# Hydroptila occulta Eaton, New to the Danish Fauna.

## With Descriptions of the Specific Characters.

By
Anker Nielsen.

In the upper part of the river Lindenborg Aa, flowing through the forest Rold Skov in Himmerland (northern Jutland) there is a rather abundant population of *Hydroptila*. Being surprised to find larvæ and pupæ on stones in a swifter current than that in which these animals are generally found, I reared some of the pupæ in late July and early August.

It turned out to be *H. occulta* Eaton. This species occurs in England, where it is even said to be "widely distributed and abundant" (5, p. 266), but otherwise it had not so far been found in Northern Europe. From Germany only a single specimen, taken at Chiemsee in Upper Bavaria, is known (8, p. 206). It has been found in Switzerland, Bohemia, and Bosnia. *H. insignis* Martynov, recorded from the Kara-tau mountains in eastern Turkestan (Syr-Darja), most probably is identical with *occulta*, though Martynov's description and figures (4, p. 176, pl. IX, figs. 28-29) do not allow any definite conclusion. This being the case, the species has a remarkably wide distribution.

The pupæ reared were taken at Stubberupvad (9° 47' 36" E, 56° 48' 44" N). Lindenborg Aa must here be designated as a large brook, rather shaded by a dense growth of alders at the banks. The clear water flows over stony riffles at a velocity of about 75 cm/sec. at the bottom.

The stream has a somewhat stenothermous character. Only rarely, and only on exceptionally hot summer days, the temperature rises above 15° C. (highest temperature actually measured $15^1/_3{}^0$). In return the winter temperature is comparatively high. Considering the southern distribution of the species we might hence suppose to be concerned with an atlantic relict (cp. 7), which in this stream has found an adequate balance between its requirements of summer and winter temperature, resp. Its occurrence in England with its mild winters does not speak against this possibility — but that, however, does its probable occurrence in Turkestan. If really the occurrence in Himmerland is so isolated as it may seem, it will be rather difficult to explain. From the records it appears that the species is distinctly rheophilous and is chiefly found in mountainous districts. In this respect it fits excellently into the animal community of the very unusual lowland stream Lindenborg Aa.

The descriptions given by Eaton (1, p. 136, pl. III 4—4b), MacLachlan (3, p. 512, pl. LVIII figs. 1—2), Klapálek (2, pl. II, fig. 13), and Mosely (5, pp. 265—66) are not very accurate. Moreover there is some confusion as to the structures which are called "penis sheaths" by MacLachlan and Mosely, and "upper branch of the pedes genitales" by Martynov. (According to Ulmer — 9, p. 263 — Klapálek considers them as "ventral liegende, basale Fortsätze des 10. Tergits"). Hence a description of the specific characters will not be superfluous. The descriptions given below are based upon material mounted as slide preparations in Canadian balsam. In this connection it may be pointed out that the specific characters of Trichoptera are best studied on material preserved in alcohol or — in small forms as the Hydroptilids — mounted as slide preparations. If it is desired to pin the animals, the genito-anal segments ought to be cut off from at least some specimens and preserved in this way.

♂ (figs. A—F). As in other Hydroptilids the big segment IX for the greater part is withdrawn into the preceding segments; its anterior margin has broad and very deep dorsal and ventral excisions. The posterior margin has a pair of broad, bilobed lateral processes (fig. C). The upper lobe is triangular, with rounded apex and covered with rather stout setæ. In dorsal view (fig. A) a short, pointed, backward directed process is seen on the inside of its upper margin; this process, however, is hyaloid and not quite easy to be seen. In lateral view (fig. C) the lower lobe is also triangular; in ventral view (fig. B) it is almost semicircular. There are no true ventral processes, but the ventral part of the posterior margin is very convex.

The membraneous segment X ("the dorsal plate") is long and slender. In dorsal view (fig. A) it has prominent and rather acute posterior corners; in lateral view (fig. C) the latter are broadly rounded. The double excision of the posterior margin is not nearly so pronounced as stated in previous descriptions; the latter shape, no doubt, is a result of desiccation. In lateral view (fig. C) the lateral margin of the segment has the shape shown in MacLachlan's, Klapálek's, and Mosely's figures, it is true, but from the ventral surface a pair of membranes projects. Posteriorly the latter are very thin, anteriorly they are thicker and partly enclose the sheath of the ædeagus. On the dorsal surface there is a pair of sclerotized stripes, which form an articulation with the posterior margin of segment IX. Segment X is moved by strong muscles which originate in the dorsal fourth of the anterior margin of segment IX. The very thin rectum terminates on the narrow posterior edge of segment X. (The two latter features of course are not particular to this species).

The proximal end of the inferior appendages is thickened, especially laterally and medially; medially the two appendages touch each other. In ventral view (fig. B)

they are straight and only slightly attenuated towards the apex. In lateral view (fig. D) they are club-shaped, being somewhat flattened near the base, and downward bent. Laterodorsally the apex is dark-coloured and rough with small nodules. Laterally the appendages are covered with setæ, which are comparatively stout on the proximal, thickened part, minute on the distal part; two of the latter placed dorsolaterally and a little distally to the middle are greater and of constant occurrence. The very strong muscles of the inferior appendages originate in the ventral $^3/_4$ of the anterior margin of segment IX and are inserted dorsally into the proximal margin of the appendages.

The very slender, membraneous ædeagus (fig. F) projects well beyond the posterior margin of segment X. It is furnished with a rather proximal titillator, which arises on the dorsal side of the ædeagus. It is wound (towards the right and anteriorly) in one spiral turn around the latter and then bent backwards. In fig. B its apex is just seen projecting beyond the sheath of the ædeagus (phallocrypt). The latter carries a sclerotized, cordate ventral plate (shown with a broken line in fig. B). On this plate a pair of very long, slender, tubular processes arises. It is MacLachlan's "penis sheaths", which thus belong to segment IX and should be designated as parameres. Rudimentary homologa of these organs are perhaps represented in some other species as minute, pointed processes on the ventral plate (cp. 6, p. 126, fig. 56a). Almost in the middle they carry a rather stout, lateroventral seta. Distally to the posterior margin of segment X the parameres are bent upwards. Their slender, conical apex has a very peculiar sculpture (fig. E): it is covered with deep grooves, rounded in the bottom and separated by high, narrow ridges. Just proximally to this part the parameres are somewhat thickened. The lanceolate shape which is pictured by Klapálek and Ul-

mer (9, p. 264) is not natural, but a result of desiccation; even in balsam preparations the parameres may have a tendency to collapsing (fig. A, left side). To the anterior margin of the ventral plate a strong muscle is attached; it originates in the lateroanterior corner of segment IX.

The process of the VII. sternite (fig. BC) is short, much sagittally compressed, lanceolate. On the posterior halves of tergite VIII and sternite VIII there is a dense fringe of very stout setæ, interrupted in the middle for some distance, which on the tergite is about equal to the width of segment X, on the sternite much smaller. The dorsal setæ, especially, are very long, projecting beyond the posterior margin of segment X; in dried specimens they will of course contribute to make examination difficult. The ventral setæ almost reach the middle of the inferior appendages.

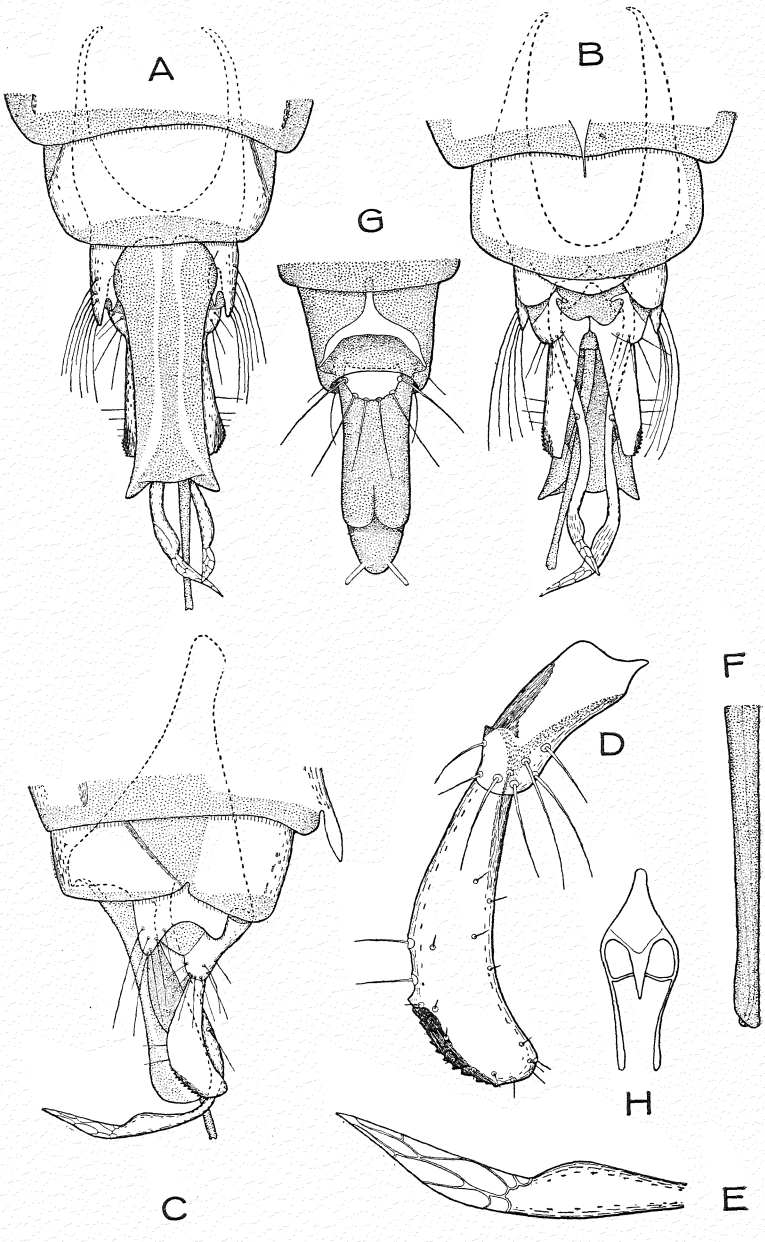
Body-length (alcohol specimens) 2.4—2.65 mm, length of the anterior wing 2.3—2.7 mm.

♀ (fig. GH). About the anterior $^1/_6$ of the long, slender segment X is withdrawn into segment VIII; (the degree of withdrawal varies a little). Segment IX, which is a little shorter and broader than segment X, is entirely withdrawn into segment VIII, so that its anterior end comes to lie almost in the middle of segment VII. The genital opening is situated posteriorly on the ventral

---

Explanation of the figures.

A—F: ♂. A: segments (VII), VIII, IX, and X in dorsal view; the withdrawn parts of segment IX are shown with a broken line; the setæ of segments VII and VIII have been omitted. B: same, ventral view. C: same, lateral view. D: right inferior appendage in lateral view. E: distal part of right paramere in lateral view. F: distal part of ædeagus in lateral view. GH: ♀. G: segments (VII), VIII, and X in ventral view; the setæ of segments VII and VIII have been omitted. H: skeleton of the vaginal chamber in ventral view. Membranes dotted. A—C: 160 ×; D—F: 385 ×; GH: 75 ×.


A
B
G
C
D
F
H
E

side of segment VIII. Its anterior (or ventral) margin is supported by an almost semicircular sclerite, "the ventral plate", which has an anterior, stalk-like extension. Behind the genital opening there is, on the ventral side of segment X, a "dorsal plate", carrying three pairs of strong setæ on its distal margin. The anus is placed posteriorly on the ventral side of segment X. The cerci are cylindrical. Sternite VI has a process, which is only half as long as that on sternite VII in the ♂ and triangular in lateral view. The skeleton of the vaginal chamber (Mosely's "trident-like structure") is very light-coloured, and hence it is a little difficult to make out its shape, but the latter is approximately as shown in fig. H. The central piece lies in the ventral wall, the arms in the lateral walls, and the "bridge" in the dorsal wall. The backward directed point of the central piece will seem to be a process projecting freely into the vaginal chamber.

Body-length (alcohol specimens) 2.5—2.7 mm, length of anterior wing 2.15—2.35 mm.

At present six species of *Hydroptila* are known from Denmark, viz. *pulchricornis* Pictet, *femoralis* Eaton, *sparsa* Curtis, *cornuta* Mosely (6, p. 125), *simplex* Anker Nielsen (6, p. 125), and *occulta* Eaton. As to *simplex*, however, the possibility that we are concerned with an abnormality cannot be excluded.

---

## References.


1. Eaton, A. E., 1873: On the Hydroptilidæ, a family of Trichoptera. Trans. Ent. Soc. London.
2. Klapálek, Fr., 1903: Ueber neue und wenig bekannte Arten der paläarktischen Neuropteroiden. Bull. Int. Acad. Prague. **7**.
3. MacLachlan, Robert, 1874—80: A monographic revision and synopsis of the Trichoptera of the European fauna. London.
4. Martynov, A., 1927: Contributions to the aquatic entomofauna of Turkestan. I. Trichoptera annulipalpia. Annu. Mus. Zool. Acad. Leningrad. $\mathbf{28}_2$.

5. Mosely, Martin E., 1939: The British Caddis Flies. London.
6. Nielsen, Anker, 1948: Trichoptera of Susaa. Fol. Limn. Scand. København. **4**.
7. —, 1950: On the zoogeography of springs. Hydrobiologia. Den Haag. **2**.
8. Ulmer, Georg, 1921: Die Trichopterenfauna Deutschlands. III. Die Trichopteren von Bayern. Z. wiss. Insektenbiol. Berlin. **16**.
9. —, 1929: Über einige deutsche Hydroptiliden. Zool. Anz. Leipzig. **80**.

---

From the Freshwater Biological Laboratory
of the University Copenhagen
Hillerød, Denmark.