16. *Helicoconis lutea* (Wallengr.) ♀ from Sweden: Sdml. Saltsjöbaden (leg. A. Jansson). — 15. Apex of abdomen (7th to last segments), lateral. — 16. Bursa copulatrix, left lateral view.

Helicoconis-type but Sc joining the foremargin of the wing instead of running to apex. Forks of R and M very short. Crossvein between M and Cu_1 absent. Hindwings small, pad-like, with obscure venation but with foremargin distinctly thickened, bearing 6 long setae, the 4th of which being twice as long as the others (fig. 2).

Abdomen very weak, whitish. Tergites 7 and 8, however, with well-defined, dark brownish pigmented and strongly chitinized callosities along the dorsal hindmargin (cf. figs. 1, 7, 8, 9). Lower ends of the very narrow tergite 9 also brownish. Ectoprocts (fig. 8, epr) with smoothly rounded hind margin. Secondary 9th sternite (ix) rounded, projecting below the gonapophyses laterales (gl) which are narrow and tapering towards the apex. A very indistinct subanale (sap, fig. 10) present, being a darkpig-

mented, transverse area below anus. Bursa copulatrix blackish, bent as a hairpin and else of shape as shown in figs. 11 and 12. There are 5 pairs of plicaturae, on sternites 2 to 6 respectively; those of segment 2 very small (fig. 7).

Geographical distribution.

Denmark: Sønderjylland, Stensbæk Plantage, holotype ♀, 22. 6. 1949, leg. Worm-Hansen, in coll. Zoologisk Museum, Copenhagen.

Ecological distribution.

Dr. Nielsen has informed me that the specimen according to Mr. Worm-Hansen was captured either on meadow-ground or, most probably, on a heathery area close to the plantage. The species no doubt lacks power of flight and is most probably confined to lower herbage. The known specimens of the two African brachypterous species were found: *H. maroccana* (together with larvae) on *Arenaria pungens* in a colony of the Coccid *Orthezia arenariae* Vayss; *H. salti* under moss on stones. Dr. Nielsen suggests that *H. hirtinervis* n. sp. perhaps feeds on some Coccid on *Calluna*. It should be noted that the gut contents of the available specimen when boiled in KOH became intensively red, almost purple. The food of the specimen has thus probably been some with KOH red-reacting insect. Dr. F. Ossiannilsson, Uppsala, has informed me that the Aphids *Eriosoma lanigerum* and *Sappaphis piri* have a blood-coloured body-fluid which, at least in the latter case, sustains boiling in KOH, and that in several Pseudococcidae the body-fluid becomes blue or red when boiled in KOH (for other particulars on similar tests see my papers 1957a, p. 110 and 139, and 1957b, p. 3).

Note.

When examining the ventral abdominal structures, denominated by me (1957a) as plicaturae I observed a condition which I had never seen before. Some of these

plicaturae were open! (fig. 13). In all the other specimens of the Aleuropteryginae examined by me I have always found them closed. I have often tried to handle them with thin needles but I have never succeeded in opening a plicatura. In this specimen it was easy to pull the point of the needle between the halves of organ. The point did not, however, enter some duct but stopped on the basal plate of the organ which plate seems to be strong and solid, or at least did not have any opening which could be observed in my preparation. The function of these organs is still obscure. Withycombe's suggestion (1925) of their being repugnatorial glands may be considered as a perhaps tenable assumption.

H. hirtinervis n. sp. is easily distinguishable by the long hairiness of the veins of forewings, a character which it does not share with any known species in the family. The females of the two African subapterous species are unknown. Neither the female of the full-winged *H. capensis* End., figured by the author (1957a, figs. 10—13, 24—26), nor that of *H. lutea* (Wallengr.) have dark callosities on the 7th and 8th tergites. There are also other differences in the female genitalia. Fresh figures of *H. lutea* are here given for comparison (figs. 15—16). The bursa copulatrix of *H. lutea* has a similar hairpin bend as that of *hirtinervis* but is more slender. The gonapophyses laterales of *lutea* are much broader than those of *hirtinervis* and not tapering.

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Anmeldelse.

Bertil Gullander: **Dagsommerfugle i Norden.** Oversat og bearbejdet af Torben W. Langer. Gyldendals forlag. København. 1960. Pris Kr. 14,75.

Dette er en dansk udgave af den ovenfor omtalte bog. Den er udmærket oversat af T. W. Langer, af og til næsten lidt for direkte, som f. ex. når kalkerlærred, der på svensk hedder kalkerväv, oversættes (p. 23) ved kalkervæv, eller når det for de arters vedkommende, hvor Gullander siger: "ej i D." på "dansk" hedder "ej i Danmark". ("Ej sällsynt" oversættes derimod ved: "ikke sjælden").

Bearbejdelsen består i, at de svenske lokalitetsangivelser er strøget, og at der er tilføjet oplysninger om danske forhold.

I det nordiske samarbejdes interesse burde denne bog overhovedet ikke have været oversat; enhver interesseret læser den ligeså godt i originaludgaven. Når imidlertid den danske udgave kan tilbydes for 14,75 danske Kr., medens den svenske koster 15 svenske Kr., må det beklageligvis erkendes, at oversættelsen er berettiget.

Niels L. Wolff.

Nye sommerfugle 1958-59.

Af Wilhelm van Deurs.

På Entomologisk Forenings møder $^{11}/_{3}$ 1959 og $^{9}/_{3}$ 1960 blev der givet meddelelse om følgende for den danske fauna nye sommerfugle-arter, fundet eller erkendt i 1958 og 1959.

1958.

Euromene ocellea Hw. 1 eks. Randkløve (Bornh.) $^{10}/_{9}$ 58 (J. C. Jensen). Se Flora og Fauna, marts 1959, s. 35.

Orneodes grammodactyla Z. Flere eks. Højstrup (Sjæll.) på elektrisk lys $^{16}/_{8}$ 58 (K. H. Jensen). Se Flora og Fauna, juni 1959, s. 63.

Bactra gozmanniana Toll. Flere ældre eks. af denne nybeskrevne art er konstateret i samlingerne (fra Sjælland, Fyen, Als, Jylland) sammenblandet med *B. lanceolana* Hb. (N. L. Wolff det.).

Telphusa saltuum Zell. 2 eks. Roden skov (Loll.) $^{2}/_{7}$ 55 (N. L. Wolff).

Piercea luridana Gregs. 1 eks. Vang (Bornh.) $^{1}/_{7}$ 58 (N. L. Wolff).

1959.

Laelia coenosa Hb. 1 eks. ♂ på elektrisk lys Tisvilde $^{29}/_{7}$ 59 (Erling Bloch). Se Entomologiske Meddelelser bd. 29, hefte 5—6, s. 212 ff.

Polia splendens Hb. 1 eks. Mellemskoven (Falster) $^{20}/_{7}$ 59 (Gregers Jørgensen).

Eupithesia egenaria H. S. 6 eks. Ulfshale (Møen) 59 (P. Forum Petersen). Også fundet sammensteds tidligere, men først erkendt nu.

Scoparia sylvestralis N. L. Wolff. Talrig Jungshoved (Sjæll.) ult. juni—primo juli 59 (N. L. Wolff). Se Entomologiske Meddelelser bd. 29, hefte 4, s. 181 ff.

Pyrausta palustralis Hb. 1 eks. Ulse (Sjæll.) $^{8}/_{6}$ 59 (Tage Jensen).

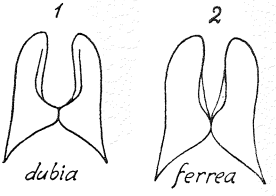
Semasia conterminana H. S. 1 eks. Stampen ved Rønne $^{5}/_{8}$ 57 (K. H. Jensen).

Phthorimaea tengströmiella Joann. 3 eks. Jungshoved (Sjæll.) $^{6}/_{6}$ 59 (N. L. Wolff).

The Danish Species of the Genus Stenostola Muls. (Coleopt., Cerambycidae).

By
Victor Hansen.

Of the genus *Stenostola* Muls. hitherto only *St. dubia* Laich. (*ferrea* Reitter, Fauna Germanica IV (1912) p. 68) has been known from Denmark (A. West, Fortegnelse over Danmarks Biller, Ent. Medd. vol. XXI p. 483). However, an examination of the Danish material shows that Denmark has both *St. dubia* Laich. and *ferrea* Schrank (*nigripes* Reitter 1912).



Figs. 1—2. Dorsal view of parameres of *Stenostola*. The long hairs at the apex are omitted.

Typical specimens of the two species may be separated as follows:

Elytra of a deep metallic-blue colour, rather shining, strongly punctured, with deep, sharply limited punctures; in the anterior half or third the ground between the punctures is shining, not or very feebly and sparsely micro-reticulated ..... *dubia.*

Elytra rather dull, without or only with a very faint metallic-blue lustre, less strongly punctured, with less deep and not so sharply limited punctures; the ground between the punctures everywhere with distinct micro-reticulation .... *ferrea.*

Typical specimens of the two species may be separated by means of the different lustres of the elytra. The dull lustre of *St. ferrea* is due both to the micro-reticulation and to the more dense, white-greyish, fine, recumbent pubescence. The feebly depressed area along the suturae just behind the scutellum is in *ferrea* more obvious than in *dubia*, because it is more strongly marked by having a slightly finer puncturation and a slightly stronger micro-reticulation than the surroundings, a character which is much weaker in *dubia*.

It must, however, be admitted, that specimens occur, which can be difficult to determine by means of the characters mentioned above. Some authors, therefore, have questioned whether *St. dubia* and *ferrea* are really two good species (Günther Schmidt in Ent. Blätter 1951-52 p. 133, C. v. Demelt in Carinthia II, 1956 p. 65). An examination of the aedeagus of the two forms shows, however, a clear difference in the forms of the parameres (see fig. 1 and 2), which justifies a separation into two species.

As a distinguishing feature has been used the colour of the pubescence on the scutellum (Reitter 1912, p. 68, F. Rüschkamp in Ent. Blätter 1935 p. 67), but the Danish specimens do not show a usable mark in this relation.

In Denmark *St. dubia* and *ferrea* are found together, but it seems as if *ferrea* is much rarer and much more sparsely occurring than *dubia*. The two species probably agree in habits, breeding in dead branches (approx. 1—5 cm in diameter) of deciduous trees, especially Tilia.

Anmeldelse.

B. Herting: **Biologie der westpaläarktischen Raupenfliegen Dipt. Tachinidae.** Monographien zur angew. Entomologie Nr. 16. Hamburg und Berlin (Paul Parey) 1960. 188 sider, 12 tekstfigurer. Pris 32 DM.

Endelig, 40 år efter von Baers kendte værk om snyltefluerne, kommer der en moderne bearbejdelse af denne interessante og nyttige fluefamilie. Efter nogle indledende kapitler om æglægning, larvemorfologi og -biologi, værtsvalg m. m. følger bogens hovedafsnit, der er en systematisk gennemgang af de ca. 400 snyltefluearter, der er kendt fra Europa, Nordafrika og Lilleasien. For hver art er angivet den geografiske og økologiske udbredelse, flyvetid, nærmere biologiske data m. m. Det mest nyttige afsnit er dog måske den systematiske fortegnelse over værterne med angivelse af, hvilke snyltefluearter der er truffet hos hvert enkelt værtsart. Langt den største værtsgruppe er sommerfuglene, og ved hjælp af denne fortegnelse og Lundbecks bearbejdelse af snyltefluerne i "Diptera Danica" vil det være ret let for vore lepidopterologer at bestemme de snyltefluer, de klækker. Man må meget håbe, at de vil gå igang også med den side af faget.

Leif Lyneborg

Ændringer i vor billefauna. 1959 [1]).

Af
Victor Hansen.

Efter at behandlingen af billerne i "Danmarks Fauna" er afsluttet med udsendelsen af tillægsbindet Biller XX, 1958, er det min agt at søge denne behandling holdt à jour ved fra tid til anden her i tidsskriftet at give supplerende beskrivelser og tabeller vedrørende nye arter, som måtte blive konstateret, og som ikke er behandlet i "Danmarks Fauna", jfr. artiklen ovenfor p. 321 om *Stenostola ferrea* Schrank.

Det er endvidere planlagt om nogle år, når August West's fortegnelse over Danmarks biller er ca. 25 år gammel, at søge en ny fortegnelse udgivet.

761 a. **Omalium rugatum** Rey (W. O. Steel i E. M. M. 1953 p. 280). Arten har været sammenblandet med den meget nærstående *O. caesum*, fra hvilken den adskiller sig ved afvigende form af hannens parringsorgan, som i midten er meget smallere end hos *caesum*. Endvidere er som regel — men ikke altid — følehornenes 1.-5. led rødlige, medens i hvert fald rodleddet er mørkt hos *caesum*. Eksemplarer foreligger fra Marselisborg Skov (3 stk. i grannålebunker, $^{16-20}/_{7}$ 21) og Dyrehaven (1 stk. sigtet, $^{17}/_{8}$ 59), (V. H. leg. et det., teste Lohse).

939 a. **Stilicus geniculatus** Er. (D. F. XV, p. 231). 1 stk., ♀, Søborg syd for Gilleleje, $^{8}/_{8}$ 1884 (N. P. Jørgensen leg. et det., teste Lohse et V. H., coll. Z. M.). I Hamburgegnen er arten iflg. meddelelse fra Lohse ikke meget sjælden tidligt om foråret i gamle halmbunker ved markkanter.

961 a. **Lathrobium ripicola** Cwal. (D. F. XV, p. 258). 1 stk., Ristinge, $^{4}/_{9}$ 41 (Christiani leg., V. H. det., teste Lohse, coll. Z. M.).

976 a. **Xantholinus fracticornis** Müller. (Lohse i Entom. Blätter 1958 p. 120, Palm i Svensk Ent. Tidskr. 1959, p. 22). Arten har været sammenblandet med *X. punctulatus* Payk. (D. F. XVI p. 16) og er antagelig udbredt som denne. Eksemplarer foreligger fra kompostbunkerne ved Dyrehavens vildthuse i selskab med *X. punctulatus* og langt talrigere end denne samt fra Samsø (på stranden under tang) (V. H. leg. et det.).

[1]) Jfr. Ent. Medd. 29, p. 151.

Arten adskilles fra *X. punctulatus* ved, at hovedets grove punktur lader en betydelig større midtplet åben, at kæbepalperne, der hos *punctulatus* som regel er ensfarvet rødgule, oftest har delvis brunligt 2. og 3. led, at gennemsnitsstørrelsen er ganske lidt ringere, og — afgørende — ved at hannens genitalkapsel er betydeligt mindre (ikke — hos *punctulatus* tydeligt — længere end pronotums største bredde).

981 a. **X. gallicus** Coiff. (Revue franc. d'Entom. XXIII (1956) p. 62—65). 2 stkr. (♂♂) sigtet i Blykobbe plantage på Bornholm, $^{26}/_{9}$ 49 (V. H. leg. et det.).
Arten har været sammenblandet med de meget nærstående *X. linearis* Oliv. og *longiventris* Heer (D. F. XVI p. 19—20), fra hvilke den adskilles ved noget smallere krop, gennemgående lysere farve, lidt slankere følehorn og — afgørende — for hannens vedkommende ved præputialsækkens afvigende tornbeklædning. Pronotum har yderst svag og utydelig eller næsten forsvunden tværbølget mikroskulptur og er forholdsvis stærkt tilsmalnet bagud. Arten angives at foretrække soleksponeret hedebund og flyvesandsstrækninger.

1327 a. **Atheta boletophila** Thoms. (D. F. XVII p. 255). 1 stk. i Dyrehaven, $^{19}/_{6}$ 59, sigtet ved en eg med svamp (Polyporus sulphureus) (V. H. leg. et det.).

1434. **Ocyusa procidua** Er. (D. F. XVII p. 397). Arten udgår, idet fundet fra Store Dyrehave angår *Eurymniusa crassa,* se nedenfor. *Ocyusa procidua* er fundet i Sydnorge og i Sverige så sydligt som Uppland; dens forekomst hos os er mulig, men ikke særlig sandsynlig.

1470 a. **Eurymniusa crassa** Epp. (F. G. II p. 29; K. M. II p. 55). Store Dyrehave (Coll. Z. M., hidtil fejlagtigt opført under *Ocyusa procidua,* se foran); Strøgårds Vang i Grib Skov, juni 1959, ved en skovsø i fugtigt løv, især ved roden af græstuer (V. H. leg. et det.).
Slægten *Eurymniusa* Ganglb. kan indføjes i tabellerne i D. F. XVII på følgende måde:

P. 358 indføjes efter l. 3 f. o.:

15. Kroppen helt sort, følehorn og ben sorte, knæ og fødder lidt lysere. Mindre, 1.5—1.8 mm... ..... 16 a. *Eurymniusa.*
Kroppen delvis lysere, følehorn og ben rødlige. Større, 2—3.5 mm ..... 15 a.

P. 358, l. 4 f. o. ændres „15“ til „15 a“.

P. 361 erstattes l. 15—19 f. o. af følgende:

For- og mellemskinnebenenes yderside kun med den sædvanlige fine behåring.....13a.

13a. Kroppen helt sort, følehorn og ben sorte, knæ og fødder lidt lysere. Vingedækkernes behåring nedliggende. Mindre, 1.5—1.8 mm..... ..... 16a. *Eurymniusa.*

Kroppen delvis lysere, følehorn og ben rødlige. Vingedækkernes behåring tydeligt opstående. Større, 2.5—3 mm ..... 16. *Crataraea.*

2532a. **Stenostola ferrea** Schrank (*nigripes* Reitter, F. G. IV p. 68, jfr. Horion's Nachtrag p. 286).

Arten har været sammenblandet med *St. dubia* Laich og er antagelig udbredt sammen med denne, som den vistnok stemmer overens med i levevis, men langt sjældnere og mere enkeltvis forekommende. Eksemplarer foreligger fra Tørning, Rugballegård ved Vejle, Falster, Frejlev, Sundby Storskov, Skarre sø og Svenstrup ved Borup st., juni (V. H. det., coll. Z. M.). Arten ligner *St. dubia* meget. Jfr. om adskillelsen af de to arter ovenfor p. 321.

Instincts of Ammophila (Psammophila) tydei Guillon (Hymenoptera, Sphecidae).

By Axel M. Hemmingsen.

A number of specimens of this species — characterized by silvery hairiness on the thorax — were caught within a minor uncultivated area near Arafo, Tenerife, at the end of December 1956. On 31/XII in the forenoon one wasp of this species — as determined by its appearance — was seen inspecting an Agrotid larva hanging in a twig of Chrysanthemum frutescens L. In the afternoon the larva had disappeared from the twig. But nearby a wasp, later caught and determined as belonging to this species, and presumably the same as had inspected the larva, was observed carrying what was presumably the same larva below herself to a nest prepared in advance and situated in rather hard soil some meters from where the larva had been hanging. She pulled the larva into the nest-hole head first. When in position the hind end of the larva almost reached the entrance of the nest. The wasp pressed down earth with her head into the entrance and used the mouth region

* *Psammophila* Dahlbom 1842 (preoccupied) = *Podalonia* Spinola 1853.

to close it with tiny particles. She also swept above her with hindward leg movements, but the closing was mainly undertaken by the pressing movements. She was heard humming. The wasp was caught and the larva excavated. The larva which still moved a little appeared to lie directly in the earth without much of a cave space and with only slight inclination of the tunnel. The egg was placed on its left side behind the last hind leg on the first abdominal segment somewhat above the level of the base of the legs. The larva gave off feces until the next day when it was preserved. Mr. J. G. Worm-Hansen, Zoological Museum, Copenhagen, has kindly identified the larva as *Mamestra oleracea* L. or a closely related species.

The habits of *Ammophila tydei* have been observed before by Picard (1903, 1925) in France and by Roth (1928, pp. 214—215) in Algeria. According to these authors earlier descriptions by J. H. Fabre of the habits of this species are contradictory and due to confusion with other species. Picard found the species working only in loose sand, whereas Roth like myself found it digging in compact soil. Both like myself found the tunnel to be only slightly inclined and Picard expressly stated that the nest consisted only of the entrance tunnel. He stated (1925, p. 164) a but slightly inclined tunnel also for *A. viatica* L. (= *hirsuta* Scop.) and *A. affinis* Kirby. Also Picard like myself found the egg to be fixed on the left side of the larva, but on the thorax.

According to Roth (1928, pp. 229—230; see also Murray 1940, pp. 8—10, and 1951, pp. 977—978: references to biology, e. g. Newcomer 1930, p. 553) all the species of the subgenus *Psammophila* to which *A. tydei* belongs (thus for instance *A. viatica* L. (= *hirsuta* Scop.) and *A. affinis* Kirby found in Denmark) capture the prey before the nest is made, whereas the bulk of the subgenus *Ammophila* (sensu stricto) prepare the nest first. However, the habit of capturing the prey first is known also within the subgenus *Ammophila* (Roth mentions *A. haimatosoma* Kohl), and according to Roth this supports the idea of subdividing *Ammophila* s. str. into a number of subgenera (loc. cit., pp. 154, 230). There is apparently general agreement among authorities that in the subgenus *Psammophila* there is never more than one larva and one egg to a given nest, e. g. Murray's survey (1940, p. 10) for *A. (Ps.) luctuosa* Smith or *A. (Ps.) communis* Cresson. But E. Tetens Nielsen (1933, p. 307) without quoting his source refers to one or two larvae being placed in each nest by *A. (Ps.) viatica* L. This is not a personal observation of his, but — though it is not remembered now — probably bases on earlier statements by Adlerz

of there being more than one larva in the nest of *A. (Ps.) viatica* (E. T. N. *in litt.*). Adlerz (1903) withdrew as doubtful these earlier statements. In the subgenus *Ammophila* there may be one (*A. sabulosa* L.) or several (*A. campestris* Jur.) caterpillars in each nest. Already Adlerz and E. Nielsen (E. Tetens Nielsen, 1933, p. 307) found that *A. campestris* Jur. inspects and provisions the nest regularly. *Ammophila adriaansei* Wilcke (Adriaanse 1948) even digs one or two more additional burrows for future use while still provisioning the first. Obviously the capture of the prey before the nest is made as in *Psammophila* seems rather incompatible with the provisioning of the nest with much more than one larva.

Newcomer succeeded in confusing the wasp so that she went in search of another worm with which to provision the nest she had already constructed. To Murray (1940, p. 10) this seems to indicate how the habits of *Ammophila* (by him called *Sphex*) may have originated.

The habit of preparing the nest after the prey has been taken and deposited nearby, e. g. in a twig of some plant, is specially characteristic of the spider wasps, the Pompilidae, though exceptions occur. The great bulk of the Hymenoptera aculeata, however, prepare the nest first and then seek the prey, and this sequence may have been a prerequisite for the evolution of the social groups. Actually some more highly advanced Pompilidae which prepare the nest first have become subsocial (Williams 1919; from Evans, 1953, p. 159). At Singora in South Siam 5. and 6. IX 1940 I saw myself specimens of a species of Pompilidae carrying spiders into the wide hollow base of a tree, where several other individuals of apparently the same species were seen, thus strongly suggesting some sort of social behaviour. Two collected specimens have been kindly determined by Mr. K. Fæster, C. E., from Bingham (1897) as males possibly of *Salius madraspatanus* (Smith).

A. (Ps.) viatica L. (= *hirsuta* Scop.) is gregarious except during the period of reproduction (several references by Maneval, 1939). It seems that a development of this gregariousness into social behaviour during the nesting period must be prevented by the habit of capturing the prey first.

The determination from Kohl (1906) of my collected specimens of *A. tydei* has kindly been confirmed by Mr. K. Fæster, C. E.

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Anmeldelse.

José C. M. Carvalho: **Catálogo dos Mirídeos do Mundo.** Parte 1-V. Arquivos do Museu Nacional, Rio de Janeiro. Vol. 44, 45, 47, 48, 51, 1957—60. 158 + 216 + 161 + 384 + 194 pp.

For Museumsmænd og andre Systematikere er Kataloger en conditio sine qua non. Et moderne Hemipter-Katalog blev startet i 1927, sygnede hen i 1948, men levede op som Homopter-Katalog 1954. Miriderne, Blomstertægerne, kunde ikke optages heri, men Kataloget over dem er formet efter samme Mønster, skønt Formatet maatte blive et andet, og udarbejdet med en enestaaende Omhu (at Stål bliver til Stäl er undskyldeligt; hvem kender den Bolle?). Det omfatter 6-7000 Arter og har en Literaturliste paa 122 Sider; ogsaa for en Revision af vore hjemlige Blomstertæger vil det sammen med Tierwelt Deutschlands være uundværligt.

S. L. Tuxen

Aphids caught in Moericke-trays on 5 localities in Denmark in 1956.

By Ole Heie
(Skive Seminarium, Skive).

Introduction.

During several years on the initiative of the State Experimental Station for Plant Diseases and Pests a number of yellow Moericke-trays measuring 49 × 32 cm containing a 1 ‰ solution of nicotine (fig. 1) have been stationed about 25 cm above ground level on various places in Denmark with the purpose of mapping out the geographic occurrences of *Myzus persicae* Sulz. and other noxious insects and finding the seasons of their main flight. From April to October the trays were emptied once a week. The flying insects attracted by the yellow colour and killed by the nicotine were filtered out of the solution and kept in alcohol (70 %). At the

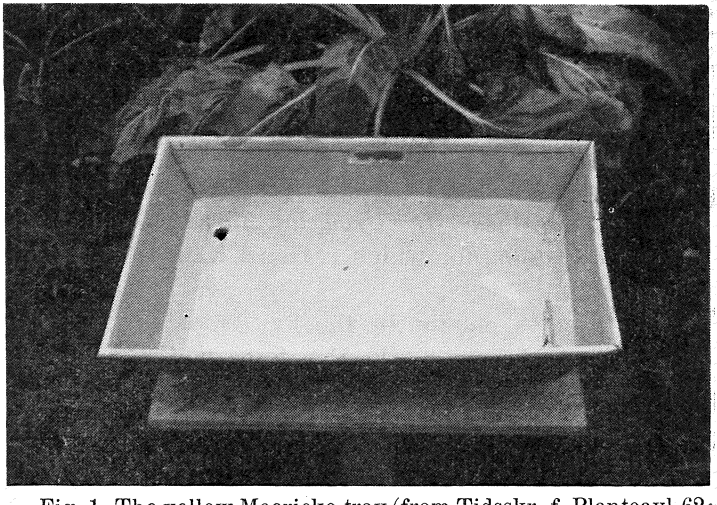


Fig. 1. The yellow Moericke-tray (from Tidsskr. f. Planteavl 62; M. Dahl fot.).

Zoological Department of the State Experimental Station for Plant Diseases and Pests the aphids were sorted out and sent to the writer, who counted the specimens of *Myzus persicae* and the total sum of aphids in the weekly samples (Heie 1959).

During the work with these aphid catches a desire for being acquainted with which species they were made up of grew up, but as the fulfilment of this wish required mounting and determination of hundreds of thousands single aphids, the writer preferred to confine himself to an analysis, based on the weekly captures from one summer only (1956), of only five localities. These localities were chosen in such a way that different main regions of the country were represented, viz. central Sealand (Ørslev at Ringsted), Funen (Årslev), northern Jutland (Tylstrup in Vendsyssel), western Jutland (Borris at Skjern), and southern Jutland (Jyndevad just off the frontier between Germany and Denmark). The mounting and determination work was then limited to 5684 winged aphids. The aphids were mounted in the way given by Hille Ris Lambers (1950) and examined microscopically. The determination work was based on keys from the available literature (see the references on p. 358) and on a collection of aphid slides collected by the writer mainly in the years 1956—58. Dr. Hille Ris Lambers most kindly determined single specimens of the species *Dactynotus achilleae, D. (Uromelan) taraxaci,* and *Microlophium carnosum,* for which reason I want to thank him very much.

The species caught in the five trays are listed in the tables 1—5 and 8. On the dates which are given above the columns in these tables (and below the columns and curves in fig. 4—10) the trays were emptied. The date of e. g. $^{20}/_{7}$ is placed above the number of aphids caught during the week $^{13}/_{7}$—$^{20}/_{7}$. During the first weeks, from $^{20}/_{4}$ until $^{25}/_{5}$, no aphids were caught.

This work has been supported by the Danish foundation: Statens almindelige Videnskabsfond.

The localities.

All localities lay 5—50 m above sea-level, and all the trays were placed in beet fields. Some particulars concerning the placing of each tray are given below:

Ørslev:
The tray was placed in a beet field. The town (Ørslev) was at a distance of 50—100 m north west of the tray, surrounded with gardens. To the south and to the east wide fields with potatoes etc. and a few quicksets with Salix etc. stretched out, nearest building situated at a distance of 1 km, nearest hardwood forest at a distance of 2—3 km.

Årslev:
The tray stood in a beet field at the north-west corner of a little potato plot. The ground round the tray was very plane, covered with fields of barley, oats etc. Nearest gardens and buildings lay at a distance of 200 m south-east of the tray. Westward, gardens and buildings lay at a distance of 1 km. Nearest forest 2½ km away, the town (Årslev) nearly 2 km to the south-east.

Tylstrup:
The tray stood in a beet field containing some potato plots 50—100 m south of the buildings of the Tylstrup Experimental Station. A barley field lay westward. Both fields were surrounded with high hedges with Sorbus and Ulmus. The hedges stood at distances of about 20, 100 and 400 m from the tray in eastward, westward and southward direction respectively. Behind the western hedge a swede field was situated. Many high trees and many species of plants grew round the buildings. There was no forest in the neighbourhood, but extensive bog areas at a distance of few kilometres.

Borris:
The tray was placed in a beet field at a potato plot more than 400 m north of the buildings and garden of the Borris Experimental Station. Barley, oats, rye, wheat, and peas grew in the surrounding fields. Quicksets stood at a distance of 50—100 m westward and eastward. No buildings stood nearer than 400—500 m from the tray. In the region many quicksets, meadows (at the river Skjernå), coniferous plantations, and moor areas are situated, but the greater part of the region is agricultural country. An extensive moor area was at a distance of 5 km southeast of the tray.

Table 1.

Ørslev	25/5	1/6	8/6	17/6	22/6	29/6	6/7	13/7	20/7	27/7	3/8	10/8	17/8	24/8	31/8	7/9	14/9	21/9	28/9	5/10	Total
APHIDIDAE																					
Macrosiphoniella artemisiae Fonsc.	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	1
M. tanacetaria Kalt.	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	1
Dactynotus cirsii L.	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	1
D. sonchi L.	—	—	—	—	—	—	—	—	1	3	3	1	—	—	—	—	—	—	—	—	8
D. tussilaginis Walk.	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	1
D. (Uromelan) jaceae L. complex	—	—	—	—	—	—	—	1	—	1	—	—	—	—	—	—	—	—	—	—	2
D. (U.) taraxaci Kalt.	—	—	—	—	—	—	—	1	3	—	—	—	—	—	—	—	—	—	—	—	4
Macrosiphum euphorbiae Ths.	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	1
M. (Sitobion) avenae Fabr.	—	—	—	—	—	—	—	—	4	4	2	9	6	—	—	1	—	—	—	—	26
Acyrthosiphon loti Theob.	—	—	—	—	—	1	3	—	1	—	—	1	—	—	—	—	—	—	—	—	6
A. malvae Mosl. s. lat.	—	—	—	—	—	1	—	—	—	—	—	1	—	—	—	—	—	—	—	—	2
A. pisum Harris	—	—	—	—	—	—	4	1	5	12	8	2	1	—	—	—	—	—	—	—	33
Unidentified *Acyrthosiphon* ssp.	—	—	—	—	—	—	2	—	—	—	—	—	—	—	—	—	—	—	—	—	2
Metopolophium dirhodum Walk.	—	—	—	—	—	—	—	1	21	18	3	1	—	—	—	—	—	—	—	—	44
Microlophium carnosum Buckt.	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	1
Megoura viciae Buckt.	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	1
Hyperomyzus lactucae L.	—	—	1	2	13	—	2	25	107	35	28	17	9	—	—	—	—	—	—	—	239
H. pallidus H. R. L.	—	—	—	—	—	—	—	2	11	6	15	18	12	—	—	—	—	—	—	—	64
Nasonovia ribis-nigri Mosl.	—	—	—	—	—	—	—	2	1	1	—	—	—	—	—	—	—	—	—	—	4
Cryptomyzus galeopsidis Kalt.	—	—	—	—	1	—	—	2	13	9	12	36	14	2	2	—	—	—	—	—	91
C. ribis L.	—	—	—	—	—	—	—	—	2	—	—	—	1	—	—	—	—	—	—	—	3
Pleotrichophorus glandulosus Kalt.	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	1
Capitophorus elaeagni d. Gu.	—	—	—	—	—	—	—	—	2	—	3	—	—	—	—	—	—	—	—	—	5
C. hippophaës Walk.	—	—	—	—	—	—	—	—	5	8	13	20	8	5	—	—	—	—	—	—	59
C. horni Börner	—	—	—	—	—	—	—	—	—	—	2	—	—	—	—	—	—	—	—	—	2
C. similis v. d. G.	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	1
Unidentified *Capitophorus* spp.	—	—	—	—	—	—	—	—	—	—	—	1	1	—	—	—	—	—	—	—	2
Myzus cerasi Fabr.	—	—	—	—	—	—	1	3	3	8	2	2	—	—	—	—	—	—	—	—	19
M. persicae Sulz.	—	—	—	—	—	—	—	1	3	5	8	19	8	—	1	—	—	—	—	—	45
Phorodon humuli Schrk.	—	—	—	—	—	—	—	3	12	9	2	—	1	—	—	—	—	—	—	—	27
Cavariella aegopodii Scop.	—	—	1	—	—	1	2	1	—	3	1	—	2	—	—	—	—	—	—	—	11
C. pastinacae L.	—	—	—	—	3	—	—	1	2	1	1	—	—	—	—	—	—	—	—	—	8
C. theobaldi Gill. & Bragg	—	1	2	—	1	—	1	—	2	1	2	—	—	—	—	—	—	—	—	—	10

Brachycolus sp.	–	–	–	–	–	–	3	–	–	–	–	–	–	–	–	–	–	–	–	–	3
Hayhurstia atriplicis L.	–	–	–	–	–	–	–	–	1	–	4	10	2	1	–	–	–	–	–	–	18
Lipaphis erysimi Kalt.	–	–	–	–	–	–	–	–	22	6	–	1	1	–	–	–	–	–	–	–	30
Brevicoryne brassicae L.	–	–	–	–	–	–	–	–	–	3	–	2	4	1	–	–	–	–	–	–	10
Brachycaudus cardui L.	–	–	–	–	–	–	–	–	–	2	–	–	–	–	–	–	–	–	–	–	2
B. helichrysi Kalt.	–	–	–	–	2	–	–	1	2	–	1	–	2	–	–	–	–	–	–	–	8
Dysaphis spp.	–	–	–	–	1	–	2	6	4	3	1	2	–	–	–	–	–	–	–	–	19
Anuraphis farfarae Koch	–	–	–	1	–	–	2	–	3	–	–	–	–	–	–	–	–	–	–	–	6
Aphis corniella H. R. L.	–	–	–	–	–	–	–	–	–	2	–	–	–	–	–	–	–	–	–	–	2
A. fabae Scop. complex	–	–	–	–	–	1	2	3	23	29	70	504	232	6	4	3	–	–	–	–	877
A. idaei v. d. G.	–	–	–	–	–	–	–	4	4	–	–	1	–	–	–	–	–	–	–	–	9
A. sambuci L.	–	–	–	–	1	–	–	2	–	15	4	1	–	–	–	–	–	–	–	–	23
Unidentified *Aphis* spp.	–	1	–	–	2	1	3	11	14	2	4	16	10	1	–	1	–	–	–	–	66
Rhopalosiphum padi L. *R. oxyacanthae* Schrk.	–	–	–	–	–	12	33	6	48	15	4	–	–	–	–	–	–	–	–	–	118
Hyalopterus pruni Geoffr.	–	–	–	–	–	–	1	–	–	2	–	–	2	–	–	–	–	–	–	–	5
Unidentified or unidentifiable specimens	–	–	–	–	–	–	3	3	4	5	2	1	1	2	–	–	–	–	–	–	21
CHAITOPHORIDAE																					
Unidentified specimens	–	–	–	–	1	–	–	–	–	2	–	–	–	–	–	–	–	–	–	–	3
CALLAPHIDIDAE																					
Kallistaphis basalis Stroyan	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	1
Drepanosiphum platanoides Schrk.	–	–	–	–	–	–	1	–	–	–	1	1	–	–	–	–	–	–	–	–	3
Tuberculoides annulatus Hartig	–	–	–	–	–	–	–	2	1	–	–	–	–	–	–	–	–	–	–	–	3
Eucallipterus tiliae L.	–	–	–	–	–	1	–	–	2	3	–	–	–	–	–	–	–	–	–	–	6
Therioaphis luteola Börner	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	1
T. trifolii Monell	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	1
Unidentified specimens	–	–	1	–	1	–	–	–	–	–	2	–	–	–	–	–	–	–	–	–	4
LACHNIDAE																					
Protrama ranunculi d. Gu.	–	–	–	–	–	–	–	2	–	1	1	1	1	–	–	–	–	–	–	–	6
THELAXIDAE																					
Anoecia sp.	–	–	–	–	–	–	–	–	–	1	1	–	–	–	–	–	–	–	–	–	2
PEMPHIGIDAE																					
Schizoneura ulmi L.	–	–	–	–	19	8	37	–	3	–	–	–	–	–	–	–	–	–	–	–	67
Unidentified specimens	–	–	–	–	–	–	1	5	7	4	–	1	–	–	–	–	–	–	–	–	18
Total	0	2	5	3	45	26	103	89	338	221	203	672	320	18	7	5	0	0	0	0	2057

Table 2.

Årslev	25/5	1/6	8/6	15/6	22/6	29/6	6/7	13/7	20/7	27/7	3/8	10/8	17/8	24/8	31/8	7/9	14/9	21/9	28/9	5/10	Total
APHIDIDAE																					
Dactynotus sonchi L.	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	1
D. tussilaginis Walk.	—	—	—	—	—	—	—	—	1	1	2	2	1	—	—	—	—	—	—	—	7
D. (Uromelan) taraxaci Kalt.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	1
Macrosiphum (Sitobion) avenae Fabr.	—	—	—	—	—	—	—	—	3	5	4	4	3	1	1	—	—	—	—	—	21
Acyrthosiphon loti Theob.	—	—	—	—	—	—	—	—	—	2	—	—	—	—	—	—	—	—	—	—	2
A. pisum Harris	—	—	—	—	—	—	—	—	4	5	2	—	—	1	—	1	—	—	—	—	13
Unidentified *Acyrthosiphon* sp.	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	1
Metopolophium dirhodum Walk.	—	—	—	—	—	—	—	2	8	—	—	—	—	—	—	—	—	—	—	—	10
Aulacorthum solani Kalt.	—	—	—	—	—	—	—	—	—	—	1	1	—	—	—	—	—	—	—	—	2
Microlophium evansi Theob.	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	1
Amphorophora rubi Kalt.	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	1
Hyperomyzus lactucae L.	—	—	—	—	1	1	—	—	12	2	4	1	3	—	—	—	—	—	—	—	24
H. pallidus H. R. L.	—	—	—	—	—	—	—	—	16	4	—	2	—	—	—	—	—	—	—	—	22
Nasonovia ribis-nigri Mosl.	—	—	1	—	—	—	—	1	5	—	1	—	—	—	—	—	—	—	—	—	8
Cryptomyzus galeopsidis Kalt.	—	1	—	—	2	1	—	1	6	4	12	28	43	12	2	2	—	—	—	—	114
C. ribis L.	—	—	—	—	—	—	—	—	—	—	1	—	1	—	—	—	—	—	—	—	2
Capitophorus hippophaës Walk.	—	—	—	—	—	—	—	—	—	1	2	2	2	2	1	1	—	1	—	—	12
C. similis v. d. G.	—	—	—	—	—	—	—	—	—	—	—	—	—	1	1	—	—	—	—	—	2
Unidentified *Capitophorus* sp.	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	1
Myzus cerasi Fabr.	—	—	—	—	—	—	—	—	4	1	—	—	1	—	—	—	1	—	—	—	7
M. persicae Sulz.	—	—	—	1	—	—	—	1	6	1	17	16	8	4	3	1	—	—	1	—	59
Phorodon humuli Schrk.	—	—	—	—	—	—	—	—	—	—	4	2	4	—	—	—	—	—	—	—	10
Ovatus sp.	—	—	—	1	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	2
Cavariella aegopodii Scop.	—	—	1	—	1	—	—	1	5	—	—	—	—	—	—	—	—	—	—	—	8
C. archangelicae Scop.	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	1
Hayhurstia atriplicis L.	—	—	—	—	—	—	—	—	2	1	5	29	85	3	—	2	—	—	—	—	127
Lipaphis erysimi Kalt.	—	—	—	—	—	—	—	—	3	1	1	1	4	—	1	1	1	—	—	—	13
Brevicoryne brassicae L.	—	—	—	—	—	—	—	1	—	—	1	—	3	3	—	—	—	—	—	—	8
Brachycaudus helichrysi Kalt.	—	—	—	—	—	—	1	—	2	—	—	2	—	—	—	1	—	—	—	—	6
Dysaphis spp.	—	—	—	—	—	—	1	1	4	2	—	—	—	1	1	1	—	—	—	—	11

Anuraphis farfarae Koch	–	–	–	–	1	–	–	1	2	1	–	–	–	–	–	–	–	–	–	–	5
Aphis fabae Scop. complex	–	–	–	–	–	–	1	–	16	15	148	227	175	62	9	1	1	1	–	–	656
A. idaei v. d. G.	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	1
A. sambuci L.	–	–	–	–	–	–	–	–	2	–	–	–	1	–	–	–	–	–	–	–	3
Unidentified *Aphis* spp.	–	–	–	–	1	1	–	1	3	4	4	6	6	2	–	1	–	–	–	–	29
Toxopterina vandergooti Börner	–	–	1	–	1	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	3
Rhopalosiphum padi L. *R. oxyacanthae* Schrk.	–	–	–	–	–	–	1	2	49	10	3	2	2	–	–	–	–	2	–	–	71
Hyalopterus pruni Geoffr.	–	–	–	–	–	–	–	1	6	–	1	–	1	–	–	–	–	–	–	–	9
Unidentified or unidentifiable specimens	–	–	–	–	1	–	–	–	4	1	–	1	2	1	–	–	1	–	–	–	11
CHAITOPHORIDAE																					
Periphyllus testudinacea Fern.	–	3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3
CALLAPHIDIDAE																					
Euceraphis punctipennis Zett.	–	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2
Kallistaphis basalis Stroyan	–	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2
Drepanosiphum platanoides Schrk.	–	–	–	1	–	–	–	–	1	–	1	–	1	–	–	–	–	–	–	–	4
Myzocallis coryli Goetze	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	1
Tuberculoides annulatus Hartig	–	–	–	–	–	–	–	–	–	–	1	1	–	–	–	–	–	–	–	–	2
Therioaphis luteola Börner	–	–	–	–	–	–	–	–	1	–	1	2	–	–	–	–	–	–	–	–	4
Unidentified specimen	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1
LACHNIDAE																					
Protrama ranunculi d. Gu.	–	–	–	–	1	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	2
Cinara sp.	–	–	1	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2
THELAXIDAE																					
Anoecia sp.	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2	–	–	–	–	2
PEMPHIGIDAE																					
Schizoneura ulmi L.	–	–	–	–	3	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	4
Unidentified specimens	–	–	–	–	–	–	–	3	14	2	3	1	1	–	–	–	1	–	–	–	25
Total	0	9	4	4	12	4	5	17	181	66	219	331	349	94	20	14	5	4	1	0	1339

Table 3.

Tylstrup.	25/5	1/6	8/6	15/6	22/6	29/6	6/7	13/7	20/7	27/7	3/8	10/8	17/8	24/8	31/8	7/9	14/9	21/9	28/9	5/10	Total
APHIDIDAE																					
Dactynotus achilleae Koch	–	–	–	–	–	–	–	–	1	–	–	–	1	–	–	–	–	–	–	–	2
D. cirsii L.	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	1
D. tussilaginis Walk.	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	1
Macrosiphum (Sitobion) avenae Fabr.	–	–	–	–	–	–	–	1	–	2	4	3	2	–	–	–	–	–	–	–	12
Acyrthosiphon pisum Harris	–	–	–	–	–	–	–	–	2	1	–	4	1	–	1	–	–	–	–	–	9
Unidentified *Acyrthosiphon* sp.	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	1
Metopolophium dirhodum Walk.	–	–	–	–	–	–	1	1	2	1	–	–	–	–	–	–	–	–	–	–	5
Microlophium evansi Theob.	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	1
Amphorophora rubi Kalt.	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	1
Hyperomyzus lactucae L.	–	–	–	–	–	1	1	–	11	5	3	2	2	–	–	–	–	–	–	–	25
H. pallidus H. R. L.	–	–	–	–	–	–	–	–	–	–	–	2	–	–	–	–	–	–	–	–	2
Cryptomyzus galeopsidis Kalt.	–	–	–	1	–	–	–	1	3	–	–	1	2	–	–	–	–	–	–	–	8
Capitophorus hippophaës Walk.	–	–	–	–	–	–	–	–	–	–	–	1	–	2	–	–	–	–	–	–	3
Myzus cerasi Fabr.	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	1
M. persicae Sulz.	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2	1	3	–	–	–	6
Phorodon humuli Schrk.	–	–	–	–	–	–	–	–	–	1	1	–	–	–	–	–	–	–	–	–	2
Ovatus sp.	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	1
Liosomaphis berberidis Kalt.	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1
Cavariella aegopodii Scop.	–	–	–	–	–	–	–	–	1	–	–	–	1	–	1	–	–	–	1	–	4
Hayhurstia atriplicis L.	–	–	–	1	–	–	4	23	35	24	16	17	25	3	–	–	–	–	–	–	148
Lipaphis erysimi Kalt.	–	–	–	1	–	–	–	–	1	1	1	1	1	–	–	1	–	–	–	–	7
Brachycaudus helichrysi Kalt.	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	1
B. (Appelia) tragopogonis Kalt.	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1
Dysaphis sp.	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1

Aphis fabae Scop. complex	–	–	–	–	–	–	1	2	1	–	–	–	11	25	94	44	6	–	–	–	184
A. sambuci L.	–	–	–	–	–	–	–	–	1	–	–	–	1	1	–	–	–	–	–	–	3
Unidentified *Aphis* spp.	–	–	–	–	2	2	7	7	4	2	2	2	6	31	32	73	4	1	–	–	175
Rhopalosiphum padi L. } *R. oxyacanthae* Schrk. }	–	–	–	1	–	–	11	–	3	2	1	–	1	–	1	1	8	7	2	5	43
Hyalopterus pruni Geoffr.	–	–	–	–	–	–	2	–	–	–	–	–	–	–	–	–	–	–	–	–	2
Pterocomma salicis L.	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1
Unidentified or unidentifiable specimens	–	–	–	–	–	–	–	1	–	2	–	–	–	–	1	2	–	–	–	–	6
CHAITOPHORIDAE																					
Periphyllus testudinacea Fern.	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1
CALLAPHIDIDAE																					
Euceraphis punctipennis Zett.	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1
Drepanosiphum platanoides Schrk.	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	1
Therioaphis trifolii Monell	–	–	–	–	–	–	1	–	–	2	–	–	–	–	–	–	–	–	–	–	3
LACHNIDAE																					
Protrama ranunculi d. Gu.	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	1
THELAXIDAE																					
Anoecia sp.	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	1	–	–	–	2
PEMPHIGIDAE																					
Schizoneura ulmi L.	–	–	–	–	–	–	1	1	–	–	–	–	–	–	–	–	–	–	–	–	2
Unidentified specimens	–	–	–	–	–	–	–	2	2	1	1	1	–	–	1	–	–	1	–	–	9
Total	0	1	0	5	5	4	30	40	70	46	29	35	55	63	133	122	22	9	4	5	678

Table 4.

Borris.	25/5	1/6	8/6	15/6	22/6	29/6	6/7	13/7	20/7	27/7	3/8	10/8	17/8	24/8	31/8	7/9	14/9	21/9	28/9	4/10	Total
APHIDIDAE																					
Macrosiphoniella millefolii De Geer	–	–	–	–	–	–	–	–	1	–	1	–	–	–	–	–	–	–	–	–	2
Dactynotus achilleae Koch	–	–	–	–	–	–	–	–	1	1	1	–	–	–	–	–	–	–	–	–	3
D. sonchi L.	–	–	–	–	–	–	2	1	–	1	1	–	–	–	–	–	–	–	1	–	6
D. tussilaginis Walk.	–	–	–	–	–	–	1	–	–	1	–	1	3	–	–	–	–	–	–	–	6
D. (Uromelan) taraxaci Kalt.	–	–	–	–	–	–	–	2	–	2	–	–	–	–	–	–	–	–	–	–	4
Dactynotus sp.	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	1
Macrosiphum (Sitobion) avenae Fabr.	–	–	–	–	–	–	1	1	–	–	2	–	–	1	1	–	–	–	–	–	6
M. (S.) fragariae Walk.	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	1
Acyrthosiphon pisum Harris	–	–	–	–	–	–	2	–	4	1	–	–	–	–	–	1	–	–	–	–	8
Metopolophium dirhodum Walk.	–	–	–	–	–	–	–	1	5	3	1	–	–	1	–	–	–	–	–	–	11
Aulacorthum solani Kalt.	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	1
Microlophium carnosum Buckt.	–	–	–	–	–	–	–	2	5	3	–	–	–	–	2	1	1	–	1	–	15
Hyperomyzus lactucae L.	–	–	–	–	–	–	1	1	17	8	1	1	1	–	2	1	–	1	1	–	35
H. pallidus H. R. L.	–	–	–	–	–	–	–	–	1	1	2	1	–	1	–	–	–	–	–	–	6
H. (Hyperomyzella) rhinanthi Schout.	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	1	2	–	2	–	6
Nasonovia ribis-nigri Mosl.	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	1
Rhopalosiphoninus tulipaellus Theob.	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	1
Rhopalomyzus (Judenkoa) lonicerae Sieb.	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	1
Cryptomyzus galeopsidis Kalt.	–	–	–	–	–	–	2	1	1	1	3	5	5	7	5	3	–	–	–	–	33
C. ribis L.	–	–	–	–	–	4	4	–	3	1	1	1	–	–	–	1	–	–	–	–	15
Capitophorus hippophaës Walk.	–	–	–	–	–	–	–	–	–	–	1	–	–	–	1	2	–	–	–	–	4
Ericaphis latifrons Börner	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	1
Myzus cerasi Fabr.	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	1	–	–	2
M. persicae Sulz.	–	–	–	–	–	–	–	–	2	2	–	–	2	–	4	2	–	2	1	–	15
Phorodon humuli Schrk.	–	–	–	–	–	–	–	–	–	2	–	–	–	–	–	–	–	–	–	–	2
Ovatus sp.	–	–	–	1	–	1	–	1	1	2	–	–	–	–	–	–	–	–	–	–	6
Cavariella archangelicae Scop.	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	2
C. pastinacae L.	–	–	–	–	–	–	–	1	1	–	–	–	–	–	–	–	–	–	–	–	2
C. theobaldi Gill. & Bragg	–	–	–	–	–	–	2	–	–	–	–	–	–	–	–	–	–	–	–	–	2
Brachycolus sp.	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	1

Hayhurstia atriplicis L.	—	—	—	—	—	—	6	6	28	20	25	31	3	1	—	—	—	—	—	—	120
Lipaphis erysimi Kalt	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	—	—	—	—	2
Brevicoryne brassicae L.	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	1
Brachycaudus helichrysi Kalt.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	1
B. (Appelia) tragopogonis Kalt	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1
Dysaphis spp.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3	—	3
Ceruraphis eriophori Walk	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	—	4
Aphis fabae Scop complex	—	—	—	—	—	1	1	2	—	3	6	7	20	44	45	52	—	2	1	—	184
A. sambuci L.	—	—	—	—	—	—	1	1	18	4	1	—	—	—	—	—	—	—	—	—	25
Unidentified *Aphis* spp.	—	—	1	1	—	—	3	2	4	3	2	2	1	—	7	24	6	2	—	—	58
Rhopalosiphum padi L. *R. oxyacanthae* Schrk.	—	—	—	1	—	—	1	—	10	1	—	—	—	—	—	2	7	24	13	1	60
Hyalopterus pruni Geoffr.	—	—	—	—	—	—	3	—	—	—	—	—	—	—	—	—	—	—	—	—	3
Unidentified or unidentifiable spicimens	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	4	—	5
CALLAPHIDIDAE																					
Euceraphis punctipennis Zett.	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	1
Drepanosiphum acerinum Walk	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	1
D. platanoides Schrk.	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	1
Myzocallis myricae Kalt	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	1
Tuberculoides annulatus Hartig	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	1
LACHNIDAE																					
Protrama ranunculi d. Gu.	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	1
Cinara sp.	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1
THELAXIDAE																					
Anoecia sp.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	1
Unidentified specimen	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	1
PEMPHIGIDAE																					
Schizoneura ulmi L.	—	—	—	—	—	—	3	3	6	1	—	—	—	—	—	—	—	—	—	—	13
Unidentified specimens	—	—	—	—	—	—	—	—	2	2	—	1	—	3	—	—	—	1	—	—	9
Total	0	0	3	4	—	6	36	27	113	65	49	52	35	59	69	93	16	35	33	2	697

Table 5.

Jyndevad	25/5	1/6	8/6	15/6	22/6	29/6	6/7	13/7	20/7	27/7	3/8	10/8	16/8	24/8	31/8	7/9	14/9	21/9	28/9	5/10	Total
APHIDIDAE																					
Dactynotus achilleae Koch	—	—	—	—	—	—	1	—	1	—	—	—	—	—	—	—	—	—	—	—	2
D. cichorii Koch	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1
D. hypochoeridis H. R. L.	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	1
Dactynotus sp.	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1
Macrosiphum (Sitobion) avenae Fabr.	—	—	—	—	—	—	—	1	2	1	2	—	—	—	—	—	—	—	—	—	6
Acyrthosiphon pisum Harris	—	—	—	—	—	—	1	1	5	1	5	—	—	—	—	—	—	—	—	—	13
Metopolophium dirhodum Walk.	—	—	—	—	—	1	—	—	7	—	—	—	—	—	—	—	—	—	—	—	8
Aulacorthum solani Kalt.	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	1
Amphorophora rubi Kalt.	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1
Hyperomyzus lactucae L.	—	1	5	3	—	5	—	3	7	3	15	1	—	—	—	—	2	—	—	—	45
H. pallidus H. R. L.	—	—	—	—	—	—	—	—	—	2	1	1	—	—	—	—	—	—	—	—	4
Nasonovia ribis-nigri Mosl.	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	1
Cryptomyzus galeopsidis Kalt.	—	—	—	1	—	—	—	1	3	20	—	16	4	2	—	—	—	—	—	—	47
C. ribis L.	—	—	—	—	—	1	—	—	1	—	—	—	—	—	—	—	1	—	—	—	3
Pleotrichophorus glandulosus Kalt.	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1
Capitophorus elaeagni d. Gu.	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	1
C. hippophaës Walk.	—	—	—	—	—	—	—	—	3	—	1	2	—	—	—	2	—	—	—	—	8
C. similis v. d. G.	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1
Myzus cerasi Fabr.	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	1
M. persicae Sulz.	—	2	—	—	—	—	—	3	1	3	5	4	2	2	1	—	—	1	—	—	24
Phorodon humuli Schrk.	—	—	—	—	—	—	—	—	2	—	—	—	—	—	—	—	—	—	—	—	2
Ovatus sp.	—	—	—	—	1	—	—	—	1	—	—	—	—	—	—	—	—	2	—	—	4
Liosomaphis berberidis Kalt.	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1
Cavariella aegopodii Scop.	—	—	1	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	2
C. pastinacae L.	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	1
Hayhurstia atriplicis L.	—	—	—	—	2	4	5	27	32	5	23	51	4	8	2	1	—	—	—	—	164
Lipaphis erysimi Kalt.	—	—	—	—	1	—	1	2	1	—	1	—	—	—	—	—	—	—	—	—	6
Brevicoryne brassicae L.	—	—	—	—	—	—	—	—	—	1	—	11	4	77	13	5	1	—	—	—	112

Brachycaudus helichrysi Kalt.	–	–	–	–	–	–	–	–	1	–	–	1	–	–	–	–	–	1	–	–	3
Dysaphis sp.	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	3	2	–	6
Aphis fabae Scop. complex	–	–	–	–	–	1	–	3	6	13	20	34	10	10	2	2	7	4	–	–	112
A. sambuci L.	–	–	–	–	–	–	–	4	–	–	2	–	–	–	–	–	–	–	–	–	6
Unidentified *Aphis* spp.	–	–	3	–	1	4	4	4	4	–	2	10	–	–	–	7	5	–	1	–	45
Toxopterina vandergooti Börner	–	–	–	–	2	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3
Rhopalosiphum padi L. / *R. oxyacanthae* Schrk.	–	–	9	–	–	–	1	4	47	–	5	1	1	–	–	7	63	62	3	–	203
Hyalopterus pruni Geoffr.	–	–	–	–	–	–	–	–	2	–	–	–	–	–	–	–	–	–	–	–	2
Unidentified or unidentifiable specimens	–	–	1	–	–	–	–	–	–	–	1	1	–	–	–	–	–	–	–	–	3
CALLAPHIDIDAE																					
Symydobius oblongus v. Heyd.	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	1
Euceraphis punctipennis Zett.	–	5	1	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	7
Drepanosiphum platanoides Schrk.	–	–	–	–	–	2	–	9	–	–	1	–	–	–	–	–	–	–	–	–	12
Tuberculoides annulatus Hartig	–	–	–	–	–	–	–	1	–	–	1	–	–	–	–	–	–	–	–	–	2
Therioaphis luteola Börner	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	1
T. trifolii Monell	–	–	–	–	3	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	4
Unidentified specimens	–	2	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3
LACHNIDAE																					
Protrama ranunculi d. Gu.	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	1
Cinara sp.	–	–	1	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	2
THELAXIDAE																					
Anoecia sp.	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	2	–	3
PEMPHIGIDAE																					
Schizoneura ulmi L.	–	–	–	–	2	19	2	5	1	–	–	–	–	–	–	–	–	–	–	–	29
Unidentified specimens	–	–	–	–	–	–	–	–	1	–	–	1	–	–	–	–	–	1	–	–	3
Total	0	11	23	4	14	41	17	72	129	49	86	137	25	99	18	25	80	75	8	0	913

Jyndevad:
The tray stood in a little potato plot, which was placed in a beet field 50—100 m south of the buildings and garden of the Jyndevad Experimental Station. No buildings within a distance of less than 1—2 kilometres from the tray in the directions of south, west, and east, but cultivated areas with swedes ets. Quicksets stood in the neighbourhood, coniferous plantations at a greater distance.

The aphid fauna of a locality depends on the composition and the condition of the vegetation. Therefore soil and climate are important factors. In a broad outline one can make a distinction between East Denmark (the islands and eastern Jutland) and West Denmark (northern and western Jutland). The soil is clayey in the greater part of East Denmark and sandy in the greater part of West Denmark. There is a climatic difference, too, because West Denmark is nearer to the ocean.

Two localities, Ørslev and Årslev, in East Denmark on moraine clay from the last glacial period, have fertile soil with barley and beets as dominant crops and with several wheat fields, with several hardwood forests, without moors.

The other three localities are situated in West Denmark. Borris stands on soil consisting of moraine from the last but one glacial period, partly clay, partly sand, north-west of a district with river sand from the last glacial period. The soil at Jyndevad is river sand from the same period. Tylstrup stands on marine sand. In the sandy districts the dominant cultivated plants are swedes, potatoes, and rye (though beets, barley, and wheat are common crops, too). Grass, oats, and leguminous crops are very common at all five localities. Coniferous plantations and moors are widely distributed in western Jutland. The aphids *Ericaphis latifrons* and *Myzocallis myricae* feeding on plants in moors (viz. *Empetrum nigrum* and *Myrica gale* respectively) were caught in the tray at Borris only.

In accordance with the abovementioned distribution of cultivated plants, *Aphis fabae,* feeding especially on

beets, was more numerous in the trays in East Denmark than in West Denmark, whereas *Brevicoryne brassicae* was most common at Jyndevad, probably coming from a swede field in the nighbourhood (fig. 2).

Among species more common in the trays placed on the fertile land of East Denmark than in those placed

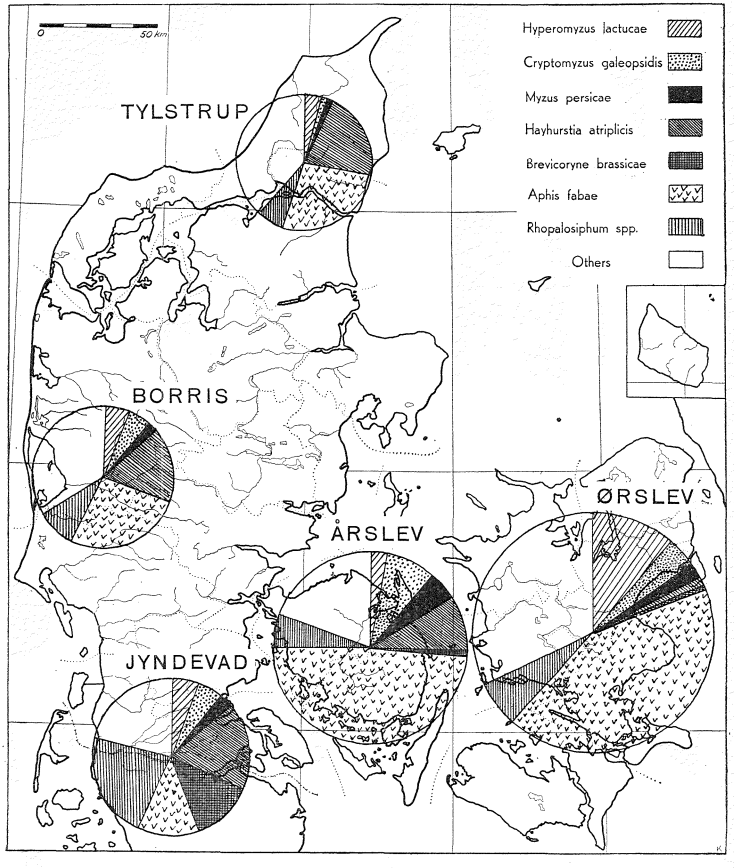


Fig. 2. Total catches of aphids in yellow trays at five localities, from April to October, 1956.

The area of the circles and the sectors are in ratio to the number of aphids.

in the more infertile West Denmark *Sitobion avenae, Acyrthosiphon loti, A. pisum, Cryptomyzus galeopsidis, Capitophorus hippophaës, Myzus cerasi, M. persicae, Phorodon humuli, Cavariella aegopodii, Lipaphis erysimi, Brachycaudus helichrysi, Dysaphis* spp., and *Anuraphis farfarae,* some of them coming from cultivated plants, others from the wild flora, can be mentioned. Among species more common in all three trays in the West than in the two trays in the East only *Dactynotus achilleae* and perhaps *Ovatus* spp. and *Hayhurstia atriplicis* (also common at Årslev, fig. 10) can be mentioned.

Perhaps this geographical distribution of aphid species is no rule, but existed only in 1956. The relation between the total numbers of aphids flown into trays at the five localities was not the same every year (fig. 3). The succession in 1956 was: Ørslev (2057), Årslev (1339), Jyndevad (913), Borris (697), and Tylstrup (678); in 1955: Borris (3847), Årslev (2943), Ørslev (1730), Tylstrup (1364), and Jyndevad (806); in 1954: Ørslev (5467), Årslev (3698), Borris (753), Jyndevad (656), and Tylstrup (589). In 1953 no tray was placed at Ørslev. The other four trays contained only about 300 aphids each (Tylstrup 312, Årslev 299, Jyndevad 277, Borris 271).

It will be seen that the distribution in 1954 resembled that of 1956, whereas 1955 greatly diverged. The figures show that it is impossible to draw extensive conclusions for other years from the results of a single year, but it is also impossible to draw extensive conclusions for a whole region from the result from a single tray. In 1955, when Borris in western Jutland caught more aphids (3847) than twice the number caught at Ørslev on Sealand (1730), many more aphids were caught in some other trays on Sealand, e. g. 16618 at Virumgård and 5967 at Trollesminde. The distribution on the various weeks during the summer was not the same in different years either (Heie 1959), and presumably the composition of species

is subject to considerable fluctuations, too. The writer knows from experience that some aphids being very common in Denmark one year may be rare the next year.

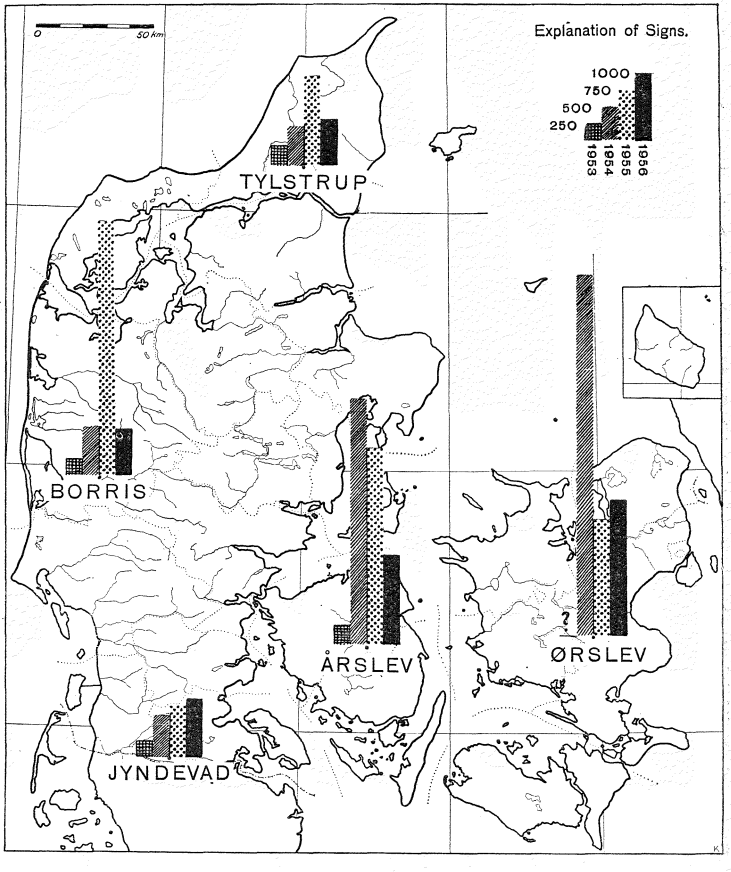


Fig. 3. Total catches of aphids at the same five localities in different years (1953—56).

The composition of the catches.

The species most common in the trays is *Aphis fabae* (perhaps mixed with some related species forming the *Aphis fabae* complex). Only at Jyndevad this species is

not no. 1. The fact that the trays were placed in beet fields may partly explain the great total number of this species caught in the five trays (2014). The next one is *Hayhurstia atriplicis* (577), which is more common than *Aphis fabae* in the tray of Jyndevad (fig. 2). Other common species are *Hyperomyzus lactucae* (368), *Cryptomyzus galeopsidis* (293), *Rhopalosiphum padi* and *R. oxyacanthae (insertum)* (495), *Myzus persicae* (149), *Brevicoryne brassicae* (131), and *Schizoneura ulmi* (115). Among unidentified *Aphis* spp. (372) probably several specimens are *Aphis nasturtii* Kalt., the common aphid on potatoes. Some of the specimens identified as *Hyperomyzus pallidus* (98) are perhaps *H. lampsanae* Börner.

The species most common in the trays need not be the most common in the nature. The production of alate individuals is for instance variable with different species. It is remarkable that common Danish aphid species as *Macrosiphum rosae* L., *Metopeurum fuscoviride* Stroyan, *Myzus ascalonicus* Donc., and *Phyllaphis fagi* L. are completely lacking, and that the potato aphids *Macrosiphum euphorbiae* Ths. and *Aulacorthum solani* Kalt. are relatively rare in the trays.

Hyalopterus pruni Geoffr. is sparsely represented in proportion to the enormous colonies so often seen on plum-trees and on Phragmites communis. The number of alate individuals of *Macrosiphum (Sitobion) avenae* Fabr. and *Acyrthosiphon pisum* Harris in the trays seems rather small compared with the big attacs by these noxious species on respectively pea and cereals in the summer of 1956. Appearing from the number of apterous *Sitobion avenae* drowned in the trays (table 8, p. 356) numerous individuals occurred on grasses in beet fields at Årslev and Tylstrup, too.

It is an important fact that some species are more strongly attracted by yellow colours than others (Eastop 1955, 1957). Among species selected by the yellow trays

Eastop found *Macrosiphum euphorbiae, Brevicoryne brassicae, Brachycaudus helichrysi,* and *Myzus persicae.* Grass-feeding species and the pea aphid *Acyrthosiphon pisum* were only weakly attracted as compared with most dicotyledon-feeding species. Moericke (1955) showed that the grass-feeding *Hyalopterus pruni* preferred greyish-green to yellow.

Suction traps (Johnson 1950, Johnson & Eastop 1951), therefore, are preferred to yellow Moericke-trays when analysis of the aphid contents of a distinct air volume shall be made.

A comparison made with the analysis done by Johnson & Eastorp (1951) shows some agreement in spite of the geographical distance, working within another year (1947) and another catching method (the suction trap), many dominant species being the same: *Aphis* spp. (including *A. fabae*), *Brevicoryne brassicae, Rhopalosiphum padi* and *R. oxyacanthae (insertum), Metopolophium dirhodum, Myzus persicae,* and *Hyperomyzus lactucae,* whereas *Macrosiphum rosae* and *M. euphorbiae* being sparsely represented, *Aulacorthum solani* and *Metopeurum fuscoviride* being lacking. Several grass-feeding species are more numerous showing the deficiency of the yellow tray method: *Metopolophium dirhodum, Anoecia corni, Hyalopterus pruni, Sitobion avenae,* and *S. fragariae. Hayhurstia atriplicis* is caught more rarely, whereas some aphids from deciduous trees more commonly: *Drepanosiphum platanoides* and *Eucallipterus tiliae.* Several specimens of *Pemphigus bursarius* and *Macrosiphum cholodkovskyi* are recorded by Johnson & Eastop, but not by the writer, who in return found *Lipaphis erysimi, Hyperomyzus pallidus, Microlophium carnosum,* and *Dactynotus tussilaginis,* not recorded by Johnson & Eastop.

In western Germany (at Elsdorf, Birkhof, and Osterath) Martini (1953) caught numerous aphids in Moericke-trays measuring 34×52 cm as early as in May and June.

In June, 1952, the dominant species were *Aphis fabae* and *Hyperomyzus lactucae,* but in 1951 only few specimens of the latter were caught.

Influence by climatic factors.

Table 6 shows average monthly temperatures for the five localities in 1956. As no meteorological measure-

Table 6.

Average monthly temperatures (°C.).

1956.	April	May	June	July	August	September	October
Ørslev	3,5	10,6	13,6	15,9	13,3	12,8	8,1
Årslev	4,0	11,8	13,3	16,3	13,2	12,9	8,1
Tylstrup	4,2	10,6	13,3	16,3	13,0	12,4	7,3
Borris	4,5	11,0	12,8	16,2	13,0	13,1	7,9
Jyndevad	4,8	11,5	13,2	16,8	13,3	13,4	8,2

Table 7.

Precipitation (in mm).

1956.	April	May	June	July	August	September	October
Ørslev	19	24	60	51	110	55	75
Årslev	19	11	49	44	95	28	49
Tylstrup	15	25	64	37	105	62	37
Borris	20	29	57	45	128	66	67
Jyndevad	10	19	39	31	147	41	65

ments are made at Ørslev, the figures have been taken for Tureby a few kilometres away. It will be seen that Jyndevad had an early spring owing to its more southern latitude. In accordance with this fact flying aphids arrived at this tray in relatively great numbers earlier than at the other trays, viz. $^{25}/_{5}$—$^{8}/_{6}$ (fig. 8). Perhaps the little precipitation (table 7) compared with the other localities had an effect, too.

The spring migration of *Metopolophium dirhodum, Hyperomyzus lactucae,* and *Rhopalosiphum* sp. took place at Jyndevad at first, and among the non-migrating species *Lipaphis erysimi* and *Hayhurstia atriplicis* had an earlier

maximum of their summer flight pointing to an acceleration of the production of alate forms here.

At Borris and Tylstrup in return the flight of some aphids was behind time, e. g. *Capitophorus hippophaes, Aphis fabae,* and *Schizoneura ulmi,* perhaps owing to the more oceanic climate (later spring with greater precipitation).

On figs. 4—8 some meteorological data (maximum temperature and precipitation per week) are given, because the capture of a tray is under a double influence of the weather. The weather of preceding weeks acts on the breeding of the aphids and the developing of winged

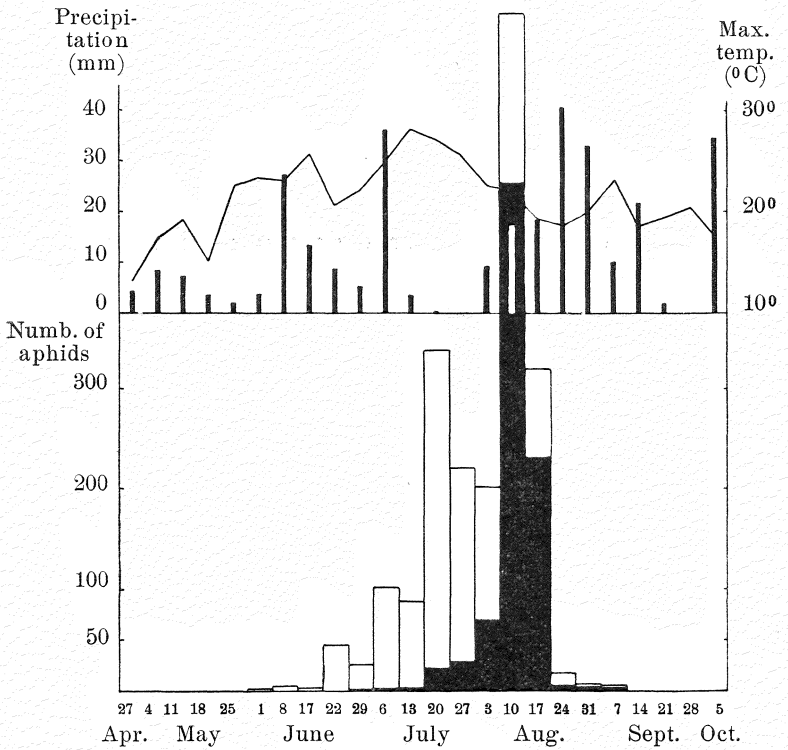


Fig. 4. Ørslev.
(For legend see p. 351).

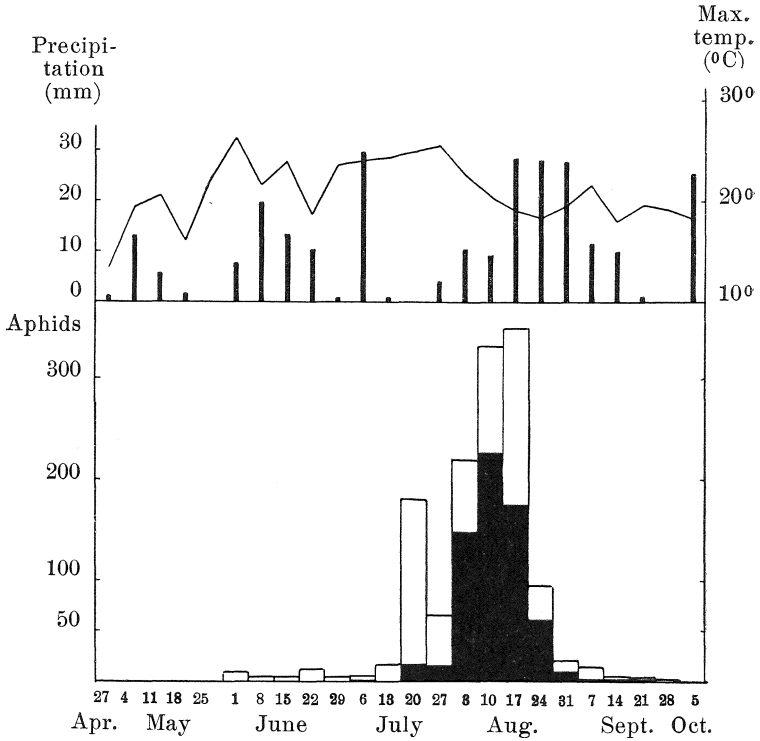


Fig. 5. Årslev.

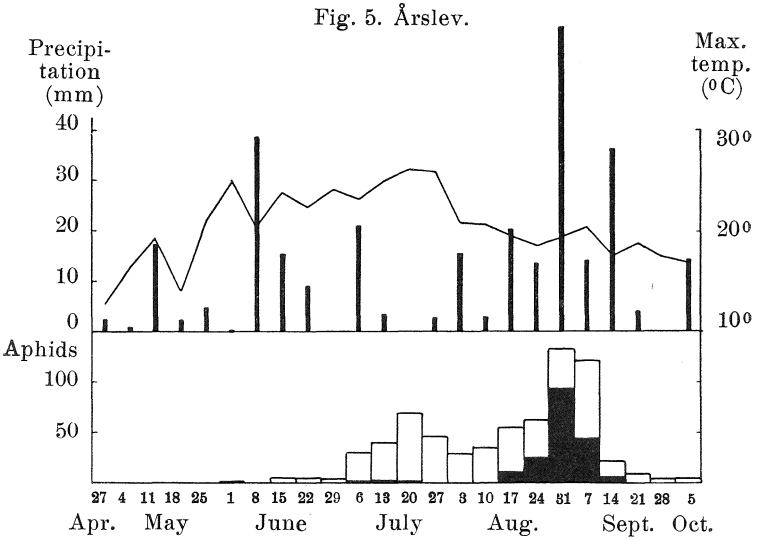


Fig. 6. Tylstrup.

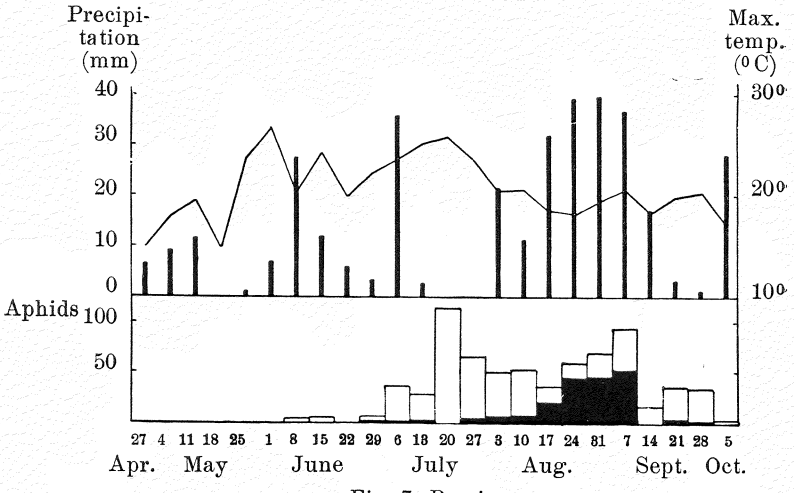


Fig. 7. Borris.

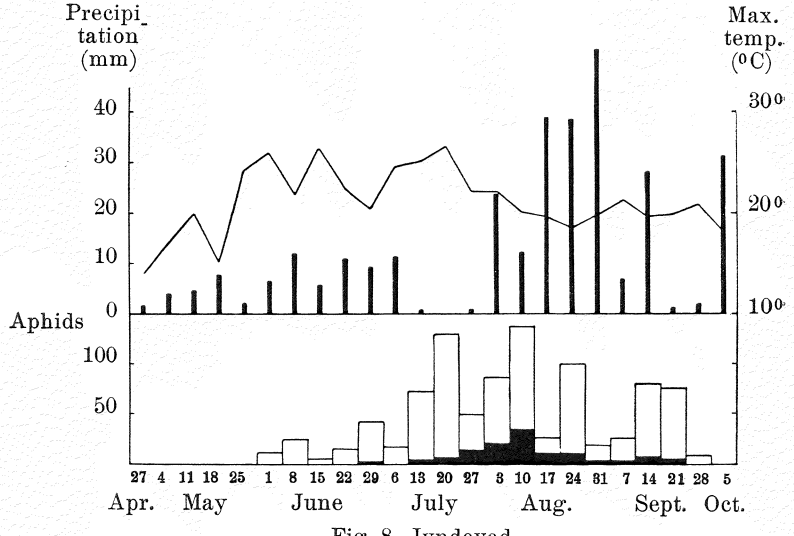


Fig. 8. Jyndevad.

Fig. 4—8. Weekly catches of total aphids (broad white columns) and those of *Aphis fabae* Scop. (broad black columns) compared with maximum temperatures in °C. (the curve) and precipitation in mm (narrow black columns) of the weeks from April to October, 1956.

individuals, and the weather of a week during which the catching by means of the yellow tray takes place, has influence on the size of the capture through its influence on flight and landing of the insects.

The precipitation at Ørslev is measured at Haslev, the maximum temperature at Ørslev is that of Sønder-sted, at Årslev that of Odense, at Borris that of Studsgård, and at Jyndevad that of Tønder.

In the warm and dry weeks $^{13}/_{7}$—$^{20}/_{7}$ and $^{20}/_{7}$—$^{27}/_{7}$ great numbers of aphids flew to the trays, especially at Ørslev where the maximum temperature of the preceding week was rather high (28,1 °C.). But the greatest number of aphids caught appeared in weeks with some precipitation, at Tylstrup even in a week with maximum precipitation ($^{24}/_{8}$—$^{31}/_{8}$: 62,7 mm).

For *Aphis fabae* (broad black columns in figs. 4—8) the influence by weather seems still smaller than for the total sum of aphids. The decrease of the number about the middle of August (at Ørslev, Årslev, and Jyndevad) is owing to the great precipitation in August, perhaps.

Flight period of different species.

Obviously three flight periods can be noticed in the case of *Hyperomyzus lactucae* (fig. 9), which is a migratory species with Ribes (especially R. nigrum) as winter host and Sonchus as summer host, viz. 1) the spring migration from Ribes to Sonchus in June (evident at Ørslev and Jyndevad, demonstrable at Årslev, too) till the first week of July (Tylstrup), 2) the flight between summer hosts (July and August), and 3) the autumnal migration from Sonchus to Ribes in September (demonstrable only at Borris and Jyndevad). Males were not found, probably because their migration took place after the first week of October, when the trays were emptied for the last time.

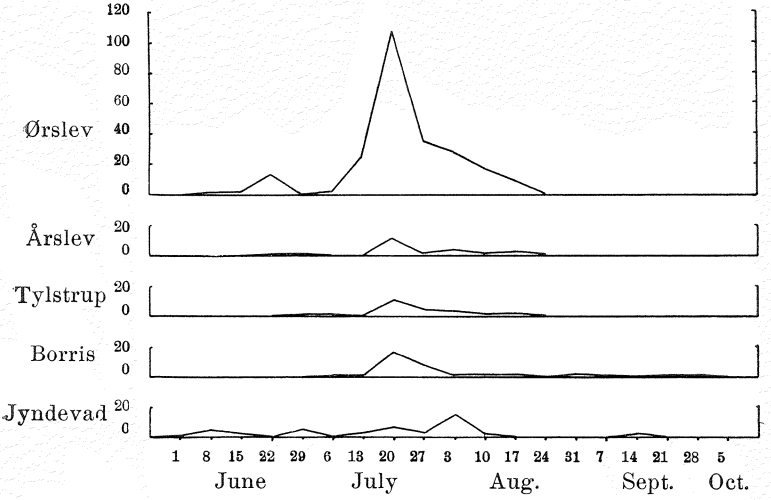


Fig. 9. Weekly catches of *Hyperomyzus lactucae* L. at five localities, from June to October, 1956.

The spring migration of *Schizoneura ulmi* from Ulmus to roots of Ribes takes place from the middle of June until first part of July, 2—3 weeks later in western and northern Jutland than on the islands and in southern Jutland. The greatest weekly capture is obtained at Ørslev in the first week of July. The autumn flight from Ribes to Ulmus has not been registered.

Of some other migratory species single spring migrants, but only few or none of the autumnal migrants are caught by the trays, e. g. *Metopolophium dirhodum* from Rosa, *Nasonovia ribis-nigri* from Ribes, and *Cavariella* spp. from Salix. Most of the migratory species are represented only or nearly only by alate individuals, developed on summer hosts, flying to other summer hosts, e. g. *Aphis fabae* (fig. 4—8). *Phorodon humuli* has only been caught from the beginning of July until the middle of August, especially at Ørslev. Nevertheless all or some of the individuals that flew into this tray may possibly have arrived from Prunus, the winter host, so that they

represented the spring migration. In 1957, the following year, this species of aphid was seen on sloe as late as on July 6, but at that date migration had been lasting for some time, as apterous adults simultaneously occurring on hops. Perhaps the spring migration and the summer flight may have been mixed in the case of other species too, e. g. *Cryptomyzus galeopsidis* and *Aphis fabae.*

Only few autumnal migrants of different species are taken by this method, probably because the returning of aphids to their winter hosts mainly goes on after the trays having been withdrawn. At Ørslev the autumn migration is not registered at all. Among migratory species specimens of which are caught in autumn are *Rhopalosiphum* spp., *Anoecia* sp., *Capitophorus hippophaes, Cavariella aegopodii, Hyperomyzus rhinanthi, Nasonovia ribisnigri,* and *Ovatus* sp. Winged males did not fly into the two trays on the islands and only few specimens into the Jutland trays. Males of *Cryptomyzus galeopsidis* are oddly enough caught already in summer (Borris $^{13}/_{7}$—$^{20}/_{7}$: 1 specimen, Jyndevad $^{3}/_{8}$—$^{10}/_{8}$: 1 specimen). In this connexion it ought to be mentioned that the writer once (in 1957) observed oviparous females of this aphid species on Ribes rubrum in the middle of the summer, July 28, at Skive (subspecies *citrinus* H. R. L. living on Ribes rubrum all the year; Hille Ris Lambers found the sexuales in September (Hille Ris Lambers 1953, p. 101)). The other males appeared in the autumn: *Nasonovia ribisnigri* (Borris $^{21}/_{9}$—$^{28}/_{9}$: 1 specimen), *Hyperomyzus rhinanthi* (Borris $^{21}/_{9}$—$^{28}/_{9}$: 2 specimens), *Rhopalosiphum* spp. (Tylstrup $^{21}/_{9}$—$^{28}/_{9}$: 1, $^{28}/_{9}$—$^{5}/_{10}$: 1; Borris $^{21}/_{9}$—$^{28}/_{9}$: 1; Jyndevad $^{7}/_{9}$—$^{14}/_{9}$: 1, $^{21}/_{9}$—$^{28}/_{9}$: 1), *Aphis* sp. (Tylstrup $^{31}/_{8}$—$^{7}/_{9}$: 1, $^{14}/_{9}$—$^{21}/_{9}$: 1; Jyndevad $^{21}/_{9}$—$^{28}/_{9}$: 1), and unidentified *Aphididae* (Borris $^{21}/_{9}$—$^{28}/_{9}$: 3).

The non-migrating species have been caught mainly in July and August, some of them appearing rather late, e. g. *Brevicoryne brassicae,* arriving from the middle of

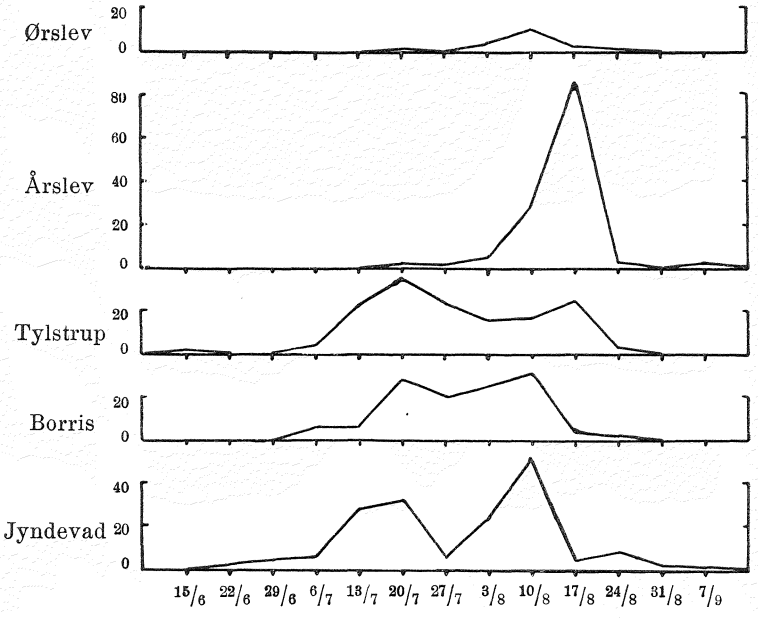


Fig. 10. Weekly catches of *Hayhurstia atriplicis* L. at five localities, from June to September, 1956.

July until the middle of September, the curve of this species topping at Jyndevad about August 20. *Sitobion avenae* and *Acyrthosiphon pisum* appeared about July 1. The dominant non-migrating species is *Hayhurstia atriplicis* (fig. 10), which is common on Chenopodium album, a widely distributed weed in beet and potato fields. Winged specimens of this species arrived from the middle of June (Tylstrup), the curve topping about August 10, at all five localities, at the Jutland localities about the middle of July, too (while the weather was warm and dry; both the same topping periods are found in the cases of *Cryptomyzus galeopsidis* as well as of total aphids (figs. 4—8)).

Table 8.

Apterous aphids in the five trays.

	13/7	20/7	27/7	3/8	10/8	17/8	24/8	31/8	7/9	14/9	21/9	28/9	Total
ØRSLEV													
Metopolophium dirhodum	–	–	1	–	–	–	–	–	–	–	–	–	1
Nasonovia ribis-nigri	–	–	1	–	–	–	–	–	–	–	–	–	1
Myzus persicae	–	–	–	–	–	2	–	–	–	–	–	–	2
Lipaphis erysimi	–	–	–	–	–	1	–	–	–	–	–	–	1
Aphis fabae	–	–	1	–	4	6	–	1	–	–	–	–	12
Rhopalosiphum padi	–	–	2	–	–	–	–	–	–	–	–	–	2
Unidentified specimens	1	–	2	–	–	–	–	–	–	–	–	–	3
ÅRSLEV													
Macrosiphum (Sitobion) avenae	–	–	2	3	1	–	1	1	–	–	–	–	8
Aulacorthum solani	–	–	–	–	–	–	–	2	–	–	–	–	2
Hyperomyzus lactucae	–	–	1	–	–	–	–	–	–	–	–	–	1
Myzus persicae	–	–	–	2	2	1	1	–	–	–	–	–	6
Hayhurstia atriplicis	–	–	–	–	–	1	3	–	1	–	–	–	5
Lipaphis erysimi	–	–	–	1	–	1	–	–	–	–	–	–	2
Aphis fabae	–	–	–	1	1	2	–	–	–	–	–	–	4
Rhopalosiphum padi	–	–	–	4	7	5	–	–	–	–	–	–	16
Unidentified specimens	–	–	–	2	4	1	–	–	–	–	–	–	7
TYLSTRUP													
Macrosiphum (Sitobion) avenae	–	1	17	4	4	–	–	–	–	–	–	–	26
Metopolophium dirhodum	1	1	1	–	–	–	–	–	–	–	–	–	3
Hayhurstia atriplicis	1	–	–	1	1	–	–	–	–	–	–	–	3
Aphis fabae	–	–	–	–	–	–	–	–	–	–	1	–	1
Rhopalosiphum padi	–	1	–	–	–	–	–	–	–	–	–	–	1
BORRIS													
Dactynotus tussilaginis	–	–	–	–	–	–	–	–	–	–	1	–	1
Aulacorthum solani	–	–	–	–	–	–	–	1	–	–	–	–	1
Myzus persicae	–	–	–	–	–	–	–	1	–	–	–	–	1
Lipaphis erysimi	–	–	–	–	–	–	1	–	–	–	–	–	1
Brachycaudus helichrysi	–	–	–	–	1	–	–	–	–	–	–	–	1
Aphis fabae	–	–	–	–	–	1	1	1	–	–	–	–	3
Rhopalosiphum padi	–	–	–	–	–	–	1	–	–	1	–	1	3
Unidentified specimens	–	–	–	–	–	–	–	–	1	–	–	1	2
JYNDEVAD													
Aulacorthum solani	–	–	–	–	–	–	–	–	–	–	2	–	2
Myzus persicae	–	–	–	1	2	–	–	1	1	2	–	–	7
Hayhurstia atriplicis	1	–	–	–	–	1	1	3	2	–	1	–	9

Apterous aphids in the trays.

Apterous aphids found in the samples did not seek out the tray for the sake of its yellow colour, of course (table 8). They may accidentally have fallen into the trays from neighbouring plants, viz. beets (*Aphis fabae, Myzus persicae*), potatoes (*Myzus persicae, Aulacorthum solani*), and weeds: Chenopodium album (*Hayhurstia atriplicis, Aphis fabae*), Cruciferae (*Lipaphis erysimi*), Compositae (*Dactynotus tussilaginis, Hyperomyzus lactucae, Nasonovia ribis-nigri, Brachycaudus helichrysi*), and grasses (*Sitobion avenae, Metopolophium dirhodum, Rhopalosiphum padi*).

No apterous aphid fell into any tray until the week from July 6—13. There was little similarity between the different trays. No aphid species was to be found in all five trays.

A single specimen of *Hayhurstia atriplicis* was an oviparous female (Jyndevad: $^{14}/_{9}$—$^{21}/_{9}$). The others were viviparous females. Several of them were larvae.

Faunistic supplement.

Some of the species mentioned here are known in Denmark from yellow trays only, viz. *Microlophium carnosum* (Buckton 1876), *Capitophorus elaeagni* (d. Guerc. 1894), and *Therioaphis trifolii* (Monell 1882).

The following species have not yet been recorded as Danish in any zoological publication as far as the writer knows though several of them being very common:

Sitobion fragariae (Walker 1848), *Acyrthosiphon loti* (Theob. 1912), *Acyrthosiphon malvae* (Mosley 1841) s. lat., *Metopolophium dirhodum* (Walker 1848), *Microlophium carnosum* (Buckt. 1876), *Microlophium evansi* (Theob. 1923), *Amphorophora rubi* (Kalt. 1843), *Megoura viciae* Buckt. 1876, *Hyperomyzus pallidus* H. R. L. 1935, *Hyperomyzus (Hyperomyzella) rhinanthi* (Schout. 1903), *Nasonovia ribis-nigri* (Mosley 1841), *Rhopalomyzus lonicerae* (Sieb. 1839), *Cryptomyzus galeopsidis* (Kalt. 1843), *Pleotrichophorus glandulosus* (Kalt. 1846), *Capitophorus elaeagni* (d. Guerc. 1894), *Capitophorus hippophaes* (Walker 1852), *Capitophorus horni* Börner 1931, *Capitophorus*

similis v. d. Goot 1915, *Ericaphis latifrons* (Börner 1942), *Liosomaphis berberidis* (Kalt. 1843), *Cavariella archangelicae* (Scop. 1763), *Cavariella pastinacae* (L. 1758), *Cavariella theobaldi* (Gill. & Bragg 1918), *Lipaphis erysimi* (Kalt. 1843), *Anuraphis farfarae* (Koch 1854), *Ceruraphis eriophori* (Walker 1848), *Aphis corniella* (H. R. L. 1935), *Aphis idaei* v. d. Goot 1912, *Toxopterina vandergooti* (Börner 1939), *Pterocomma salicis* (L. 1758), *Periphyllus testudinacea* (Fernie 1852), *Symydobius oblongus* (v. Heyd. 1837), *Euceraphis punctipennis* (Zett. 1828), *Kallistaphis basalis* Stroyan 1957, *Drepanosiphum acerinum* (Walker 1848), *Drepanosiphum platanoides* (Schrk. 1801), *Myzocallis coryli* (Goetze 1778), *Myzocallis myricae* (Kalt. 1843), *Tuberculoides annulatus* (Hartig 1841), *Therioaphis luteola* (Börner 1949), *Therioaphis trifolii* (Monell 1882), and *Protrama ranunculi* (d. Guerc. 1909).

All slides are kept in the author's collection.

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Månedsoversigt over vejrforholdene 1956 udsendt af Meteorologisk Institut.

Anmeldelse.

Ingrid Sparing: **Die Larven der Hydrachnellae, ihre parasitische Entwicklung und ihre Systematik.** Parasitol. Schriftenreihe Heft 10, Jena (Gustav Fischer) 1959, 168 pag. 13.85 DM.

For en 30-40 Aar siden kom Systematik i Miskredit over hele Verden, og vi var herhjemme undtagelsesvis meget hurtige til at følge denne Modestrømning. Efter 2. Verdenskrig er Systematik kommet paa Mode igen, hvad der forhaabentlig ogsaa vil slaa igennem herhjemme; de almene Videnskaber kan ikke arbejde med navnløse Dyr. En af dem, der i nyeste Tid har haft Forstaaelse heraf, er Prof. H. J. Stammer i Erlangen, der specielt interesserer sig for Parasiter; men Parasiter maa jo ses i Sammenhæng, og følgelig arbejdes der paa Stammers Institut med talrige forskellige Dyregruppers Systematik. Og ogsaa Sansen for at finde Publikationsmuligheder for disse Arbejder, har Stammer haft; flere Publikationsserier er startet af ham i de senere Aar.

I en af disse har Ingrid Sparing nu givet en Oversigt over Vandmide-Larverne baseret paa meget omfattende selvstændige Undersøgelser. Opstillingen er den klassiske: historisk Indledning, morfologisk Oversigt, Bestemmelsestabeller først til Familie, senere til Slægt og Art, Beskrivelse af de enkelte Arter, desværre med for faa og lidt vel groft-skematiske Figurer, og tilsidst nogle almindelige Betragtninger. Disse omfatter dels en Gennemgang af Vandmidernes Udvikling med Hensyntagen ogsaa til Hvilestadierne, dels en Gruppering af Udviklingsmaaderne i 4 forskellige Typer, der hænger sammen med mere eller mindre omfattende Parasitisme, dels endelig nogle Ord om Vandmidernes Fylogeni, hvor man glæder sig over igen at kunne betragte dem som en Enhed; den moderne Tendens til at splitte alle Grupper ad havde allerede godt fat i Vandmiderne.

Maatte nogen inspireres til at tage Studiet af de danske Vandmider op og fortsætte Lundblads fortræffelige Arbejder fra 20'erne!

S. L. Tuxen

A Few More Oribatids from Greenland and Lapland.

By
Marie Hammer

In the summer of 1956 I made some collections of oribatids around Abisko in Swedish Lapland. The chief purpose of the collections was that of finding high arctic species in the cold springs there, more especially I hoped to find *Mucronothrus nasalis* (Willm.), which had already been reported from Lapland (Willman 1943). I wanted to see for myself the conditions under which this species lives. Its strange distribution from Switzerland (Schweizer 1956), Austria (Franz 1953), East Sudetia (Willman 1933, 1939, 1956) (most habitats being springs, some of them bogs) to Lapland (Willman 1943), Norway (Willman 1929), and the Faroes (Trägårdh 1931), and even to the alpine areas of the Andes Mountains (the Argentine, Bolivia (Hammer 1958), Peru, (Hammer, not published)) suggested to me that it might also be found in cold springs e. g. in Denmark. When I had examined some springs without finding the animal in question*), I went to Lapland, where I found some specimens in a limestone area on the bank of a brook in moss with oozing water, in an area in part of a heleocrinic character overgrown also by Saxifraga aizoides and yellow violet. At the examination some time later of some material from Greenland I found *Mucronothrus nasalis* (Willm.) in a sample from a bog near Angmagssalik, East Greenland. With this distribution there is no doubt that it will be possible to find it throughout North America if the

*) During a short visit to Jutland in July 1960 *Mucronothrus nasalis* (Willm.) was found in several samples taken from moss incrustated with chalk at "Ravnekilde", a spring near Rebild south of Ålborg, Denmark. The water temperatur is constantly about 9° C.

right places are examined, viz. areas with springs and alpine bogs. Its occurrence in Central European mountainous regions and in the mountains of South America would seem to indicate that it must be a relict from the Glacial Age.

At the above-mentioned examination of Greenland oribatids I furthermore found *Trhypochthoniellus setosus* Willm. in some material from a spring near Unartasiak in West Greenland. This species is known from Germany ("in nassen Sphagnumpolstern und an untergetauchten Wasserpflanzen der Moore", Willman 1931), Iceland (near hot springs, Tuxen 1944), and Canada (in Scirpus vegetation on lake shores with a bottom vegetation of moss and liverwort, Hammer 1952).

Camisia foveolata Hammer was described from Pt. Barrow, Alaska (Hammer 1955). It is furthermore known from Klaushavn, West Greenland (Hammer 1955). At the examination of springs in Swedish Lapland 1956 I found three full-grown individuals and a nymph in thick yellowish green moss immersed in ice-cold water at a source of the Risajaura, which in the latter part of June to the beginning of July was in part ice-covered. All the findings of this species have been made north of the polar circle, so that, until different information about its distribution is available, it must be supposed that it has a circumpolar high arctic distribution.

Neonothrus humicola Forssl. was found in some material from Godthaab, West Greenland. Otherwise this species has only been found in Sweden (Forsslund 1943, 1945, 1955) and Finland (Karppinen 1953). *Neonothrus humicola* Forssl. was described as late as 1955 (Sellnick & Forsslund), the same year as *Camisia foveolata* Hammer.

The fact that it is still possible to find such comparatively big new species as the two last-mentioned ones in a country which for more than half a century has had eminent specialists within this special field, suggests that

a large number of years will still pass before the oribatid fauna of a country is only fairly well-known.

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Anmeldelse.

Heinrich Schmutterer: **Schildläuse oder Coccoidea I. Deckelschildläuse oder Diaspididae.** Tierwelt Deutschlands 45 Jena (Gustav Fischer) 1959, 260 pp. Pris 39.80 DM. — Kurt Harz: **Geradflügler oder Orthopteren (Blattodea, Mantodea, Saltatoria, Dermaptera).** Ibid. 46 Jena (Gustav Fischer) 1960, 232 pp. Pris 33.10 DM.

Det er saa heldigt, at "Tierwelt Deutschlands" i de senere, siden Krigen udkomne Bind beskæftiger sig med Grupper, der er daarligt eller slet ikke repræsenteret i "Danmarks Fauna": Edderkopper, Blomstertæger, Slørvinger, og nu Skjoldlus og Retvinger. Det burde i høj Grad kunne være en Drivkraft til Studiet af vor hjemlige Faunistik af de mindre "populære" Grupper. Over de danske Skjoldlus har Henriksen i 1921 skrevet en lille Oversigt; men denne Gruppe er først i de sidste 20-25 Aar blevet saa vel systematisk studeret, at man kan gaa i Gang med en ordentlig Bestemmelse af de Dyr, man finder, og i Virkeligheden er man forbavset over, at Tiden allerede er inde til et Arbejde i "Tierwelt Deutschlands". Men en Gennemgang af Schmutterers Arbejde viser, at det virkelig er Tilfældet; det er et overordentlig gedigent Værk, der med fortræffelige Illustrationer karakteriserer de enkelte Arter efter først omhyggeligt at have skildret den morfologiske Bygning og den indviklede Levevis, der gør at mange Stadier maa bestemmes hver for sig, hvis de overhovedet kan bestemmes. Som sædvanligt er særlige Afsnit helligede Klækning og Præparation.

Det andet Bind, om Retvingerne, er af samme Forfatter som den i 1959 (p. 156) anmeldte Bog om Mellemeuropas Retvinger, og slutter sig meget nøje dertil. Da Forf. jo ikke kan forventes at have læst min daværende Anmeldelse, er de Indvendinger, jeg dengang gav, gyldige ogsaa her; men der er flere Tegninger i den nye Bog og med langt udførligere Forklaringer. Biologien faar en langt mere omfattende Omtale end det ellers er Tilfældet i "Tierwelt Deutschlands". Trods Indvendingerne er det en god Støtte for den, der vil kaste sig over Gruppen; bortset fra Sommerfugle og Biller staar vi i Henseende til faunistisk Kendskab væsentligt tilbage for vore Nabolande i Øst og Syd og tildels Vest. Man undrer sig undertiden over, at saadanne overskuelige Opgaver ikke frister Samlerne eller de studerende; men nu er i hvert Fald bl. a. med de foreliggende Bøger solide og ikke særligt dyre Hjælpemidler forhaanden.

S. L. Tuxen

Description of Podagrion enei n. sp. and Notes on Two Other Hymenopterous Parasites.

By O. Bakkendorf.

From Dr. John C. Ene, Nigeria, West Africa, I have received the following parasites of mantid eggs, the first of which I name in honour of its collector. Another species was collected by Mr. Eigin Suenson at Shanghai, China.

1. *Podagrion enei* n. sp.

Figures 1—7.

Length of female 3,5 mm, ovipositor exserted 6 mm, length of fore wing 2,5 mm. Length of male 3,4 mm.

Head of female blue-green, metallic, eyes bright red, ocelli dark, antennae yellow with the club dark brown, thorax dark golden green with metathorax more golden and propodeum bluish, hind border of scutellum, metathorax and keels of propodeum with igneous lustre, abdomen bluish with a dorsal elongate yellow spot anterior to the middle, base of abdomen ventrally yellowish, ovipositor sheaths brownish, coxae blue, metallic, their apex yellowish, fore and middle femora yellowish, the outside of fore femora blue, metallic, of middle femora dark brownish, hind femora blue, metallic, fore and middle tibiae yellowish brown, hind tibiae brown, knees yellowish, tarsi yellow, middle tarsi lighter, apex joints brownish, club brown, venation brownish. Male with the funicle of antennae light brownish, club brown, abdomen without yellow spot, fore and middle legs yellow, metatarsal joint of all the tarsi brownish.

Head, pro- and mesothorax finely punctate, metathorax nearly smooth, propodeum more coarsely punctured, the apex transversely rugose, mesopleura punctate, metapleura nearly smooth, abdomen polished, most of the body with whitish pubescense.

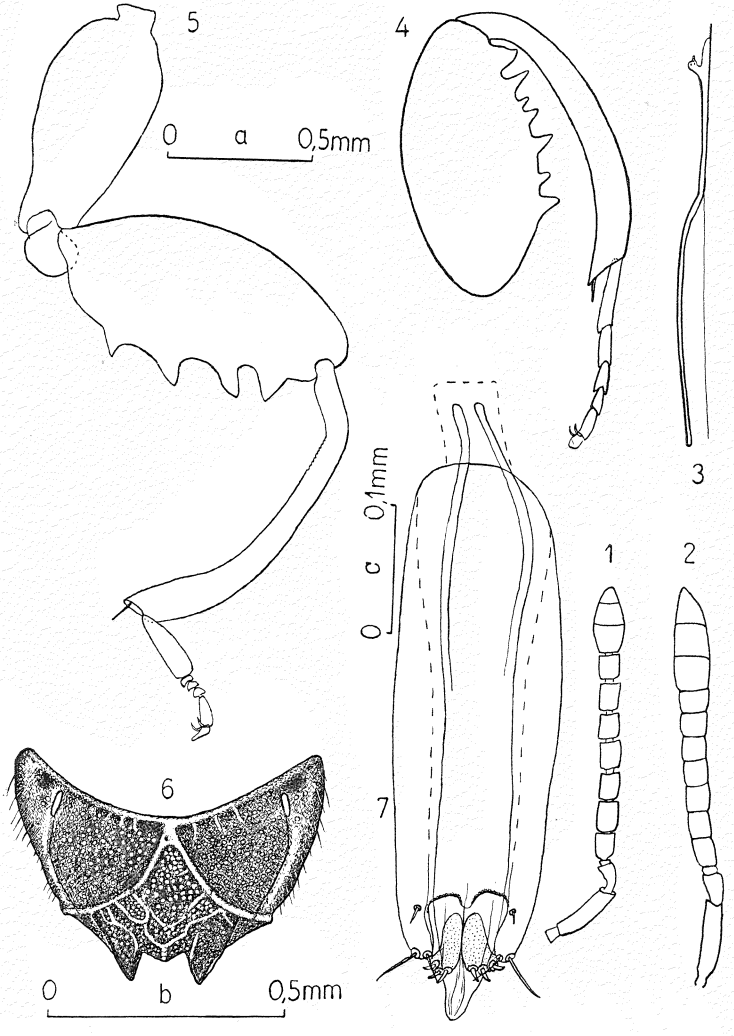


Fig. 1. *Podagrion enei* n. sp. ♂, antenna. — 2. ♀, do. — 3. ♀, venation of fore wing. — 4. ♀, hind leg. — 5. ♂, do. — 6. ♀, propodeum. — 7. ♂, phallus. — a. scale of figs. 1—5. — b. scale of fig. 6. — c. scale of fig. 7.

Female: head roundish, broader than high, 50:45, somewhat flattened, its length: 29, sloping with the face nearly horizontal, eyes large, ovate, somewhat angulated below, ocelli large, in a flat triangle, about 105°, lateral ocelli their own breadth from the eye margins, scrobes deep, nearly concealing the scapes, separated at base by a lengthened triangle at level with the face, vertex rounded behind, occiput concave, cheeks rounded, clypeus not visibly separated from the face, its border equally hollowed. Antennae inserted at the middle of the face, considerably above the level of the lower border of the eyes, the length of antennae: 95,5, of funicle: 41,5, of club: 22,5, radicula, rounded, 3:3, scape slender, 18:5, pedicel conical, 9:4, anellus transverse, 1,5:3, funicle 7-jointed, the joints decreasing in length, 6,5:6,5:6,5:6:6:5:5, and increasing in breadth, 4,5:5:5:5:6:6:6,5, club 3-jointed, length of joints, 8:7:7,5, breadth of joints, 9:9:7, last joint conical, funicle joints with two rows of linear sensoria, club joints with about three rows. Thorax narrower than head, 44:50, its length: 86, prothorax large, transverse, about thrice as broad as long, slightly rounded in front, a little narrower than mesothorax, parapsidal furrows reaching the middle of mesoscutum, scutellum convex, but flattened above in a rounded level with meso- and prothorax, a somewhat dentated cross furrow along the hind border, metathorax forming a narrow arched and smooth cross band, propodeum horizontal, as long as scutellum, with two keels originating anteriorly at the middle and diverging posteriorly to terminate at the posterior angles, spiracles elongate. Abdomen slender, 110:38, somewhat rhomboideus, petiole hardly visible, second tergit narrow at base, foveated, reaching three thirds of abdomen, broad at apex, where it is broadly splitted, as also the following tergit, which is narrower and occupies half the length of the rest, where some few tergits may be seen at apex, which bears two oblong py-

gostyles with 3-4 bristles; ovipositor from base of abdomen, issuing near the apex, exserted portion about $1^2/_3$ as long as body, 370:225. Wings of moderate size, fore wing ratio, 163:52, longest fringe: 2, hind wing, 92:25, longest fringe: 2, length of subcosta, marginal, postmarginal and radial veins, 55:31:7:3, fore wing naked at base, 5-6 hairs indicating a basal vein (m-cu), the disc evenly haired with short hairs and two rows of hairs indicating a median and an anal vein, subcosta with a row of about 18 hairs of double length, costal cell broad with two rows of hairs at the border, hind wings evenly haired with shorter hairs. Legs with the fore coxae cylindrical, ratio of length and breadth, 19:12, middle coxae smaller, 12:10, hind coxae large, 52:14, flat and evenly hollowed at the sides; fore and middle femora slightly swollen, ratio of fore femora, 36:8, of middle femora, 39:8, hind femora very large, 58:29, flat, but convex at the sides, armed on the hind border with a row of seven large teeth of which the one nearest the apex is the largest, fore tibiae stright, 33:4, middle tibiae longer, 50:4, hind tibiae strong, 64:6,5. and curved towards the teeth of the femora, they are thickened towards the apex, which is obliquely pointed and bears a subapical bristle, fore tarsi shorter than middle and hind tarsi, 34:46:47, their breadth, 3:3,5:3, length of fore tarsal joints, 14:5:5:4:6, of middle tarsi, 23:8:5:3:7, of hind tarsi, 17:9:6:4:11, thus the middle metatarsus most remarkable.

Male: antennae inserted at the middle of the face, radicula rounded, 2,5:2,5, scape slender, 15:4, pedicel conical, 6:3,5, anellus short, 1,5:2,5, funicle 7-jointed, the length of joints, 6,5:7,5:7,5:6,5:6:6:5,5, equal in breadth: 4, club 3-jointed, the length of joints, 6:5:4, the breadths, 6:6:4,5, last joint conical. Fore wing ratio, 148:52, longest fringe: 2, ratio of subc., marg., postm. and rad. veins, 55:34:7:3,5, ratio of hind wing, 100:

22, longest fringe: 2. Mandibles three dentated with two mandibular folds, maxillary palpi 4 jointed, their lengths, 19:14:15:33, breadths, 10:11:10:9, labial palpi 3-jointed, lengths, 20:10:18, breadths 10:10:9. Legs: ratio of length and breadth:

fore coxae 23:12	middle coxae 18:10	hind coxae 56:23
- femora 35:14	- femora 31:10	- femora 70:29
- tibiae 34:7	- tibiae 50:8	- tibiae 70:8
- tarsi 27:3,5	- tarsi 33:4,5	- tarsi 30:4,5.

Length of fore tarsal joints, 15:2:2:6, of middle tarsi, 23:2:2:2:4, of hind tarsi, 16:2:2:8, breadth of small joints: 2, of metatarsus as above. Hind femora armed with four very large teeth. Phallus about one quarter the length of abdomen, parameres with one subapical and two apical bristles, digiti with three spines.

Variation: hind femora in the female often with 6 teeth, the two smaller ones coalescing to one large teeth, and sometimes the legs lighter with the hind tarsi whitish-yellow.

Material. One female and five males labelled A, 11. 4. 57 from mantid ootheca No. 33, found on Eucalyptus tree. Holotype, the female mounted on a slide. Allotype, one of the males on a slide. Further eight females and seven males labelled B, hatched from ootheca of *Sphodromantis lineola* (Burm.). All from Ibadan, Nigeria, W. Africa. Holotype and allotype in the collection of the Zoological Museum of Copenhagen.

Note. The species differs from the description of the following African species:

bambeyi Risb. 1951: 308 from Senegal has the club brown and longer than funicle, in *enei* dark brown and half as long as the funicle.

coerulea Sauss. 1890–92, pl. 15, fig. 30. No description, and the identity of the species can not be seen from the figure.

descampsi Risb. 1954: 889, has the last funicle joint longer than broad, in *enei* this joint is broader than long.

diaspiri Risb. 1951: 316, from Senegal has the ovipositor shorter than the body, in *enei* it is $1^2/_3$ as long as the body.

fraternum Westw. 1847: 260, from Mauritius has the ovipositor short.
idomene Walk. 1850: 130, from Sierra Leone, with the ovipositor as long as the body, has 2 anelli and a 6-jointed funicle. It is probably not a Podagrion.
insulare Westw. 1847: 259, from Mauritius, has the ovipositor only as long as the body.
olenus Walk. 1839: 7, according to the short description in Westwood 1847: 260 it seems to be differently coloured and can not be differentiated with security.

Also the following species outside Africa has been taken into consideration:

philippinensis Crawf. acc. to Gahan 1925: 89 with the ovipositor not longer than the body.
semialbiclavus Girault 1917: 152, with the club partly white.
sinensis Walk. 1852: 42. Antennae black, much shorter than the thorax, in *enei* the antennae are yellow with the club dark brown, longer than thorax.
splendens Spinola 1811: 147, the type of the genus from South Europe has the apex tooth in the hind femora small and the club thicker, in *enei* this tooth is the largest.
tarachodesi Risb. 1951: 312, the male has five dents on hind femora.

The following three species are found enclosed in copal:
bellator Dalm. 1825: 390, has the club as long as the funicle, in *enei* half as long.
capitellatus Dalm. 1825: 390, with the ovipositor only as long as the body.
clavellatus Dalm. 1825: 390, ovipositor but distinctly longer than body.

2. *Podagrion philippinensis* Crawford.

Of this species I have a pair on slides, prepared by J. P. Kryger, bred from eggs of *Mantis* sp., December 1929 at Shanghai, China, by Mr. E. Suenson.

The ovipositor is exserted as long as the length of the body, the head is only a little lighter blue than the thorax, propodeum more rugose between the keels and towards the borders, nor without fine punctures. The funicle of the male antenna have a deformation at the end of the fifth funicle joint, which is feigning an extra minute joint.

3. *Rielia manticida* Kieffer.

Two female specimens with short wing stumps were found under the elytra of a *Sphodromantis lineola* (Burm.) by Dr. John C. Ene, Nigeria. They do not seem to deviate from the description given by Chopard 1922: 249—264. The species is known as a parasite of *Mantis religiosa* L. The biology — studied in details by Chopard — is rather remarkable. The larval development is endoparasitical in the host egg, its first stage is cyclopoid, the last stage normal larviform. The newly bred imago seeks up a mantid and after having cast off its wings it lives as an ectoparasite on the host for months, awaiting the egg-laying of the mantid. It then leaves the host temporarily for stinging its eggs through the viscid mass of the ootheca. Some specimens which have settled down on a male mantid perish in a rather short time, others may be bursted off when they leave their sheltered place during the egg-laying and they do not seem to be able to find a new host.

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Anmeldelse.

Beiträge zur Systematik und Ökologie mitteleuropäischer Acarina. Hrsg. von Hans-Jürgen Stammer. Band I Tyroglyphidae und Tarsonemini. Teil 2. Herbert Krczal: **Systematik und Ökologie der Pyemotiden.** — Helmut Karafiat: **Systematik und Ökologie der Scutacariden.** — Ludwig Schaarschmidt: **Systematik und Ökologie der Tarsonemiden.** Leipzig (Geest & Portig) 1959 p. 385—839. 54.00 DM uindb.

I 1958 anmeldte jeg i dette Tidsskrift (XXVIII p. 174) første Afdeling af denne Bog og fremhævede der det glædelige ved at faa gode systematiske Oversigter over Mide-Familierne. Denne anden Del, fortløbende pagineret med første og opstillet paa samme Maade, slutter sig ganske til denne, og alt det gode, der dengang var at sige, kan her gentages. Der er et Fællespræg over Tegningerne, der virker behageligt, og hvor de karakteriserende Forskelle er fremhævet, saa at man med Glæde kan konstatere, at en dygtig Redaktør kan faa et ensartet Præg over en Bog, lavet af mange Medarbejdere — men det hjælper naturligvis, naar alle Medarbejderne er hans Elever! Det første Afsnit, Pyemotiderne, omhandler rent ud sagt de bekendte Pediculoider; det er for tyve Aar siden lykkedes Oudemans at finde et ældre Navn, saa ogsaa dette kendte Navn kan forsvinde. (Dette fortælles bramfrit saaledes, at Dyret var almindeligt bekendt under Navnet Pediculoides, der endog var blevet brugt til Familiens Navn, men i 1937 opdagedes det "rigtige" Navn, hvorfor begge Dele "zwangsläufig" maatte ændres. Mere naivt kan Nomenklaturreglernes Bagside næppe fremstilles). De øvrige to Familier er mindre kendt, men spiller en stor Rolle i Jordbundsfaunaen. Alle tre Afsnit bygger Artsbeskrivelserne op paa Basis af fortræffelige morfologiske Oversigter og omfattende Bestemmelsestabeller, og ender desuden i økologiske Afsnit, hvor særlig det første, om Pediculoiderne, er meget indgaaende.

S. L. Tuxen

Description of Anaphoidea chrysomelae n. sp. (Hym., Mymaridae).

By O. Bakkendorf.

From Dr. Cl. Besuchet, centre of identification, CILB, Geneva, I have received the following species, which could not be identified with any species known to me, because the rather large material showed such a variation that it overlapped the description of 4 species described by Soyka 1949, pp. 368, 370, 374 and 381. As I have not had any material of these species for direct comparison I am not able to clear up the synonymy with security and I, therefore, prefer to describe the species as new.

***Anaphoidea chrysomelae* n. sp.**

Length of female 0,7 mm, length of male 0,65 mm. Colour of body in ♂♀ brownish, eyes red, antennae light brownish with the pedicel light, dorsally bordered with brownish, scape light, bordered with brownish both dorsally and ventrally, legs light with coxae, fore femora basally, middle and hind femora, borders of middle and hind tibiae, and last joint of all the tarsi brownish; fore wing hyaline with the border at apex brownish.

Female: The specimens prepared in Canada-balsam from spirit are somewhat shrunk, but have the normal habitude of *Anaphoidea*. The measures of the parts, which may be shrunk, are marked in table 1 by a sign of interrogation.

The antennae consist of a rounded radicula, scape, pedicel, 6 funicle joints and a 2-jointed club, the first funicle joint is somewhat small, double as long as broad, the following joints decreasing in length an slightly increasing in breadth towards the club, of which the first joint is somewhat shorter than the end joint, 26 : 35, the

Table 1. Measures in ratio of *Anaphoidea chrysomelae* n. sp. Last measures of antennae at a higher scale.

No.	1	2	3	4	5	No.	1	2	3	4	5	No.	1	2	3	4	5
Sex	♀	♀	♀	♂	♂	Sex	♀	♀	♀	♂	♂	Sex	♀	♀	♀	♂	♂
Thorax	25	23	16	26	22	1. coxa	8	7	?	8	8	Scape, l. a. br.	50-10	45-8	35-9	46-11	41-10
Head	10?	10?	7?	10?	9?	- femur+troch.	16	13	12	18	17	Pedicel	20-10	20-8	14-7½	19-11	16-10
Abdomen	22?	20?	15?	21?	19?	- tibia	16	13	10	17	14	1. funicle	13-6	12-5½	9-4	31-8	26-8
Body length	57?	53?	38?	57?	50?	- tarsus	19	17	12	19	17	2. -	34-7	30-7	20-5	33-7	28-7
Antenna	63	58	45	83	74	2. coxa	5	4½	4	5	4	3. -	32-7	28-7	20-5	33-7	30-7
Ovipositor	18	14	13	÷	÷	- femur+troch.	19	16	12	19	17	4. -	32-7	28-8	20-5	34-7	30-7½
Phallus	÷	÷	÷	10	9	- tibia	20	20	15	21	19	5. -	30-7½	26-8	19-5	33-7	28-7
Fore wing	72	64	48	72	65	- tarsus	19	19	14	19	17	6. -	27-8	24-8	18-6	32-7	28-7
- - breadth	10	9	5½	10	8	3. coxa	10	9	6½	9	8	7. -	÷	÷	÷	31-7	27-7
- - lg. fringe	13	12	10	13	13	- femur+troch.	21	19	15	22	19	8. -	÷	÷	÷	31-7½	28-8
Hind wing	68	63	43	66	60	- tibia	25	23	16	25	22	9. -	÷	÷	÷	30-8	27-7
- - breadth	2½	2½	2	3	2½	- tarsus	20	18	11	20	18	Club (♀ 2-jt.)	54-13	51-13	41-11	30-8	28-7
- - lg. fringe	10	10	9	10	10							In all	292.	264.	196.	383.	337.

sutur oblique, the funicle joints 2—6 each with 2 (or 1) rhinaria, first club joint with 2, last joint with 3 rhinaria.

The abdomen is roundish, seen from the side somewhat triangular and a little longer ventrally than dorsally, 22:25, the ovipositor slightly protruding: 2, and its base distant from thorax: 9, owing to the larger ventral length of abdomen.

Fore wing with a fringe consisting of 78 cilia from the venation around to the retinaculous fold, the longest cilia slightly longer than the wing breadth both on anterior and posterior wing border, the wing disc rather roughly and irregularly haired with about 9 rows across, a submarginal row of hairs along posterior border, and from the venation a row of 6—7 hairs directed distad, further from the base of venation a row of 8 hairs directed obliquely distad to the hind border of wing, the base of wing naked.

Hind wing with a fringe of 40 short cilia along anterior border and 40 long cilia along hind border of wing, the wing disc with a submarginal row of hairs, especially within the hind border.

Male: The antennae consist of radicula, scape, pedicel and 10 funicle joints, which are nearly alike and seem each to bear 4 rhinaria, first funicle joint a little shorter than the following joint, fourth joint the longest and therefrom the joints shortening a little towards apex. Aedeagus but slightly flattened, rod-like, equally bent downwards.

Variation. No. 1, the female holotype, one of the largest specimens, measured 0,7 mm in length, no. 2, a female of average size, 0,65 mm and no. 3, a small female specimen, 0,4 mm; no. 4, the male allotype, a large specimen, measured 0,65 mm and no. 5, a male of average size 0,6 mm. The female no. 1 had 78 cilia in the fringe of fore wing, 40+40 in the hind wing as said above, in no. 2: 73, 38+38, in no. 3: 56, 32+28 and in the males

no. 4: 72, 38+38, no. 5: 68, 32+32. In no. 3 the fore wing with no more than 6 rows across the wing disc and with antennae, legs and apex of fore wing light; in no. 5 with about 8 rows across the wing disc. Variation in length of the antennal joints etc. may be seen in the table.

Material. In all 17 females and 4 males bred 22. 3. 59 ex ova *Chrysomela americana* L., Bocca di Magra (Italia) coll. no. 5.60 no. 5, leg. Venturi, Pisa. The material consists of 5 slides with 3 females and 2 males, no. 1 the holotype ♀, no. 4 the allotype ♂, in spirit 9 females and 2 males, on carton 5 females. Holotype and allotype deposited in the Museum of Natural History in Geneva. Paratypes ♀♂ in my collection.

Synonymy. The following characters of the present species are compared with those in the key of Soyka's 1949, p. 353. ♀: Fore wing ratio, 7 to 9, ovipositor not basally protruding, abdomen roundish, 2nd funicle joint 4—5 times as long as broad, 3rd and 4th funicle joints equal in length, 2nd funicle joint considerably longer than pedicel. These characters leads to 4 species viz. *longipennis, lineipennis, semimedia* and *obscura* all of Soyka, of which the first has page priority. The characters which hold good are marked by spacing. The other characters in the key of Soyka are overlapping or combined in such a way that they can not be used for the determination of the present species.

Reference.

Soyka, W. 1949. Monographie der Mymar-Gruppe, mit den Gattungen *Mymar* Curtis, *Synanaphes* Soyka, *Ferrierella* Soyka, *Anaphoidea* Girault, *Hofenederia* Soyka, *Fulmekiella* Soyka and *Yungaburra* Girault. Rev. de Entomologia, vol. 20, p. 301—422.

Usædvanligt fund i en seng.

Af Flemming Weis.

Det forbavsede mig ikke synderligt, da jeg en eftermiddag sidst i juli ifjor fandt en sommerfuglelarve liggende tilsyneladende død ved fodenden af min seng. Jeg havde umiddelbart inden tilbragt nogle timer med at klippe en naurhæk omkring min have, og fundet blev gjort samtidig med, at jeg var ved at skifte tøj.

Derimod blev jeg adskilligt mere overrasket, da jeg et par dage senere, uden forudgaaende havearbejde, paa nøjagtig samme sted fandt nogle stykker af samme larvetype, formentlig en af de større Pyralider — ca. 2 cm lang, hvid med mørkt hoved og nakkeskjold og besat med enkelte haar — og ikke mindre forbløffet blev jeg, da jeg opdagede, at der rundt omkring dem og inde under sengen krøb nogle fluelarver.

Jeg løftede den nederste madras i min seng og fandt, at der ved fodenden, hvor denne madras hviler paa selve sengens ramme, var et mellemrum paa størrelse godt og vel med en tændstikæske. Her forefandtes adskillige eks. af samme larve, talrige udsugede huder af disse samt mange fluelarver, navnlig bunket sammen i det ene hjørne. Paa den del af madrassen, der som laag dækkede over hulrummet, sad 7-8 jordbyggede celler. At disse ikke kunne være bygget hverken af sommerfuglelarverne eller af fluelarverne stod mig straks klart. En tredie part maatte altsaa være impliceret i sagen, — en bi eller hveps formodentlig.

Jeg fik indsamlet saa meget materiale som muligt og henvendte mig med dette til Dr. S. L. Tuxen, der bekræftede min formodning. Fluelarvernes tilstedeværelse blev i første omgang anset som hidrørende fra, at enkelte af de indslæbte sommerfuglelarver i forvejen maatte have været parasiterede — en antagelse, der dog ikke viste sig at holde stik.

Zoologisk Museum beholdt fluelarverne, der alle var paa det forpupningsmodne stadium. Efter disses klækning nogle maaneder senere bestemte Dr. L. P. Mesnil, Schweiz, de fremkomne fluer til arten *Pachyophtalmus signatus* Meig., om hvilken Dr. Mesnil skriver, at „larven lever i reder af forskellige hvepse, hvor den ernærer sig af værtslarven eller dennes indslæbte fødeemner".

Herefter kan begivenhedernes forløb formentlig rekonstrueres saaledes, at først er de jordbyggede celler blevet opført — efter Ing. K. Fæsters formodning udfra foreliggende fotografiske optagelser — af den enligt boende gedehams *Ancistrocerus parietinus*.

De indslæbte, paralyserede sommerfuglelarver har oprindelig været tænkt som næring for dennes larver, hvilket den uforudsete optræden af fluen saa er kommet i forkøbet.

Selve tildragelsen er altsaa ikke saa besynderlig endda. Kun kan gerningsstedet give anledning til nogen forbavselse. Men i sommertiden staar to franske døre i mit soveværelse i mit hus i Ordrup aabne dag og nat saaledes at, hvad der har lyst til at flyve ind kan gøre det, og hverken den daglige sengeredning saavel som skiften af sengetøj er et saa dybtgaaende foretagende, at dyrene har ladet sig forstyrre deraf.

Derfor var det først fluelarvernes forsøg paa at finde sig et egnet forpupningssted, der kom til at afsløre, hvad der foregik, idet de under deres kryben omkring dels selv er faldet paa gulvet og dels har faaet nogle af de endnu ikke fortærede sommerfuglelarver til at falde ned.

Tilbage er blot at nævne, at fluen *Pachyophtalmus signatus* iflg. Lundbeck: Diptera Danica VII, 1927, pag. 239, er sjælden her i landet; kun kendt i fire eksemplarer fra Nordsjælland.

Anmeldelser.

Thure Palm: **Die Holz- und Rinden-Käfer der süd- und mittelschwedischen Laubbäume.** Opuscula Entomologica, Supplementum XVI, Lund, 1959. 374 sider. Pris: sv. kr. 25.

Denne bog danner en fortsættelse af forfatterens tidligere afhandling om de nordsvenske træ- og barkbiller (anmeldt i Ent. Medd. 26. bind, p. 254—55), der fremkom i 1951 i Medd. fra Statens Skogforskningsinst. (bind 40, nr. 2), og den besidder de samme udmærkede egenskaber. Bogen er i det væsentlige baseret på forfatterens egne grundige undersøgelser i årene 1952—57 og medtager ligesom første del alle i veddet eller i og på barken levende biller, også rovdyrene, og yderligere de til træsvampe knyttede arter. Medens første del kun behandlede træarterne birk, asp, el og pil, omfatter denne bog som følge af Mellem- og Sydsveriges langt rigere løvskovsflora yderligere bøg, avnbøg, eg, elm, ask, lind, ahorn, røn, hassel og (i en samlet rubrik) andre løvtræer, såsom æbletræ, hestekastanie, tjørn, kræge og vrietorn. Landområdet omfatter hovedsagelig den del af Sverige, der ligger syd for en linie, draget gennem södra Värmland, Västmanland, södra Dalarna og södra Gästrikland.

Arbejdet er inddelt på samme måde som første del, og falder altså i en almindelig del, der bl. a. behandler ernæringsbiologi, udviklingsbiologi og forstlig betydning, og en speciel del, der behandler de enkelte arter i systematisk rækkefølge. Mellem disse to afsnit er, ligesom i første del, indskudt tre meget udførlige tabeller, der indeholder oversigter, I: over arternes forekomst indenfor undersøgelsesområdet og i de forskellige træarter (med en rubrik også for nåletræ), II: over de undersøgte træers vokseplads og nær-

mere beskaffenhed og III: over arternes ernæringsforhold, forstlige betydning, udviklingsforhold og hyppighed. Som et af de generelle resultater, forfatteren er nået til, kan anføres, at arterne i meget ringe grad er bundne til en bestemt træart, idet milieufaktorer og veddets beskaffenhed spiller en langt større rolle end træarten ved dyrenes valg af yngletræ (p. 31 og 357).

Af de i første bind omhandlede 414 arter er henimod 300 kendt som danske. I det nye bind behandles 820 arter (af hvilke 64 er nye for den svenske fauna), og af disse er lidt over 600, altså en tilsvarende procentdel, fundet hos os. Af de i Skåne eller Blekinge fundne 684 arter kendes c. 90 ikke som danske. Blandt de behandlede arter er der flere, som man anså for uddøde i Sverige, men som efter mange års forløb er blevet genfundet, f. eks. lucaniden *Aesalus scarabaeoides* Panz. (p. 304) og cerambyciden *Mesosa curculionoides* L. (p. 330), arter, der — ligesom et ikke ubetydeligt antal andre arter — betegnes som „urskovsrelikter" (p. 21).

Afgrænsningen af, hvilke arter man vil medtage i et arbejde som det foreliggende, beror naturligvis i høj grad på et individuelt skøn. Forfatteren har draget grænsen meget vidt. Eksempelvis kan nævnes, at arter som *Leptinus testaceus* Müll. (p. 218), *Euthia plicata* Gyll. (p. 219) og *Quedius nigrocoeruleus* Fauv. (p. 226) er medtagne, skønt det vel nok — i hvert fald efter erfaringerne hos os — må forekomme tvivlsomt, om de kan siges at have nogen væsentlig tilknytning til træer. Men man må vel hellere drage grænsen lidt for vidt end for snævert, og forfatteren er naturligvis, med sin store erfaring som samler, klar over vanskelighederne ved en afgrænsning, jfr. f. eks. p. 16.

Bogen indeholder ligesom første del en fylde af vigtige biologiske oplysninger, deriblandt mange nye, og den bør, ligesom fordel, anskaffes af enhver, der beskæftiger sig med den danske billefauna. Navnlig for de arter, der hos os er sjældne eller meget sjældne, og som det ofte er håbløst at eftersøge uden nøjere kendskab til deres levevis, vil man i bogen som regel finde værdifulde oplysninger, hvis pålidelighed man kan stole på, fordi de, hvor ikke det modsatte er angivet, er baseret på forfatterens egne undersøgelser både i marken og ved klækninger, og danske coleopterologer må være forfatteren taknemmelig for det store og dygtige arbejde, der ligger bag denne bog.

Bagest i bogen er gengivet 87 fotografier af svenske lokaliteter, hvoraf flere rummer megen naturskønhed, og som giver et mægtigt indtryk af, hvilke urskovsagtige lokaliteter den svenske coleopterolog kan glæde sig over at kunne samle på, lokaliteter, som vi ikke her i landet kender magen til.

Victor Hansen.

Adolf Horion: **Faunistik der mitteleuropäischen Käfer.**

Bd. I. Adephaga — Caraboidea. 1941. 464 sider..... DM. 20.
„ II. Palpicornia — Staphylinoidea (ausser Staphylinidae). 1949. 388 sider..... DM. 25.
„ III. Malacodermata — Sternoxia. 1953. 340 sider... DM. 18.
„ IV. Sternoxia — Fossipedes — Macrodactylia — Brachymera. 1955. 280 sider..... DM. 18.

Bd. V. Heteromera. 1956. 336 sider ..... DM. 18.
„ VI. Lamellicornia. 1958. 343 sider ..... DM. 24.70.
„ VII. Clavicornia, 1. Teil (Sphaeritidae bis Phalacridae). 346 sider ..... DM. 24.70.

Edmund Reitters kendte værk „Fauna Germanica", som fremkom i årene 1908—1916, betød for de nord- og mellemeuropæiske coleopterologer et mægtigt fremskridt i systematisk henseende, og også her i landet fandt værket på et tidspunkt, hvor kun en ringe del af billerne (løbebiller, pragtbiller, smeldere og træbukke) var behandlet i „Danmarks Fauna", en vid udbredelse. I 1935 blev værket suppleret med det vigtige og lige så velkendte „Nachtrag" af Adolf Horion. Men lige så fremragende „Fauna Germanica" var for sin tid i systematisk henseende, lige så mangelfuldt var det med hensyn til angivelserne af arternes udbredelse. Disse angivelser hvilede i det store og hele på Julius Schilskys fortegnelse over tyske og østrigske biller af 1888 og 1909, der var et meget ukritisk og mangelfuldt arbejde. Det var dette forhold, der dannede grundlaget for det uhyre arbejde, som Adolf Horion — bistået af en lang række medarbejdere — påtog sig og fortsatte gennem årene med tilvejebringelsen af kritisk bearbejdede oplysninger om billefaunaen i Tyskland (sensu lato) og Østrig, og hvis resultater efterhanden offentliggøres i hans „Faunistik der mitteleuropäischen Käfer".

De ovenfor anførte, hidtil udkomne 7 bind er af stor værdi også for danske coleopterologer. De indeholder nemlig ikke blot angivelser af arternes geografiske udbredelse, men også en mængde vigtige oplysninger om dyrenes levevis og ofte også om vanskelige systematiske spørgsmål.

Som tillæg er yderligere optaget i bind IV en afhandling af Tord Nyholm om de mellemeuropæiske arter af slægten *Cyphon* Payk.[1]), i bind V bestemmelsestabeller af K. Ermisch over familien *Mordellidae*, hvor navnlig artsgruppen omkring *Mordellistena pumila* Gyll. — der har vist sig at være en kollektivart — er vanskelig, og i bind VI to artikler om oldenborrens optræden i Tyskland (af Er. Gersdorf) og om skadelige lamellicornier i Østrig (af Harald Schweiger).

Adolf Horion, der i 1958 fyldte 70 år, skriver i forordet til bind VII, at han håber at få offentliggjort også 2. del af *Clavicornia* (med *Teredilia*). Alle nord- og mellemeuropæiske coleopterologer vil inderligt håbe, at det må lykkes Horion ikke blot at få dette bind frem, men også at kunne fortsætte og afslutte „Faunistik". For de familier, som endnu ikke er behandlet, må man indtil videre ty til den af Horion i 1951 udgivne „Verzeichnis der Käfer Mitteleuropas (Deutschland, Oesterreich, Tschechoslovakei) mit kurzen faunistischen Angaben", der dog, som det fremgår af titlen, er meget kortfattet og navnlig ikke indeholder nogen biologiske oplysninger.

Victor Hansen.

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[1]) Denne afhandling er lagt til grund for behandlingen af slægten i „Danmarks Fauna", bind XX (tillægsbindet) p. 196—203.

Torben W. Langer: **Sommerfugle.** Indsamling og præparation. Råd og vink for unge samlere. 64 sider. J. Fr. Clausens forlag. 1960. Pris Kr. 6,75.

De existerende vejledninger i sommerfuglesamleteknik (van Deurs: Indsamling af Sommerfugle (1948), "Jeg er samler", Politikens håndbøger bd. 91 (1956), Gullander: Dagsommerfugle i Norden (1960) m. fl.) er blevet suppleret med en ny, idet T. W. Langer nu har skrevet en bog også om dette emne.

Medens de almindelige oplysninger om indsamling og præparation stort set er de samme som i de andre vejledninger, indeholder denne bog tre vigtige afsnit, nemlig om moderne lyslokning (efterhånden den eneste saliggørende samlemetode for alt, måske med undtagelse af dagsommerfugle), om genitalpræparation (som enhver, der ønsker selv at bestemme vanskelige småsommerfugle, bliver nødt til at lære) og endelig et glossar over entomologisk terminologi.

I det første afsnit forventer man at få svar på de spørgsmål, man oftest får stillet af begyndende samlere, såsom: "Hvad koster et kviksølvlampeudstyr?". "Hvordan forbinder man de enkelte dele?". "Kan kviksølvlamper bruges til jævnstrøm?". "Hvordan bygger man et transportabelt lysaggregat?". Men her bliver man skuffet. Udover den omtrentlige pris på en blandingslyslampe, er der slet ingen exakte angivelser. Om lysfælder hedder det (p. 52): "Færdiglavede fælder kan endnu ikke købes, og man må derfor selv konstruere sin egen. En udmærket, relativt billig og handy model er den afbildede, der er konstrueret af kriminaloverbetjent Ib Norgaard i Lyngby, som i tidsskriftet Flora og Fauna 1956 (på ethvert kommunebibliotek) har givet udførlig beskrivelse og arbejdstegninger til den. Den arbejder med Acetylentetraklorid som bedøvelsesmiddel". Da man heraf må få det indtryk, at omtalte lysfælde er en dansk opfindelse, bør det retfærdigvis oplyses, at denne model (den lille vaskebalje er en dårlig forbedring) efter indgående forsøgsarbejde er konstrueret i England (på Rothamsted Experimental Station), hvor man også har gennemprøvet en lang række bedøvelsesmidler, inden man fandt frem til acetylentetraklorid (se beskrivelse og tegning af fælden i Entom. Gazette I, 1950). Iøvrigt har fælden i den sidste halve snes år kunnet købes færdig hos det velkendte engelske entomologi-udstyrsfirma Watkins & Doncaster, i hvis katalog den også kan ses afbildet.

I afsnittet om genitalpræparation har der indsneget sig en alvorlig misforståelse, som desværre vil få den begynder, som i god tro følger forf.s anvisninger, til hurtigt at opgive ævret. Der står (p. 40): "Efter udpræpareringen ... dryppes der med en pipette en dråbe absolut alkohol på præparatet.... Alkoholen opsuges så med filtrerpapir, kitindelene får lov at tørre helt ... osv.". Enhver, der kender til genitalpræparation, vil imidlertid have erfaret, hvor vigtigt det er at forhindre præparatet i på noget tidspunkt af processen at tørre ind, og at det værste, der kan ske, er, at netop alkoholen fordamper. Et robust han-præparat kan nok tåle mishandlingen, men drejer det sig om et lille, svagt sklerotiseret dyr eller om et hun-præparat af en micros, er ulykken uoprettelig, og for det sammenkrøllede ubrugelige "præparat" er der da, som forf. (p. 41) i en anden forbindelse siger: "kun een udvej: skarnkassen".

At tilføje en oversigt over entomologiske fagudtryk er en udmærket ide, og det må opfattes som en ubetinget ros, at anm. kunde ønske, at dette afsnit havde været langt mere fyldigt. Der mangler oplysning om mange ganske almindeligt anvendte, men for begynderen uforståelige, ord. Der omtales "discoidalribbe", og det forklares, hvad "spejlet" på vingen af visse micros er, hvorimod betegnelsen "dorsalplet" (eller andre forbindelser af "dorsal") ikke nævnes. Forkortelsen "coll." betyder ikke (p. 60) "indsamlet af" (hvilket hedder "leg." (p. 52)), men betegner den samling, hvorfra exemplaret hidrører, uanset hvem, der har indsamlet det. Forklaringen (p. 62) af betegnelsen "lectotype" som "af en senere forfatter udvalgt holotype i en serie af cotyper" er mindre heldig, og burde hedde: "et af en senere forfatter blandt artens typoider udvalgt individ, som træder i stedet for holotypen, når author ikke selv har udvalgt en sådan", men ellers må "oversættelserne" siges at være både gode og koncise.

Niels L. Wolff.

Torben W. Langer: **Danmarks Dagsommerfugle.** Komplet systematisk fremstilling for unge samlere. 112 sider. 167 fotografier. J. Fr. Clausens Forlag. 1960. Pris Kr. 12.75.

Med denne bog (som foreløbig slutsten?) er det lykkedes forf. at få udsendt 6 sommerfuglebøger på dansk indenfor et tidsrum af 4 år. Nok er de 2 bearbejdninger fra andre sprog, men de 4 er af egen tilvirkning, og alene dette er en skriftlig filibusterpræstation af rang.

Forf. er gået den omvendte vej. Han startede som begynder i "den tunge ende", det dyre, i foliantformat, ordrige forklaringer, megen videnskab, komplicerede kemiske formler, luxusafbildninger i 8-farvetryk, og er nu endt med netop den bog, alle danske samlere har ventet på, en lille fordringsløs bog i fornuftigt format og med brugelige sort-hvide fotografier. Hver art har fået præcis én side, og på den står netop de oplysninger, man har brug for uden overflødige dikkedarer.

Selvfølgelig er systematikken igen lavet om. Forf. har fundet et amerikansk arbejde, hvorefter satyriderne (randøjerne) skal kaldes takvinger, og da dette er sidste skrig, og da tilmed forf. (p. 6) er overbevist om rigtigheden heraf, indføres det nu i bogen.

Problembørnene, de suspekte danske arter, er alle taget med på lige fod med de øvrige, dog med bemærkning om, at de sikkert er indslæbt med tog, eventuelt skib. Denne forklaring kan godtages af anm. omend med den tilføjelse, at adskillige af disse sikkert har været behørigt emballeret under "indslæbningen".

Larven af *Vanessa cardui* siges (p. 72) at være "meget lidt sky", hvordan man så ellers har båret sig ad med at konstatere det.

Denne bog er efter anm.s skøn den bedste af de 4, og den kan varmt anbefales ikke alene unge samlere, men også mere erfarne.

Niels L. Wolff.

Oversigt over Entomologisk Forenings møder og ekskursioner 1958-1960.

Møder.

1958—1959.

8. okt. 1958. Lic. agro. Jørgen Jørgensen talte om "Coloradobillen". 22 medlemmer til stede.

15. okt. 1. klubaften. 12 medlemmer til stede,

22. okt. Indbudt af Dansk Naturhistorisk Forening.
Prof. dr. phil. R. Spärck talte om "Carl von Linné". Med svensk film om Linné.

5. nov. 2. klubaften, 11 medlemmer til stede.

19. nov. Hr. Aage Bau viste farvelysbilleder af insekter og fortalte om sin fremgangsmåde ved optagelserne. 23 medlemmer og 4 gæster til stede.

3. dec. Bibliotekar, cand. mag. T. W. Langer forelagde sin bog om "Nordens Dagsommerfugle". 20 medlemmer til stede.

17. dec. Dr. phil. P. Bovien talte om: "Angreb af skadedyr på kulturplanter i 1957". Diskussion: C. Strømberg, N. Wolff, R. Spärck, Anker Nielsen, J. Jørgensen, E. Bro Larsen og O. Bakkendorf. 19 medlemmer til stede.

14. jan. 1959. Dr. phil. S. L. Tuxen talte om "Typer, deres opbevaring og udnyttelse". 26 medlemmer til stede.

21. jan. 3. klubaften. 17 medlemmer til stede.

28. jan. Biologisk møde uden specielt emne. 14 medl. til stede.
Dr. phil. E. Bro Larsen fortalte om angreb af sommerfuglelarver i Draved Skov og demonstrerede en grammofonoptagelse af amerikanske frøstemmer.
Skoleelev Axel Michelsen demonstrerede parring hos Rhagium inquisitor.
Bøssemager Sig. Sjøholm meddelte iagttagelser over næsehornsbiller.
Dyrlæge C. Strømberg omtalte iagttagelser vedrørende oldenborreæg.

11. febr. Viceskoleinsp. P. L. Jørgensen indledte en diskussion om "Skadedyrsbekæmpelse og begreberne amatørarbejde og viden-

skabeligt arbejde". Diskussion: R. Spärck, S. L, Tuxen, J. Jørgensen, I. Norgaard, B. Beier Petersen, Anker Nielsen, O. Bakkendorf, L. Lyneborg, A. Michelsen, C. Strømberg, K. Stubbe-Teglbjerg, N. Wolff, W. van Deurs. 29 medlemmer til stede.

18. febr. 4. klubaften. 11 medlemmer og 3 gæster til stede.

25. febr. Direktør, cand. mag. Svend Andersen fortalte om "Problemer ved indretning af insektarier og terrarier." Derefter rundtur i Zoologisk Have.
Aftenen sluttede i Zoologisk Haves restaurant, hvor man fejrede foreningens 91. fødselsdag.

13. marts. Formanden udtalte mindeord over afdøde stabslæge Tage Feddersen.
Meddelelser om fund af sommerfugle i 1958 blev givet af N. Wolff, Preben Holst, M. Schrøder, Sig. Sjøholm, P. K. Nielsen og I. Norgaard. De sjældnere fund er omtalt i Ent. Medd. 29, p. 320. 29 medlemmer til stede.
Som nyt medlem proponeredes Jan Edelmann.

15. marts. 5. klubaften. 15 medlemmer til stede.

1. april. Kommunelærer H. Friss-Jensen talte om "Fangst og klækning af træbukke". 24 medlemmer til stede.

15. april. Meddelelser om fund af biller i 1958 blev givet af Victor Hansen, F. Bangsholt, Uffe Kornerup, C. Strømberg, Sig. Sjøholm og Ole Martin. De sjældnere fund er omtalt i Ent. Medd. 29, p. 151. 17 medlemmer til stede.

18. april. Fællesmøde med Entomologiska Sällskapet i Lund.
Prof. Risto Tuomikoski, Helsingfors: Något om släktsbegrænsningen inom insektsystematiken, belyst af dipterfamiljen Sciaridae".

29. april. Ordinær generalforsamling. — 1. Civilingeniør W. van Deurs valgtes til dirigent. — 2. Formanden aflagde beretning. Medlemstallet var 235. Der var afholdt 13 møder (gnsn. 26 delt.), 6 klubaftener (gnsn. 14 delt.) og 2 ekskursioner. — 3. Kassereren forelagde de reviderede regnskaber for foreningen og dens fonds. — 4. Halvdelen af renterne af Entomologisk Fond overførtes til Kongresfonden. — 5. Redaktøren og sekretæren genvalgtes begge med 14 stemmer. — 6. Som revisorer genvalgtes O. Schaltz, medens W. van Deurs nyvalgtes. — 7. Det overdroges bestyrelsen at træffe afgørelse vedrørende ekskursionerne. 16 medlemmer til stede.

13. maj. 6. klubaften. 12 medlemmer til stede.

1959—1960.

14. okt. 1959. 1. klubaften. 17 medlemmer til stede.
Som nye medlemmer proponeredes Anne Bendix, Claes Friberg, Hans Sttig Hansen, Ole Jørgensen, Bodil Kofoed, C. F. Lühr, Kuno Pape, Bent Schmidt-Rasmussen.

28. okt. Dr. phil. Anker Nielsen berettede om Entomologkongressen i Finland. Derefter viste J. Brændegaard, Hans Gønget og S. L. Tuxen lysbilleder. 27 medlemmer til stede.

11. nov. Dr. phil. S. L. Tuxen udtalte mindeord over afdøde dr. Palitsch.
Kommunelærer A. G. Carolsfeld-Krausé talte om "Præparation af genitalierne hos meget små sommerfugle". Diskussion: A. Fog, M. Wolff, O. Bakkendorf, K. Fæster, P. Kinch, E. Traugott-Olsen og Anker Nielsen. 25 medlemmer til stede.

18. nov. 2. klubaften. 18 medlemmer til stede.
Som nyt medlem proponeredes South Australian Museum, Adelaide.

25. nov. Lektor dr. phil. Jens Brændegaard talte om "Spindlere i Peary-Land og deres zoogeografi". 29 medlemmer til stede.

9. dec. Dr. phil. Anker Nielsen talte om "Nogle betragtninger over leddyrenes nedstamningshistorie". Diskussion: R. Spärck, H. Lemche, S. L. Tuxen, U. Røen og A. Nørrevang. 38 medlemmer til stede.

16. dec. 3. klubaften. 23 medlemmer til stede.
Dyrlæge C. Strømberg demonstrerede billepræparation for begyndere.
Som nyt medlem proponeredes Jens A. Hillgaard.

13. jan. 1960. 4. klubaften. 12 medlemmer til stede.
Som nye medlemmer proponeredes Ole Jensen og Anker Olsen.

27. jan. Lic. agro. Jørgen Jørgensen talte om "Oldenborrernes optræden i Danmark". Med lysbilleder. 28 medlemmer til stede.

10. febr. Dr. phil. P. Bovien talte om "Angreb på kulturplanter i 1959". Diskussion: R. Spärck. O. Bakkendorf, Børge Petersen og Jørgen Jørgensen. 22 medlemmer til stede.

17. febr. 5. klubaften. 13 medlemmer til stede.

24. febr. Farvefilm om forskellige skadeinsekters biologi. 25 medlemmer og 3 gæster til stede.
Derefter fejredes foreningens 92. fødselsdag på sædvanlig måde.

9. marts. Meddelelser om fund af sommerfugle i 1959 blev givet

af P. Forum Petersen, F. Weis, W. van Deurs, Preben Holst, R. Torp, J. Jelnes, Gorm Jacobsen, N. Wolff, Tage Jensen, P. K. Nielsen, I. Norgaard, E. Vilsund, H. Vibe-Kjærulff, S. Kaaber, G. Jørgensen, K. Jensen, Erling Bloch, Niels P. Kristensen. De sjældnere fund er omtalt i Ent. Medd. 29, p. 320. 30 medl. til stede.

16. marts. 6. klubaften. 15 medlemmer til stede.

23. marts. Auktion over redskaber og bøger, der har tilhørt afd. stabslæge T. Feddersen. 37 medlemmer til stede.

6. april. Auktionen fra sidste møde afsluttedes.
Meddelelser om fund af biller i 1959 blev givet af Victor Hansen, H. Gønget, F. Bangsholt, U. Kornerup, K. Arevad og Andr. Sørensen. De sjældnere fund er omtalt i Ent. Medd. 29, p. 323. 28 medlemmer til stede.

20. april. Ordinær generalforsamling. — 1. Ingeniør Niels L. Wolff valgtes til dirigent. — 2. Formanden aflagde beretning. Der var afholdt 10 møder (gnsn. 29 deltagere), 7 klubaftener (gnsn. 16 deltagere) og 2 ekskursioner. — 3. Kassereren forelagde de reviderede regnskaber for foreningen og dens fonds. — 4. Halvdelen af renterne af Entomologisk Fond overførtes til Kongresfonden. — 5. Da både formanden og redaktøren ønskede at træde tilbage nyvalgtes eenstemmigt dr. phil. S. L. Tuxen som formand og cand. mag. Børge Petersen som redaktør. — 6. Revisorerne O. Schaltz og W. van Deurs genvalgtes. — 7. Sommerens ekskursioner blev overladt til bestyrelsens afgørelse.

27. april. 7. klubaften. 8 medlemmer til stede.
Som nyt medlem proponeredes skovrider P. Fogh.

Ekskursioner.

1959—1960.

30. maj 1959. Til Nørrevang (lyslokning). 16 deltagere.

6. sept. 1959: Til Malmmosen. 14 deltagere.

29. maj 1960. Til Freerslev Hegn. 16 deltagere.

11. juni 1960. Til Nørrevang (lyslokning). 14 deltagere.

11. sept. 1960. Til Holmegaards Mose. 15 deltagere.

2. okt. 1960. Til Furesøparken. 17 deltagere.

Driftsregnskab for Entomologisk Forening for 1958.

Indtægt:

Kassebeholdning pr. $^{1}/_{1}$ 1958	kr.	2.991,25
Renter (legat 397,31, bank 35,10, giro 18,14)	„	450,55
Statstilskud	„	1.000,00
Kontingenter	„	2.849,50
Rask-Ørsted Fondet	„	1.500,00
Universitetsbiblioteket for bytteforbindelser	„	1.500,00
Andre bytteforbindelser	„	838,00
Salg af hefter af Entomologiske Meddelelser	„	924,10
Salg af særtryk af Entomologiske Meddelelser	„	173,20
	kr.	12.226,60

Udgift:

Trykning af Entomologiske Meddelelser	kr.	7.278,85
„ „ særtryk	„	1.141,50
Meddelelser om møder samt porto	„	1.126,39
Repræsentation og diverse	„	72,30
Afholdelse af møder og ekskursioner	„	847,85
Kassebeholdning pr. $^{31}/_{12}$ 1958	„	1.759,71
	kr.	12.226,60

Aktiver:

Girokonto	kr.	1.897,26
Bankkonto	„	2.174,31
Kontant	„	998,94
	kr.	5.070,51
Kontingentrestancer endnu løbende	„	352,50

Passiver:

Tilhørende Kongresfondet	kr.	2.543,10
„ Entomologisk Fond	„	767,70
„ foreningens driftskonto	„	1.759,71
	kr.	5.070,51

Driftsregnskab for Kongresfondet m. m. 1958.

Indtægt:

Kassebeholdning pr. $^{1}/_{1}$ 1958	kr.	2.314,37
Overført fra Entomologisk Fond	„	168,13
Renter	„	62,00
	kr.	2.544,50

Udgift:

Depotafgift	kr.	1,40
Kassebeholdning pr. $^{31}/_{12}$ 1958	„	2.543,10
	kr.	2.544,50

Aktiver:

Obligationsbeholdning nom.	kr.	1.400,00
Kassebeholdning pr $^{31}/_{12}$ 1958	„	2.543,10
	kr.	3.943,10

Passiver:

Kongresfondet m. m.	kr.	3.943,10

Driftsregnskab for Entomologisk Fond 1958.

Indtægt:

Kassebeholdning pr. $^{1}/_{1}$ 1958	kr.	569,77
Aktieudbytte	„	1,60
Renter	„	353,50
Obligation nom. 200 udtrukket	„	200,00
	kr.	1.124,87

Udgift:

Depotafgift			kr.	10,04
Obligation nom. 200 indkøbt			„	179,00
Overført til Kongresfondet			„	168,13
Til disposition (188,05 ÷ 10,04)	kr.	178,01		
Fondets kapital tilhørende	„	589,69		
	kr.	767,70	„	767,70
			kr.	1.124,87

Aktiver:

Obligationsbeholdning nom.	kr.	8.700,00
Aktie, pålydende	„	20,00
Kassebeholdning pr. $^{31}/_{12}$ 1958	„	767,70
	kr.	9.487,70

Passiver:

Entomologisk Fond	kr.	9.309,69
Til disposition	„	178,01
	kr.	9.487,70

Driftsregnskab for Oluf Jacobsens Legat 1958.

Indtægt:

Renter	kr.	195,00
Obligation nom. 2.000 udtrukket	„	2.000,00
	kr.	2.195,00

Udgift:

Depotafgift	kr.	5,00
Obligation nom. 2.000 indkøbt	„	1.792,69
Provenue overført til foreningens driftskonto	„	207,31
Renter „ „ „ „	„	190,00
	kr.	2.195,00

Aktiver:

Obligationsbeholdning nom.	kr.	5.000,00

Passiver:

Legatet	kr.	5.000,00

Regnskabet revideret og befundet rigtigt. Bank- og girokontos samt kasse- og obligationsbeholdningens tilstedeværelse konstateret.

O. Schaltz. *Wilhelm van Deurs.*

København, 21. april 1959.

Driftsregnskab for Entomologisk Forening 1959.

Indtægt:

Kassebeholdning pr. $^{1}/_{1}$ 1959	kr.	1.759,71
Renter (legat 200,00, bank 30,05, giro 25,02)	„	255,07
Kontingenter	„	3.258,75
Statstilskud	„	1.250,00
Rask-Ørsted Fondet	„	2.000,00
Universitetsbiblioteket for bytteforbindelser	„	1.950,00
Andre bytteforbindelser	„	115,00
Salg af hefter af Entomologiske Meddelelser	„	845,79
„ „ særtryk af „ „	„	1.044,07
	kr.	12.478,39

Udgift:

Trykning af Entomologiske Meddelelser	kr.	7.272,41
„ „ særtryk	„	901,00
Meddelelser om møder samt porto	„	1.400,53
Repræsentation og diverse	„	232,54
Møder og ekskursioner	„	1.101,75
Kassebeholdning pr. $^{31}/_{12}$ 1959	„	1.570,16
	kr.	12.478,39

Aktiver:

Girokonto	kr.	1.170,75
Bankkonto	„	3.015,23
Kontant	„	1.102,64
	kr.	5.288,62
Kontingentrestancer	„	367,50

Passiver:

Tilhørende	Kongresfondet m. m.	kr.	2.781,71
„	Entomologisk Fond	„	936,75
„	foreningens driftskonto	„	1.570,16
		kr.	5.288,62

Driftsregnskab for Kongresfondet m. m. 1959.

Indtægt:

Kassebeholdning pr. $^{1}/_{1}$ 1959	kr.	2.543,10
Overført fra Entomologisk Fond	„	178,01
Renter	„	62,00
	kr.	2.783,11

Udgift:

Depotafgift	kr.	1,40
Kassebeholdning pr. $^{31}/_{12}$ 1959	„	2.781,71
	kr.	2.783,11

Aktiver:

Obligationsbeholdning nom.	kr.	1.400,00
Kassebeholdning pr. $^{31}/_{12}$ 1959	„	2.781,71
	kr.	4.181,71

Passiver:

Kongresfondet m. m.	kr.	4.181,71

Driftsregnskab for Entomologisk Fond 1959.

Indtægt:

Kassebeholdning pr. $^{1}/_{1}$ 1959	kr.	767,70
Aktieudbytte	„	1,36
Renter	„	354,50
	kr.	1.123,56

Udgift:

Depotafgift		kr.	8,80
Overført til Kongresfondet		„	178,01
Til disposition (177,93 ÷ 8,80)	kr. 169,13		
Fondets kapital tilhørende	„ 767,62		
Kassebeholdning pr. $^{31}/_{12}$ 1959	kr. 936,75	„	936,75
		kr.	1.123,56

Aktiver:

Obligationsbeholdning nom.	kr.	8.700,00
Aktie pålydende	„	20,00
Kassebeholdning pr. $^{31}/_{12}$ 1959	„	936,75
	kr.	9.656,75

Passiver:

Entomologisk Fond	kr.	9.487,62
Til disposition	„	169,13
	kr.	9.656,75

Driftsregnskab for Oluf Jacobsens Legat 1959.

Indtægt:

Renter	kr.	205,00

Udgift:

Depotafgift	kr.	5,00
Overført til foreningens drift	„	200,00
	kr.	205,00

Aktiver:

Obligationsbeholdning nom.	kr.	5.000,00

Passiver:

Legatet	kr.	5.000,00

Regnskabet revideret og befundet rigtigt. Bank- og girokontos samt kasse- og obligationsbeholdningens tilstedeværelse konstateret.

København, 7. april 1960.

O. Schaltz. *Wilhelm van Deurs.*

Entomologisk Forenings medlemmer

1. december 1960.

Æresmedlemmer.	Medl. siden	Speciale
Hansen, Victor, højesteretsdommer, dr. phil., I. E. Ohlsensgade 4, Ø.	1905	Col.
Hornung, S., fhv. fabrikant, Solskrænten 16, Valby.	1910	Lep.

Medlemmer med adresse i Danmark.

Andersen, Arne, kontorassistent, Postparken 30, Kastrup.	1944	Col.
Andersen, Egede, viceskoleinsp., Haabets Allé 5, Brønshøj.	1945	
Andersen, J., advokat, Aastrupvej 31, Haderslev.	1921	Col.
Andersen, F. Søgaard, dr. phil., Kornagervej 85, Lyngby.	1937	
Anthon, Henning, tegner, Slotsgaarden, Jægerspris.	1937	
Arevad, Kristian, cand. mag. Bellisbakken 71, Birkerød.	1955	
Askgaard, Stig, cand. mag., Seminarievej 6 d, Ribe.	1956	
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