

Revision of the Danish Hydroptilidae (Trichoptera)

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The Danish Hydroptilidae are revised by the study of all available material from Danish museums and private collections. *Oxyethira distinctella* McLachlan, *O. falcata* Morton, *O. tristella* Klapálek and *Hydroptila forcipata* (Eaton) are reported from Denmark for the first time and *Hydroptila cornuta* Mosely re-established as Danish. In all 19 hydroptilid species are now known from Denmark, but several more should be expected. Notes on records, distribution and habitats are given.

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Introduction

The Hydroptilidae are minute Trichoptera and often termed »micro-caddis«. Thus, the forewing length of the Danish species varies from only 2,5 to 4 mm. Imagines bear a striking superficial resemblance to Microlepidoptera because of their narrow, tapering wings and the dense covering of black or brown and white setae. Like most Lepidoptera they are readily attracted to mercury-vapour light and may form an essential part of a catch.

The larvae are small (Danish species up to 3.5-5.5 mm long). They pass through four instars of very short duration. During the fifth and final instar, they build a purselike case and the abdomen becomes characteristically distended as food reserves are deposited for the development of the future adult tissues. Nielsen (1948a), described the morphology, life history, feeding and case building behaviour of five of the six Danish genera. His work is outstanding in details as well as in accuracy, and should therefore be highly recommended to anybody with interests in Hydroptilidae.

Previous records of Danish Hydroptilidae

The first lists of Danish Hydroptilidae are presented by Esben-Petersen (1907, 1916) including only 8 species: *Agraylea multipunctata* Curtis, *A. sexmaculata* Curtis, *Oxyethira flavicornis* (Pictet), *O. sagittifera*

Ris, *Orthotrichia costalis* (Curtis), *Hydroptila pulchricornis* Pictet, *H. sparsa* Curtis and *H. tineoides* Dalman (see check-list for synonyms). Since then 7 species have been added: *Ithytrichia lamellaris* Eaton (Thienemann, 1907), *Hydroptila cornuta* Mosely, *H. simplex* Nielsen (Nielsen, 1948b), *H. occulta* Eaton (Nielsen, 1951), *Oxyethira frici* (Klapálek) (Mogensen, 1971), *Orthotrichia angustella* (McLachlan) (Svensson & Tjeder, 1975) and *Tricholeiochiton fagesii* (Guinard) (Wiberg-Larsen, 1981). Referring to a letter from Dr. A. Nielsen, Svensson & Tjeder (1975) however state, that previous records of *H. cornuta* appear to be *H. simulans* Mosely.

Material studied

Danish material of Hydroptilidae is rather sparse. Thus 1497 adults, 61 mature pupae (e.g. pupae with well developed genitalia), 541 larvae and 131 cases with larval exuvies have been identified, representing only 131 localities. The following collections have been consulted: Zoological Museum, University of Copenhagen (ZMUC), Freshwater Biological Laboratory, University of Copenhagen (FBLUC), Museum of Natural History, Aarhus (NHMA), Ussing's collection at the Stiftsmuseum of Viborg, and my private collection. The FBLUC material includes Wesenberg-Lund's collection of a series of general stream fauna samples, mainly collected during the period 1911-1921.

Esben-Petersen (1907) mentions, that he has an alcohol-collection of Hydroptilidae. I have however, not been able to locate this material.

All stages of *Agraylea* and *Tricholeiochiton* including cases containing larval remains have been identified to species. However, only adults or mature pupae of *Ithytrichia*, *Oxyethira*, *Orthotrichia* and *Hydroptila* can at present be identified to species, whereas larvae can be identified only to generic level. In order to obtain correct identifications of adult Hydroptilidae, the abdominal tips should be cut off, boiled for 3-5 minutes in 10% KOH, then washed in pure water and 70% alcohol, and finally transferred to glycerol. After this treatment all essential genital structures can be studied. The procedure has been followed for all pinned specimens and most of the alcohol preserved material. The identifications have primarily been made according to Marshall (1978).

Revision of the Danish Hydroptilidae

After revision of all the available material the following check-list of the Danish Hydroptilidae appears

Agraylea Curtis, 1834

1 *multipunctata* Curtis, 1834

2 *sexmaculata* Curtis, 1834
syn. *pallidula* McLachlan, 1875

Ithytrichia Eaton, 1873

3 *lamellaris* Eaton, 1873

Oxyethira Eaton, 1873

4 *distinctella* McLachlan, 1880

5 *falcata* Morton, 1893

6. *flavicornis* (Pictet, 1834)
syn. *costalis* Eaton, 1873 et auct.
(nec. Curtis)

7 *frici* (Klapálek, 1891)

8 *sagittifera* Ris, 1897

9 *tristella* Klapálek, 1895

Tricholeiochiton Kloet et Hincks, 1944

10 *fagesii* (Guinard, 1879)

Orthotrichia Eaton, 1873

11 *angustella* (McLachlan, 1865)

12 *costalis* (Curtis, 1834)
syn. *tetensii* Kolbe, 1887

Hydroptila Dalman, 1819

13 *cornuta* Mosely, 1922

14 *forcipata* (Eaton, 1873)

15 *occulta* (Eaton, 1873)

16 *pulchricornis* Pictet, 1834

17 *simulans* Mosely, 1920

18 *sparsa* Curtis, 1834

19 *tineoides* Dalman, 1819
syn. *femoralis* (Eaton, 1873)

Hydroptila simplex Nielsen, 1948, which is represented in the check-list by Svensson & Tjeder (1975), is omitted from the present list, as the only known specimen probably represents an abnormality (see Nielsen, 1951; Svensson & Tjeder, 1975).

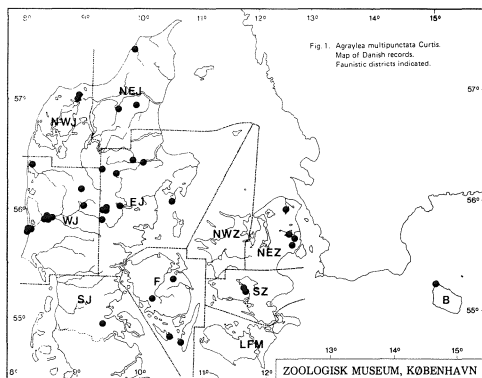
In the following survey notes on Danish records, distributions and habitats are given. In addition the distributions outside Denmark are outlined using the papers by Botosaneanu & Malicky (1978), Geijskes & Fischer (1971), Marshall (1978), Mey et al. (1979), Nybom (1980), Svensson & Tjeder (1975) and Tobias & Tobias (1981).

Agraylea multipunctata Curtis, 1834

Material. 134 adults, 9 pupae, 153 larvae and 35 cases.

Widely distributed (Fig. 1) and common. Mainly in lakes, but also in ponds and slow-flowing streams. In plant thickets or on stones in the littoral zone of lakes.

Known from the British Isles, Scandinavia, north and central Europe.

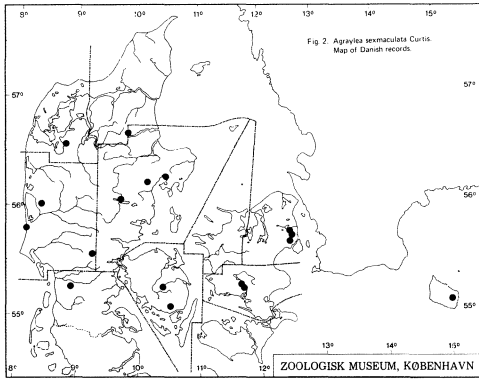


Agraylea sexmaculata Curtis, 1834

Material. 37 adults, 11 pupae, 20 larvae and 5 cases.

Widely distributed and common (Fig. 2). Inhabits lakes, ponds and slow-flowing streams, but seems to prefer small lakes and ponds. Often in plant thickets, but also on submersed wood or stones.

Widely distributed in the British Isles, north, central and southern Europe, but seems to be absent from northern Scandinavia.

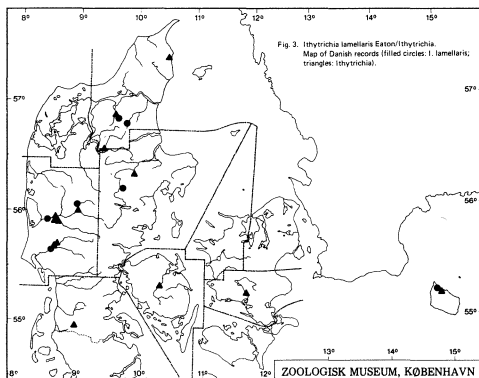


Ithytrichia lamellaris Eaton, 1873

Material. 28 adults, 4 mature pupae. In addition 6 pupae, 347 larvae and 85 cases of *Ithytrichia*. Finally, two literature records (Thienemann, 1907; Glenstrup, 1974) are included in the distribution maps of *Ithytrichia* (Fig. 3).

Probably, *I. lamellaris* is the only representative of the genus in Denmark. However, as *I. clavata* Morton, 1905 is known from the British Isles and Sweden its presence in Denmark should not be excluded.

Widely distributed and has probably been rather common (Fig. 3). However, there are only two records since 1955 and *Ithytrichia* has no doubt become extremely rare. Exclusively found in streams and rivers, often where the current is rather strong. Inhabits plant thickets (e.g. mosses), but also occurs on stones. *I. lamellaris* is widely distributed all over Europe.



Oxyethira distinctella McLachlan, 1880

New to Denmark

Material. EJ, Lilsø (Silkeborg Lillesø), 1♀, 10.vii.1907 (ZMUC).

Silkeborg Lillesø is a small, but rather deep, alkalic forest lake.

Expected to occur in Denmark, as it is known from England, Norway, Sweden and Finland.

Oxyethira falcata Morton, 1893

New to Denmark

Material. NEJ: Allerup Bakker (tributaries to Voer Å), 1♀, 2.vi.1909 (ZMUC); WJ: Rind Å, Bærslund, 1♂, 18.iv.1949 C.F. Jensen leg. (NHMA); Skern Å, broerne, Tarm Kær, 1♂, 3.viii.1955 C.F. Jensen leg. (NHMA).

Probably rather widespread in streams and rivers.

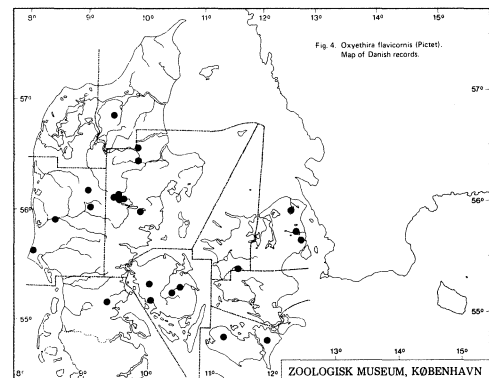
Known from the British Isles, the Netherlands, Finland and west, central and southern Europe, but not from northern West Germany and East Germany, Norway and Sweden.

Oxyethira flavicornis (Pictet, 1834)

Material. 207 adults, 7 mature pupae.

Widely distributed and common (Fig. 4). Inhabits lakes and ponds, mainly in plant thickets, but also on submerse wood or on stones in the littoral zone of lakes. Bivoltine with a very short summer generation.

Widespread throughout the British Isles, north, central and eastern Europe.



Oxyethira frici (Klapálek, 1891)

Material. WJ: Omme Å, Rabæk Krat, 1♀, 1.vii.1951 C.F. Jensen leg. (NHMA); Skern Å, broerne, Tarm Kær, 1♂1♀, 24.vii.1952 C.F. Jensen leg. (NHMA). Mogensen (1971) reports a record (1♂) from Poulstrup Sø, Himmerland (A. Nielsen leg. et det.). However, this specimen has proved to be *O. sagittifera*. *O. frici* is confined to running water, inhabiting streams and rivers (Marshall, 1978; Tobias & Tobias, 1981). Known from the British Isles, Scandinavia, north and central Europe.

Oxyethira sagittifera Ris, 1897

Material. EJ: Gedde Sø, Addit Næs, 2♀, 30.vi.1978 P. Bech Larsen leg. (PWL coll.); NEJ: Hannerup Sø, Hobro, 25♂16♀, 2.viii.1956 A. Nielsen leg. (ZMUC); Hannerup Sø (pond east to the lake), 1♂1♀, 2.viii.1956 A. Nielsen leg. (ZMUC); Madum Sø, 21♂16♀, 16.viii.1951 A. Nielsen leg. (ZMUC); Poulstrup Sø, 1♂, 7.viii.1951 A. Nielsen leg. (ZMUC); WJ: Søby Sø, Herning, 1♂, 25.v.1950 K.O. Leth leg. (ZMUC); NWJ: Vangså, moor lake, Thy, 1♀, 10.vi.1970 C.F. Jensen leg. (NHMA). The records seem to indicate, that this species primarily inhabits oligotrophic or even acid lakes and ponds (e.g. pH 4-4,5 in Gedde Sø). Known from the British Isles, Scandinavia, north and central Europe, and north-west U.S.S.R.

Oxyethira tristella Klapálek, 1895

New to Denmark

Material. EJ: Horsens, 1♂, 22.v.1869 O.G. Jensen leg. (ZMUC); WJ: Skern Å, broerne, Tarm Kær, 1♂1♀, 5.vi.1949 C.F. Jensen leg. (NHMA); SZ: Tuel Å, 1 pupa ♂, 10. viii. 1917 C. Wesenberg-Lund leg. (FBLUC). Expected to occur in Denmark, as it is known from the British Isles, the Netherlands, Scandinavia and central Europe. Confined to running waters, especially fastflowing streams and rivers (Marshall, 1978).

Tricholeiochiton fagesii (Guinard, 1879)

Material. F: Freltofte Mose, 1 la, 30.iv.1983 P. Wiberg-Larsen leg.; Kirkeby Hedeskov, Svendborg, 11 la, 4♂2♀ (reared 1983),

14.x.1982 P. Wiberg-Larsen leg.; Lisbjerg Mose, Grindløse, 2 cases, 12.viii.1981 M. Maag & F. Pedersen leg. (PWL coll.); EJ: Pøtsø, Silkeborg, 6 la. 30.v.1908 (FBLUC); Tebbestrup Bredning, Randers, 1 case, vii.1917 Hj. Ussing leg. (Ussing coll.); NEZ: Lyngby Sø, 1 pu, 2 la, 3 cases, 30.vii.1907 (FBLUC); Pederstrup, Ballerup, 1♂, 29.v.1939 A. Nielsen leg. (ZMUC); Sønder sø, Gentofte, 1 la, 27.v.1971 P. Wiberg-Larsen leg. Probably widely distributed in Denmark, but is easily overlooked. In smaller lakes and ponds with dense submerse vegetation (e.g. Characeae).

Known from the British Isles, the Netherlands, Sweden (southern part), northern East Germany and most of central, east and southern Europe. Thus, *T. fagesii* probably has its northern boundary in Denmark.

Orthotrichia angustella (McLachlan, 1865)

Material. EJ: Brassø, Silkeborg, 1♂1♀, 5.viii.1906 (ZMUC); Glenstrup Sø, Hobro, 1♂1♀, 8.viii.1956 A. Nielsen leg. (ZMUC); LFM: Røgebølle Sø, Maribo, 1♀, 1.viii.1913 (ZMUC); NEZ: Esum Sø, 4♂, 31.vii.1980 E. Jónsson leg.; *ibid.*, 1♂, 14.viii.1980 E. Jónsson leg.; *ibid.*, 1♀, 22.viii.1980 E. Jónsson leg. (FBLUC).

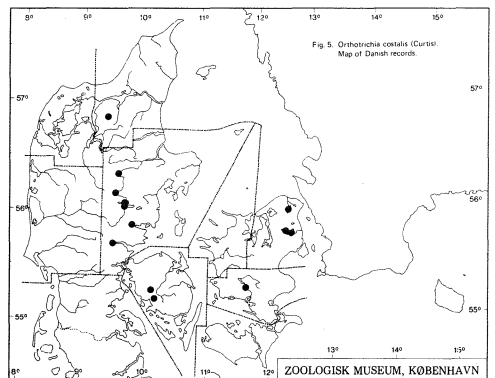
Only known from a few Danish lakes, but is probably more widely distributed.

Known from England, Norway, Sweden, central and southern Europe.

Orthotrichia costalis (Curtis, 1834)

Material. 57 adults, 8 mature pupae.

Seems to be widely distributed in Denmark, although there are rather few records, e.g. no records from western Jutland (Fig. 5). Re-



corded from lakes and streams, which drains lakes. Occur on stones, reeds and submerse macrophytes.

Known from most parts of Europe.

Hydroptila cornuta Mosely, 1922

Material. EJ: Gudenå, Klostermølle, 6♂67♀, 18-19.vi.1977 P. Wiberg-Larsen leg.; *ibid.*, 4♂47♀, 4-7.vii.1977 P. Wiberg-Larsen leg.; *ibid.*, 4♂9♀, 2-4.ix.1977 P. Wiberg-Larsen leg.; Randers, 1♀, 26.vi.1905 Jensen-Hårup leg. (ZMUC); Silkeborg, 1♂2♀, 14.vi.1911 (ZMUC); Skellerup (Linå), 4♂10♀, 11.viii.1906 (FBLUC); SZ: Suså, Holløse Mølle, 3♀, 24.v.1943 A. Nielsen leg.; *ibid.*, 1♂1♀, 19.viii.1943 A. Nielsen leg. (FBLUC); Suså, Rislev, 3♂, 17.vii.1943 A. Nielsen leg.; *ibid.*, 1♂1♀, 21.ix.1943 A. Nielsen leg. (FBLUC); Tuel Å, 1 pu♂, 10.viii.1917 C. Wesenberg-Lund leg. (FBLUC); WJ: Skern Å, broerne, Tarm Kær, 4♂3♀, 26.vi.1949 C.F. Jensen leg.; *ibid.*; 1♂, 29.vi.1949 C.F. Jensen leg.; *ibid.*, 1♀, 6.vii.1949 C.F. Jensen leg.; *ibid.* 7♂2♀, 8.vii.1962 C.F. Jensen leg. (NHMA).

Re-established as a member of the Danish fauna. Has probably been rather widely distributed, inhabiting streams and rivers. However, it seems to have disappeared from both Skern Å and Suså, probably due to stream regulation and pollution.

Known from England, Norway, Sweden, Finland, north and central Europe.

Hydroptila forcipata (Eaton, 1873)

New to Denmark

Material. MEZ: Lellinge, 2♀, 7.viii.1907 (ZMUC).

The only known Danish locality is a rather fast-flowing stream. However, *H. forcipata* has probably disappeared from this locality due to dessication during the summer 1976, where most of the rheophile fauna of the stream was lost.

Expected to occur in Denmark, as it is known from the British Isles, Norway, Sweden, Finland, central and southern Europe.

Hydroptila occulta (Eaton, 1873)

Material. EJ: Gjern Å, 1♀, 10.vii.1909 (ZMUC); NEJ: Lindenberg Å, Røde Mølle, 2 pu♀, 10.vii.1942 A. Nielsen leg.; Lindenberg Å, Stubberupvad, 1♀, 1.vii.1940 A.

Nielsen leg.; *ibid.*, 6♀, 14.vii.1942 A. Nielsen leg.; *ibid.*, 7♂4♀, 22.vii.-2.viii.1948 A. Nielsen leg. (ZMUC).

Only recorded from two Danish streams. Has probably disappeared from Lindenberg Å due to pollution from fish farms (the species has been searched for without luck in 1980 and 1981).

Recorded from fast-flowing streams in England and Finland. Its distribution in Europe is, however, poorly known.

Hydroptila pulchricornis Pictet, 1834

Material. 81 adults, 3 mature pupae.

Probably widely distributed in Denmark, although there are only few records (Fig. 6). Inhabits lakes, living on stones in the littoral zone.

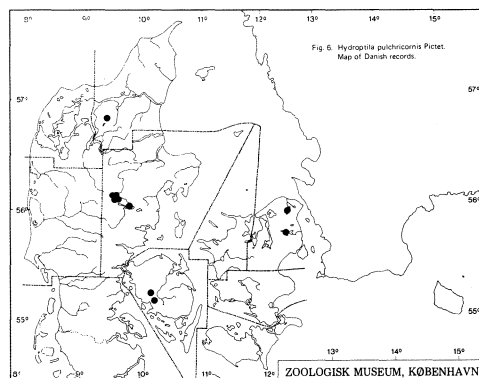
Widely distributed in Europe, i.e. the British Isles, Norway, Sweden, Finland, the Netherlands, France, East and West Germany.

Hydroptila simulans Mosely, 1920

Material. WJ: Skern Å, broerne, Tarm Kær, 1♂, 26.vi.1949 C.F. Jensen leg.; *ibid.*, 1♂, 29.vi.1949 C.F. Jensen leg.; *ibid.*, 1♀, 6.vii.1949 C.F. Jensen leg.; *ibid.*, 2♂, 1.vii.1952 C.F. Jensen leg.; *ibid.*, 1♂, 15.vii.1952 C.F. Jensen leg. (NHMA); Skern Å, Albæk Bro, 4♂, 13.vii.1976 P. Wiberg-Larsen leg.; *ibid.*, 4♂1♀, 11.vi.1977 P. Wiberg-Larsen leg.

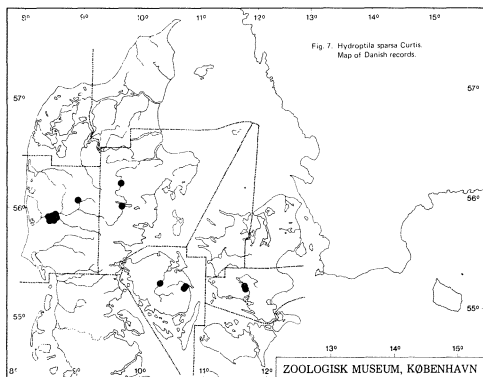
Only known from the lower reaches of Skern Å.

Inhabits streams and rivers in the British Isles, Norway, Sweden, Finland, East Germany, central and southern Europe.



Hydroptila sparsa Curtis, 1834

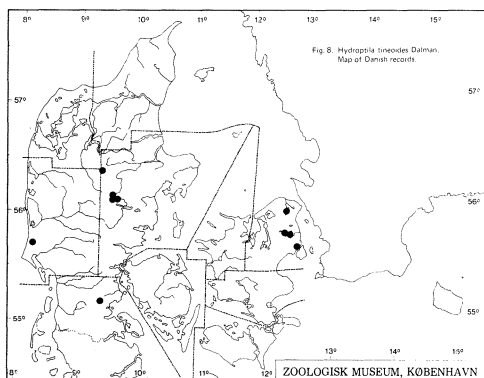
Material. 399 adults, 8 mature pupae. Seems to be widely distributed and rather common in stream and rivers (Fig. 7), living on stones where the current is rather slow. Probably bivoltine with a short summer generation July-August. Widely distributed in Europe, but seems to be rare in Scandinavia (not recorded from Norway).



Hydroptila tineoides Dalman, 1819

Material. 197 adults. Probably widely distributed and common in lakes (Fig. 8), inhabiting stones in the littoral zone or submerse macrophytes at depths about 1-2 meters. Widely distributed all over Europe including Scandinavia.

The Danish hydroptilid fauna is no doubt rather poorly known, and there is a great need for intensive investigations throughout the country. Especially the streams and rivers should be searched. Where larvae are



sampled, they should be reared to the adult stage for identification.

Judging from the occurrence of Hydroptilidae in our neighbouring countries about 8 additional species could very well be found in Denmark. However, as many streams and rivers have been heavily polluted or regulated, and many lakes highly eutrophicated during this century, the chance of discovering new species decreases. Moreover, several of the known 19 Danish species have no doubt become rare or extremely rare. One or two species may even be extinct.

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Sammendrag

Revision af de danske Hydroptilidae (Trichoptera).

Alt tilgængeligt dansk materiale af Hydroptilidae fra museer og private samlinger er blevet undersøgt. Materialet har desværre været sparsomt både med hensyn til antal individer og lokaliteter. Endvidere har det kun været muligt at artsbestemme imagines samt fuldt udviklede pupper inden for slægterne *Ithytrichia*, *Oxyethira*, *Orthotrichia* og *Hydroptila*, medens *Agraylea* og *Tricholeiochiton* har kunnet artsbestemmes i samtlige stadier.

Efter den udførte revision omfatter de danske Hydroptilidae i alt 19 arter, idet *Oxyethira distinctella* McLachlan, *O. falcata*

Morton, *O. tristella* Klapálek og *Hydroptila forcipata* (Eaton) er blevet registreret som nye for Danmark. Endvidere er det blevet fastslået, at *Hydroptila cornuta* Mosely, som blev slettet af den danske fauna af Svensson & Tjeder (1975), faktisk forekommer i Danmark.

Der gives for hver art en oversigt over findesteder, samt om muligt udbredelse og foretrukne levesteder. Endvidere er arternes udbredelse uden for Danmark angivet.

Skønt kendskabet til de danske Hydroptilidae må betragtes som værende dårligt, er der næppe tvivl om, at adskillige arter er gået stærkt tilbage på grund af forurening og regulering af vandløb samt eutrofiering af søer og damme. Der er imidlertid god grund til at opfordre interesserede til at foranstalte indsamlinger af Hydroptilidae med henblik på at forbedre kendskabet til arternes udbredelse, hyppighed og foretrukne levesteder. Egnede indsamlingsmetoder er lysfælder, vegetationsketching langs vandløb og søer eller indsamling af larver til efterfølgende klækning.

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