

# NORSK ENTOMOLOGISK TIDSSKRIFT

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## BIND V — HEFTE 2

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## The Norwegian Mayflies (Ephemeroptera).

By Reidar Brekke, Trondheim.

The investigation of the insect group Ephemeroptera has in recent time been the source of great interest. Investigators in our neighbouring countries Denmark, Finland and Sweden have, as also investigators in other European countries, published accounts of the ephemeridae of their countries.

Esben Petersen, Copenhagen, gave an account of Denmark's ephemeridae in 1910 (Bibl. nr. 30). J. E. Aaro, Helsingfors, wrote his last synopsis over Finland's ephemeridae in 1928 (nr. 1), and L. Tiensuu has since then continued investigation of this group in Finland (nr. 42—43). Simon Bengtsson, Lund, has from 1903 until 1931 published a number of papers on the subject (nr. 2—12). As regards Norway no comprehensive account of ephemeridae including the whole country has been published since the paper of the late state entomologist W. M. Schøyen in 1887 (nr. 37). The present paper therefore is an attempt to give a revisal of the old material as far as it is preserved in the museum collections and thus can be controlled, and further to give an account of known Norwegian mayflies up to this date.

I have inspected the following Norwegian collections:

1. Zoological museum of the university, Oslo (Esmark, Siebke, W. M. Schøyen, Embr. Strand. leg. — Eaton, W. M. Schøyen det.)
2. Tromsø museum, Tromsø (Zetterstedt, Sparre-Schneider, Soot-Ryen, leg. — Esben Petersen, Bengtsson det.)

Furthermore my list includes material collected in more recent time and placed at my disposal for determination.

Professor Dr. Knut Dahl (the leader of the "Experimental Research Work on Freshwater Fisheries" and his assistant cand. real. Sven Sømme have sent me the material brought together by the institute (Knut Dahl, O. Olstad, J. D. Sømme, Sven Sømme leg.)

Konservator L. R. Natvig has sent me the material (chiefly larvae) collected by him in recent years in southeastern Norway including a few specimens from the museum magazines (Siebke, O. Mathisen leg.). All this material is now brought together in one collection with my determinations and is deposited at the Zoological Museum at Oslo.

Dr. Hartvig Huitfeldt-Kaas, Oslo, has sent me material collected by him in various parts of the country through several years. Mr. Fritz Jensen, Stavanger, has sent me some dried imagines chiefly from the neighbourhood of Stavanger. The Oslo Angling Association has sent me material collected by the members all over the country.

Finally the list includes my own material collected in the recent 5 years in various parts of the country, chiefly in Trøndelag. This collection is deposited at the Museum in Trondheim.

### Norwegian ephemeridae described by older authors.

The oldest paper found giving details on Norwegian mayflies was published by pastor H. STRØM in 1783 (nr. 41). In his "Norske Insecters Beskrivelse" he gave an account of the following four species:

1. *Ephemera leucothalma*.
2. *Ephemera caudata*.
3. *Ephemera bioculata*.
4. *Ephemera ciliata*.

Later investigators have been of different opinion as to the identification of the species described by Strøm, the scantiness in his description giving no certainty as to the species. The Swedish entomologist H. D. J. Wallengren in 1882 came to the conclusion that Strøm's description concerned the following species:

1. *Baetis sulphurea* MÜLL. syn. *Heptagenia elegans* ETN.
2. *Centroptilum luteolum* MÜLL.
3. *Ephemera bioculata* LIN. or *Cloe bioculata* LIN.
4. *Cloe pumila* BURM. syn. *Eph. striata* LIN.

Dr. Simon Bengtsson in 1912 came to the conclusion that Strøm's four mayflies must be:

1. *Heptagenia sulphurea* MÜLL.
2. *Centroptilum luteolum* MÜLL.
3. *Baetis tenax* ETN.
4. *Baetis Wallengreni* BGTN. or *Baetis pumilus* BURM.

The presence of these 5 mayflies in Norway has later been ascertained.

Pastor SOMMERFELDT mentions in his "Description of Salt-dalen" ("Kgl. Norske Videnskabsselskabs Skrifter av 1827") (no. 39) one species of mayflies, viz.: *Caenis brevicauda* FABR.

W. M. Schøyen has later expressed his doubt as regards this determination, probably from the fact that *Caenis* at Schøyen's time was only known from the southern part of Norway. As I however have found *Caenis horaria* at the height of 300 m above sea level in Trøndelag it may be possible that species of *Caenis* may also be found in Saltdalen.

E. SIEBKE mentions in the publication of his researches in 1870 and 1873 (no. 38) the following species of mayflies:

1. *Ephemera vulgata* LIN. found at Krydsherred and Grundset.
2. *Ephemera venosa* found at Hønefos, Næs and Austad river.

Although all the specimens are not preserved the discovery of *Ephemera vulgata* may be presumed to be correct as this easily known species has seldom been the object of mistake. *Ephemera venosa* or *Ecdyonurus venosus* has not later been found in Norway, and it is not represented in the existing collections. As this species can easily be confused with *Ecdyonurus fusco-griseus* there remains some doubt about its existence in Norway. In Zetterstedt's collection Bengtsson found two specimens labelled *Ephemera venosa* FABR. from Norway one female from Bosekop, Finnmark, and "Var. b" represented by one ♂ and one ♀ from Kautokeino, Finnmark. The first mentioned was *Heptagenia dalecarlica* BGTN. subimag. ♀ and the two other specimens were *Heptagenia dalecarlica* BGTN. imag. ♂ and ♀. In Wallengren's collection Bengtsson found one specimen labelled *Heptagenia venosa* FABR. from Aaset in Norway. This was a *Heptagenia dalecarlica* BGTN.

The Swedish entomologists Zetterstedt in 1840 and H. J. D. Wallengren in 1882 published lists over ephemeridae discovered in Scandinavia including Norwegian mayflies. These publications as well as Zetterstedt's and Wallengren's collections have been revised by Bengtsson in his "Analysis of the Scandinavian species of Ephemeridae described by older authors" 1912 (nr. 8).

In 1871 Eaton (nr. 13) published an account of a new discovery in Norway of a species which he called *Rhithrogena borealis*, habitat said to be Finnmark county between Kautokeino and Karesuando and probably found by the English entomologist T. A. Chapman (Walker MS. in Dale mus.). Hope Professor G. D. Hale Carpenter, Oxford, has kindly sent me this specimen for examination. It is a dried specimen without legs. The neuration of the wings and the genitalia show that it is a *Metretopus norwegicus* imag. ♂ Etn. 1901 (nr. 15). The correct name for this species should then be *Metretopus borealis* with: *Heptagenia borealis* Etn. 1871, *Rhithrogena borealis* Etn. 1885, *Metretopus norwegicus* Etn. 1901 as synonyms.

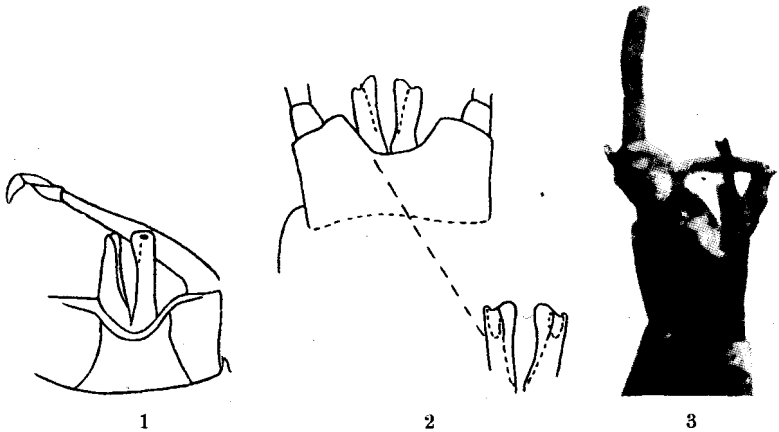


Fig. 1. 1871. *Heptagenia borealis*. Eaton Fig. 2. 1901. *Metretopus norvegicus*. Eaton. Fig. 3. Genitalia of type specimen as it is now with left part of penis broken.

In 1887 W. M. Schøyen published the first list of Norwegian ephemeridae in his "Classification over the hitherto known Neuroptera Plannipennia and Pseudoneuroptera" (nr. 37). Schøyen in this paper refers to Sommerfeldt, Siebke, Zetterstedt and Wallengren and his list contains the following 15 species:

1. *Ephemera vulgata* LIN. without doubt found over the whole of Norway.
2. *Leptophlebia marginata* LIN. Oslo and Dovre.
3. *Leptophlebia cincta* RETZ. Oslo, Dovre, Finnmark.
4. *Caenis halterata* FABR. Oslo.
5. *Baetis bioculatus* LIN. over the whole country.
6. *Baetis vernus* CURTIS. Hammerfest, Alta.
7. *Baetis muticus* LIN. Sunnmøre (H. Strøm: *Ephemera ciliata*).
8. *Baetis vitreatus* ZETT. Alta, Sørvaranger.
9. *Centroptilum luteolum* MÜLL. Sunnmøre, Finnmark.
10. *Cloeon dipterum* LIN. Oslo, Bodø.
11. *Heptagenia borealis* ETN. Finnmark.
12. *Heptagenia semicolorata* CURT. Finnmark.
13. *Heptagenia sulphurea* MÜLL. Sunnmøre, Elverum, Østerdalen.
14. *Heptagenia fluminum* PICT. Gudbrandsdalen, Dovre.
15. *Heptagenia venosa* FABR. Østlandet, Dovre.

The material preserved at the Zoological Museum, Oslo, arranged by W. M. Schøyen, consists of dried specimens, but unfortunately some of them are now in such a fragmentary condition that I have found it impossible to give a distinct identification of all specimens.

The collection at present consists of:

1. *Ephemera vulgata*. This species is represented in the collection by 12 imag. ♂, 1 imag. ♀ and 1 subimag. ♂. It is this species.
2. *Leptophlebia marginata*. This species is represented by 4 imag. ♂. It is this species.
3. *Leptophlebia cincta*. (*Paraleptophlebia cincta*). This species is represented by 4 imag. ♂ and 1 imag. ♀, the latter labelled in Eaton's handwriting. The 4 imag. ♂ are *Paraleptophlebia cincta*. The imag. ♀ is *Ameletus inopinatus* Etn. imag. ♀
4. *Caenis halterata*. This species is represented by 3 subimag. They are in a fragmentary condition and undefinable as to species. They are most probably *Caenis horaria* syn. *Caenis halterata*.
5. *Baetis bioculatus*. This species is represented by 3 imag. ♂ and 5 imag. ♀. 2 imag. ♂ are *Baetis rhodani* and 1 imag. ♂ is *Cloeon praetextum* BGTN. The five imag. ♀ are undefinable as to species, but *Baetis rhodani* is most probable.
6. *Baetis vernus* is not represented in the collection.
7. *Baetis muticus* is not represented in the collection.
8. *Baetis vitreatus* is not represented in the collection.
9. *Centroptilum luteolum* is represented by a very defective specimen. It is a *Baetis* sp.
10. *Cloeon dipterum*. This species is represented by 5 imag. ♀. It is this species.
11. *Heptagenia borealis* is not represented.
12. *Heptagenia semicolorata* is not represented.
13. *Heptagenia sulphurea*. This species is represented by 4 imag. ♂, 6 imag. ♀ and 2 subimag. ♀. 1 imag. ♂ is this species, 1 imag. ♂ is *Heptagenia dalecarlica* and 2 imag. ♂ are *Ecdyonurus joernensis*, 1 imag. ♀ is *Heptagenia sulphurea*, 5 imag. ♀ and 2 subimag. ♀ are *Ecdyonurus joernensis*.
14. *Heptagenia fluminum*. This species is represented in the collection by 2 imag. ♀. They are both *Siphonurus aestivalis*. ETN.
15. *Heptagenia venosa*. This species is represented by 11 imag. ♂, 4 imag. ♀ and 1 subimag. ♀. They are the following species:
  - 1 imag. ♂ *Parameletus chelifer* BGTN.
  - 3 » ♂ *Heptagenia dalecarlica* BGTN.
  - 1 » ♂ *Ecdyonurus fusco-griseus* RETZ.
  - 2 » ♂ *Siphonurus Zetterstedti* BGTN.
  - 3 » ♂ *Siphonurus aestivalis* ETN.
  - 1 » ♂ *Siphonurella Linnaeana* ETN.
  - 1 » ♀ *Heptagenia dalecarlica* BGTN.

- 2 imag. ♀ *Siphonurus Zetterstedti* BGTN.  
 1 » ♀ *Siphonurus aestivalis* ETN.  
 1 subimag. ♀ *Siphonurus Zetterstedti* BGTN.  
 16. *Cloeon rufulum*. This species is represented by 1 very defective specimen. It is a *Cloeon* sp. but species undefinable.

Furthermore the following specimens were found undetermined in the same case:

- Paraleptophlebia cincta* 1 subimag. ♂.  
*Leptophlebia vespertina* 1. imag ♀, 1 subimag. ♂ and 3 subimag ♀.  
*Baetis* sp. 3 specimens undefinable as to species.  
*Chitonophora* sp. 1 imag ♂ and 1 imag ♀.

For the species not found in the collection Schøyen has probably cited details from Zetterstedt's and Wallengren's publications. Bengtson's revisal of these two investigators collections has however shown that their determinations are not in accordance with modern systems of classification. New lists can therefore not be based on their publications. The same view will then be required as regards Schøyen's list and this list must be restricted to the species in the collection which are in such a state that a definite determination can be made.

According to Eaton's publication in 1901 (nr. 15) the Norwegian entomologist Embrik Strand has sent him 700 specimens of ephemeridae collected in Norway for determination. Eaton's list includes the following species:

1. *Leptophlebia marginata*
2. *Leptophlebia Meyerii*
3. *Leptophlebia Strandii* (nov. spec.)
4. *Baetis vernus*
5. *Baetis rhodani*
- 6.<sup>1</sup> *Chirotonetes* sp.
7. *Ameletus inopinatus*
8. *Siphylurus lacustris*?
9. *Siphylurus Linnaeanus*
10. *Siphylurus* sp.
11. *Metretopus norwegicus* (nov. spec.)
- 12.<sup>1</sup> *Rhithrogena* sp.
13. *Heptagenia sulphurea*
14. *Ecdyurus* sp.

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<sup>1</sup> Unfortunately it has not been possible to find this collection for examination. The genera *Chirotonetes* (*Isonychia*) and *Rhithrogena* are not represented in other Norwegian collections and they are not represented in Sweden.

As will be seen the list includes 2 species new to science, viz.: *Paraleptophlebia Strandii* and *Metretopus norwegicus*. The author also mentions that species of *Ephemerella* and *Centroptilum* are found in Norway.

I July 1902 mr. and mrs. Eaton were travelling in Norway, and in the following year Robert Mc. Lachlan published the result of mr. Eaton's researches (nr. 25).

This list includes the following species which were not earlier published as Norwegian ephemeridae by Eaton:

1. *Ephemera vulgata*
2. *Ephemerella* sp. (later identified as *Chitonophora Aurivillii* BGTN.)
3. *Baetis pumilus*
4. *Centroptilum luteolum*
5. *Siphylurus aestivalis* (nov. spec.)
6. *Heptagenia caerulans*?

In the magazines at Oslo Museum was stored a collection consisting of dried specimens labelled "Ephemeridae determ. Eaton 1902 leg. Embrik Strand". The collection has the following contents:

1. *Leptophlebia Meyerii* 9 specimens Tistedal. It is this species (*Leptophlebia vespertina* LIN.).
2. *Centroptilum* sp. 6 specimens Nordreisen. They are not *Centroptilum* but *Acentrella lapponica* BGTN.
3. *Baetis* sp. 1 specimen Kristiania May 14. 1899 subim. It is *Baetis* but species not defineable.
4. *Baetis rhodani* 21 specimens whereof 19 specimens Nordreisen and 2 specimens Suldal. It is this species.
5. *Ameletus inopinatus* 2 specimens Nordreisen. It is this species.
6. *Siphylurus* sp. 2 specimens Nordreisen. It is *Siphonurus Zetterstedti* BGTN.
7. *Ecdyurus* sp. 4 specimens Tistedal. It is *Ecdyonurus* sp. but species not defineable (*Ecd. fuscogriseus* most probable).

The collection of ephemeridae in Tromsø Museum (Zetterstedt — Sparre-Schneider leg.) was examined by the Danish entomologist Esben Petersen in 1902 and later collections of 1908 and 1909 leg. Sparre-Schneider were examined by him in 1910. Esben Petersen has published the result of his revision in Tromsø Museums Aarshefter 1908 (no. 31) and 1910 (no. 32). Unfortunately the author also includes in his lists details previously published by Zetterstedt, Wallengren and Schøyen.

In 1929 the collections in Tromsø Museum were greatly enriched by material collected by T. Soot-Ryen and examined by dr. Simon Bengtsson. Bengtsson published the result of his examination in Tromsø Museums Aarshefte 1930 (no. 11). The collections contained 2 species new to science viz.: *Paraleptophlebia tumida* and *Metretopus alter*, and the number of known mayflies of northern Norway was brought up to 22 species. According to my opinion the publications of Eaton and Bengtsson must be the base for further investigations on the Norwegian mayflies.

I consider my list as provisional and only as a basis for further investigations of this insect group in Norway, and hope that continued researches will bring new species to those already known.

Of genera which in comparison with our neighbouring countries' mayflies may be counted on to be better represented in Norway I will mention *Baetis*, *Caenis* and *Ephemera*.

In conclusion I have given a table over Norwegian mayflies showing which of them are also found in other Scandinavian countries.

I want to express my gratitude to dr. Simon Bengtsson for his kind revisal of doubtful determinations (*Chitonophora* sp. and *Baetis subalpinus*?) and for his suggestions as to literature.

I thank konservator L. R. Natvig, cand. real. Sven Sømme and konservator Soot-Ryen for placing at my disposal the museum collections, and I thank for the confidence shown me by all who have sent me material for determination.

The Norwegian collections of ephemeridae are deposited at the following places:

- I. Zoological Museum of the University, Oslo:  
(leg. K. D. — L. E. — O. M. — L. R. N. — O. O. — W. M. S. — H. S. — J. D. S. — S. S. — E. S.).
- II. Museum of the Royal Norwegian Society of Science, Trondheim: (leg. R. B.).
- III. Tromsø Museum, Tromsø: (leg. S. R. — J. S. S. — Zett.).

Private collections:

- I. Oslo Angling Association, Oslo:  
(leg. A. B. — H. B. — A. E. — B. J. — P. G. — Å. R.).
- II. Dr. phil. Huitfeldt-Kaas, Oslo: (leg. H. K.).
- III. Mr. Fritz Jensen, Stavanger: (leg. F. J.).

## Norwegian mayflies also found in:

	Denmark	Finland	Sweden
<i>Acentrella lapponica</i> .....	-	-	+
<i>Ameletus inopinatus</i> .....	-	+	+
<i>Arthroplea congener</i> .....	-	+	+
<i>Baetis vernus</i> .....	+	+	+
<i>Baetis pumilus (muticus)</i> ...	+	+	+
<i>Baetis bioculatus</i> .....	+	+	+
<i>Baetis Wallengreni</i> .....	-	-	+
<i>Baetis subalpinus</i> .....	-	-	+
<i>Baetis rhodani</i> .....	+	+	+
<i>Baetis gemellus</i> .....	-	+	-
<i>Baetis tenax</i> .....	+	+	-
<i>Centroptilum luteolum</i> .....	+	+	+
<i>Chitonophora Aurivillii</i> .....	-	+	+
<i>Chitonophora mucronata</i> ....	-	-	+
<i>Cloeon dipterum</i> .....	+	+	+
<i>Cloeon inscriptum</i> .....	-	+	+
<i>Cloeon praetextum</i> .....	+	-	+
<i>Caenis horaria</i> .....	+	+	+
<i>Caenis moesta</i> .....	-	-	+
<i>Ecdyonurus fusco-griseus</i> ...	-	+	+
<i>Ecdyonurus joernensis</i> .....	-	-	+
<i>Ephemera vulgata</i> .....	+	+	+
<i>Ephemerella torrentium</i> .....	-	-	+
<i>Heptagenia sulphurea</i> .....	+	+	+
<i>Heptagenia dalecarlica</i> .....	-	+	+
<i>Leptophlebia marginata</i> ....	+	+	+
<i>Leptophlebia vespertina</i> .....	+	+	+
<i>Metretopus borealis</i> .....	-	+	+
<i>Metretopus alter</i> .....	-	-	-
<i>Paraleptophlebia Strandii</i> ...	-	+	+
<i>Paraleptophlebia tumida</i> .....	-	-	+
<i>Paraleptophlebia cincta</i> ....	+	+	-
<i>Parameletus chelifer</i> .....	-	+	+
<i>Parameletus minor</i> .....	-	-	-
<i>Procloeon bifidum</i> .....	+	+	+
<i>Siphonurus aestivalis</i> .....	+	+	+
<i>Siphonurus Zetterstedti</i> ( <i>lacustris</i> ?) .....	+	+	+
<i>Siphurella Linnaeana</i> .....	-	+	+

## Abbreviations.

B. J. = Baashuus Jessen, Oslo.	O. M. = O. Mathisen.
A. B. = Arne Baggerud, Oslo.	L. R. N. = L. R. Natvig, Oslo.
Bgtm. = Simon Bengtsson, Sweden.	O. O. = O. Olstad, Oslo.
H. B. = Harald Borchgrevink, Oslo.	Å. R. = Aage Rygh, Oslo.
R. B. = Reidar Brekke, Trondheim.	U. S. = U. Saalas, Finland.
K. D. = Knut Dahl, Oslo.	W. M. S. = W. M. Schøyen, Oslo.
Etn. = A. E. Eaton, England.	H. S. = J. H. S. Siebke, Oslo.
A. E. = Arne Engeset, Oslo.	S. R. = Soot-Ryen, Tromsø.
L. E. = L. M. E. Esmark, Oslo.	J. S. S. = H. J. Sparre Schneider, Tromsø.
P. G. = Per Gullowsen, Oslo.	E. S. = Embrik Strand, Riga.
H. K. = H. Huitfeldt-Kaas, Oslo.	J. D. S. = Jacob D Sømme, Oslo.
F. J. = Fritz Jensen, Stavanger.	S. S. = Sven Sømme, Oslo.
E. K. = E. Kanervo, Finland.	Zett. = J. W. Zetterstedt, Sweden.
M. Lachl. = Mc. Lachlan, England.	

Sommerfeldt. = S. C. Sommerfeldt.
Sch. = Eduard Schoenemund: Bibl. No. 34.
Strøm. = H. Strøm.
Tiensuu. = Lauri Tiensuu, Finland.
Ulm. = Georg Ulmer: Bibl. No. 48.
Wallengren. = H. D. J. Wallengren, Sweden.

*Ephemera vulgata* LIN. 1746.

(Etn. pg. 59, pl. VIII 12 b. Sch. pg. 13 and 72. Ulm. pg. 5 and 6.)

Østfold: Idd, Mjær (S. S.), Hobøl, Hobølelven (S. S.).  
Akershus: Aker, Holmendammen (R. B.), Heggelivann (A. B.).  
Hedmark: Tynset, Savalen (S. S.). Opland: Lunner, Stryken  
(S. S.), Nord-Aurdal, Fagernes (Etn.). Buskerud: Ål, Skurdals-  
fjord (S. S.). S. Trøndelag: Hølonda, Malmsjøen (R. B.), Strinda,  
Lianvann (R. B.), Nidelv (R. B.), Jonsvann (R. B.).

*Leptophlebia marginata* LIN. 1767.

(Etn. pg. 93, pl. XI 17 a. Sch. pg. 51 and 94. Ulm. pg. 7 and 9.)

Østfold: Øymark, Gjølssjøen (E. S.). Akershus: Søndre  
Høland (Å. R.), Oslo, Skøyen (H. S.), Tøyen (H. S.), Aker, Heggeli-  
vann (A. B.). Opland: Lunner, Stryken (S. S.), Vang, Øylo (Etn.),  
Dovre (H. S.). Buskerud: Ål, Skurdalsfjord (S. S.). Telemark:  
Holla, Ulefoss (E. S.). Aust-Agder: Tromøy (S. S.). Rogal-  
land: Klepp, Jæren (F. J.), Høyland, Bråstein (F. J.). S. Trønde-  
lag: Orkland, Hemnekjølen (R. B.). N. Trøndelag: Sparbu, Stein-  
kjerelven (R. B.), Foldereid, Flisingen (S. R.). Nordland:  
Hamarøy (E. S.), Lødingen (E. S.). Troms: Målselv, Bjerkeng  
(J. S. S.), Balsfjord, Fjellfrøskvann (S. R.), Tromsø, Prestvann  
(S. R.). Finnmark: Kautokeino, Carasjjavre (S. R.), Kistrand,  
Jotkajavre (S. R.), Alta, Jesjjavre (S. R.).

***Leptophlebia vespertina* LIN. 1746.**

(L. Meyerii Etn. 1884) Etn. pg. 95, pl. XI 17 d. Sch. pg. 52 and 95. Ulm. pg. 8 and 9.)

Østfold: Idd, Mjær (S. S.), Hobøl, Hobøelven (S. S.). Akershus: Frogn, Langen (S. S.), Midtsjøvann (S. S.), Setskog, Setta (S. S.), Aker, Heggelivann (A. B.), Ullensaker (L. R. N.). Opland: Nord-Aurdal, Fagernes (Etn.), Vang, Øylo (Etn.), Østre Slidre, Stortjern (B. J.), Dovre, Avisjøen (H. K.). Buskerud: Ål, Skurdalsfjord (S. S.), Nore/Uvdal, Pålbufjord (S. S.). Telemark: Skien (E. S.). Aust-Agder: Søndeled, Eiksjø (S. S.). Sogn og Fjordane: Sogndal, Sogndalselven (K. D.). S. Trøndelag: Brekken, Brekkebygda (P. G.), Orkland, Hemne-kjølen (R. B.), Strinda, Lianvann (R. B.), Vikerauntjern (R. B.), Jonsvann (R. B.). Troms: Målselv, Bjerkeng (S. R.), Målselven (S. R.), Balsfjord, Fjellfrøskvann (S. R.), Tromsøysund, Fagernes (S. R.). Finnmark: Kautokeino, Carasjvare (S. R.), Ki-strand, Jotkajavre (S. R.), Alta, Romsdal (S. R.), Bosekop (Zett.).

***Paraleptophlebia Strandii* ETN. 1901.**

(The Entomologist's Magazine, October 1901. Etn. pg. 253.)

Opland: Birisjøen (O. O.), Nord-Fron, Vinstra (Å. R.). Buskerud: Ål (E. S.). S. Trøndelag: Singsås, Kotsøy (R. B.), Orkland, Hemne-kjølen (R. B.), Hølonda, Ånøya (R. B.). N. Trøndelag: Rørvik, Vægtjern (R. B.).

***Paraleptophlebia cincta* RETZ. 1783.**

(Etn. pg. 95. Sch. pg. 49 and 95. Ulm. pg. 10.)

Akershus: Oslo, Frognerelv (L. E.). Opland: Lunner, Hakadalselv (S. S.). Buskerud: Tunhovd, Røungelv (S. S.). S. Trøndelag: Opdal, Kongsvoll (W. M. S.).

***Paraleptophlebia tumida* BGTN. 1930.**

(Bgt. Tromsø Museums årshäfte (Vol. 51, 1928, nr. 2) 1930.)

Troms: Øvrebygd (S. R.), Balsfjord, Fjellfrøskvann (S. R.), Målselv, Solvang (S. R.).

***Ephemorella torrentium* BGTN. 1917.**

(Bgt. 1917, pg. 178.)

S. Trøndelag: Orkland, Hemne-kjølen (R. B.), Hølonda, Malmsjøen (R. B.), Strinda, Nidelven (R. B.).

***Chitonophora Aurivillii* BGTN. 1909.**

(Bgt. 1909, pg. 6—9, 1930, pg. 3—8.)

Opland: Vestre Gausdal, Vinge (R. B.). Sogn og Fjordane: Lærdal, Lærdalsøra (Etn.). S. Trøndelag: Orkland, Orkla (H. K.), Strinda, Nidelven (R. B.). Troms: Øvrebygd, Frihetsli (S. R.), Balsfjord, Fjellfrøskvann (S. R.), Tromsøysund, Fagernes (S. R.). Finnmark: Kautokeino, Carasjvavre (S. R.), Kistrand, Fästningsstuen (S. R.), Jotkajavre (S. R.).

***Chitonophora mucronata* BGTN. 1909.**

(Bgt. 1909, pg. 6—9. 1930, pg. 3—8.)

S. Trøndelag: Orkland, Hemnekjølen (R. B.), Strinda, Nidelven (R. B.). Finnmark: Polmak, Alleknjarg (S. R.).

***Baetis vernalis* CURT. 1834.**

(Etn. pg. 161, pl. XVI 29 d. Sch. pg. 43. Ulm. pg. 19.)

Opland: Nord-Fron, Sjoa (O. O.). S. Trøndelag: Strinda Jonsvann (R. B.). Nordland: Hattfjelldal (Etn.). Finnmark: Hammerfest (Etn.).

***Baetis pumilus* BURM. 1839.**

((*Baetis muticus*. Lin.) Etn. pg. 166, pl. XVI 29 o. Sch. pg. 40. Ulm. pg. 18—19.)

Opland: V. Gausdal, Vinge (R. B.), Ringeby, Ringebyfjellene (O. M.). Hordaland: Vossestrand, Opheim (Etn.). S. Trøndelag: Strinda, Nidelv (R. B.). Nordland: Sørfold, Djupvik (S. R.). Finnmark: Karasjok (S. R.).

***Baetis Wallengreni* BGTN. 1912.**

(Bgt. 1912, pg. 112.)

Buskerud: Hol, Hardangervidda (A. B.). S. Trøndelag: Strinda, Nidelven (R. B.). Troms: Øvrebygd, Lille Ruostavann (S. R.), Bardu, Gjerdnevan (S. R.), Tromsøysund, Fagernes (S. R.), Tromsø (S. R.). Finnmark: Kistrand, Jotkajavre (S. R.).

***Baetis rhodani* PICT. 1843—45.**

(Etn. pg. 161, pl. XVI and LXIV 12. Sch. pg. 41. Ulm. pg. 21.)

Opland: Nord-Aurdal, Fagernes (Etn.). Sogn og Fjordane: Lærdal, Lærdalsøra (E. S.). Finnmark: Kvænangen, Nordreisa (E. S.), Sopnes (E. S.).

*Baetis tenax* ETN. 1870.

(Etn. pg. 164, pl. LXIV 16. Sch. pg. 43. Ulm. pg. 20.)

Finnmark: Karasjok, Ravnastuen (S. R.), Kistrand, Jotkajavre (S. R.), Skoganvarre (S. R.).

*Baetis gemellus* ETN. 1885.

(Etn. pg. 163. Sch. pg. 43. Ulm. pg. 21.)

Buskerud: Uvdal, Hardangervidda (A. B.). Sogn og Fjordane: Jølster, Jølstervann (H. K.).

*Baetis subalpinus* BGTN. 1917.

(Bgtn. 1917, pg. 187.)

S. Trøndelag: Orkland, Hemnekjølen? (R. B.). Finnmark: Sydvaranger, Bugnæs (U. S. leg. Tiensuu det.).

*Baetis bioculatus* LIN. 1736.

(Etn. pg. 158. Sch. pg. 44 and 90. Ulm. pg. 20.)

S. Trøndelag: Orkland, Hemnekjølen (R. B.). Finnmark: Sørøysund, Langvannet (S. S.).

*Acentrella lapponica* BGTN. 1912.

(Bgtn. 1912, pg. 110—111. Bgtn. 1913, pg. 300.)

Opland: Nord-Fron, N. Sjudalsvann (O. O.). Troms: Øvrebygd, Frihetsli (S. R.), Tromsøysund, Fagerfjell (S. R.). Finnmark: Kistrand, Jotkajavre (S. R.), Alta, Bojobäske (S. R.), Kvænangen, Nordreisa (E. S.), Sydvaranger, Bugnæs (U. S. leg. Tiensuu det.).

*Centroptilum luteolum* MÜLL. 1776.

(Etn. pg. 175, pl. XVII 30 a. Sch. pg. 45 and 91. Ulm. pg. 21.)

Østfold: Hobøl, Hobølelven (S. S.). Akershus: Bærum (H. B.). Hedmark: Ytre Rendal, Lomnessjøen (S. S.), Tynset, Savalen (S. S.). Opland: Lunner, Bislingen (S. S.). Vest-Agder: Grindheim (Etn.). S. Trøndelag: Brekken, Brekkebygd (P. G.), Hølonda, Ånøya (R. B.), Strinda, Nidelven (R. B.). Troms: Målselv, Bjerkeng (S. R.), Balsfjord, Fjellfrøskvann (S. R.). Finnmark: Alta, Jesjjavre (S. R.).

*Cloeon dipterum* LIN.-BGTN.

(Etn. pg. 182. Bgtn. 1914, pg. 213. Sch. pg. 46 and 91. Ulm. pg. 22.)

Akershus: Ullensaker, Kløfta (L. R. N.). Hedmark: Stange, Ottestad (S. S.). Buskerud: Lier, Nykirke (L. R. N.). Vestfold: Larvik (K. D.). Telemark: Bamble, Nysteintjern (S. S.), Fyresdal, Mjågåvann (A. E.). Aust-Agder: Tromøy (S. S.), Søndeled, Skarstølvann (S. S.), Eiksjø (S. S.), Skarvann (S. S.), Auslandsvann (S. S.). Rogaland: Time, Frøylandsvann (J. D. S.). S. Trøndelag: Leinstrand, Nypantjern (R. B.), Strinda, Lianvann (R. B.).

*Cloeon inscriptum* BGTN. 1914.

(Bgtn. 1914, pg. 215. Sch. pg. 47. Ulm. pg. 23.)

Hedmark: Åmot Ø., Rena (L. R. N.). Vestfold: Tønsberg, Akervann (S. S.). Aust-Agder: Tromøy (S. S.). S. Trøndelag: Leinstrand, Nypantjern (R. B.).

*Cloeon praetextum* BGTN. 1914.

(Bgtn. 1914, pg. 217. Sch. pg. 48. Ulm. pg. 23.)

Østfold: Fredrikstad, Kongsten (S. S.), Øymark, Kolbjørnsviksjøen (S. S.). Akershus: Drøbak (L. R. N.), Oslo (L. R. N.), Sørum, Mo gård (L. R. N.), Ullensaker, Kløfta (L. R. N.). Opland: Lunner, Stryken (S. S.), Skjåk, Nordberg (L. R. N.). Buskerud: Ytre Sandsvær, Vittingfoss (L. R. N.), Øvre Eiker, Vestfossen (L. R. N.), Lier, Nykirke (L. R. N.). Vestfold: Larvik (L. R. N.), Hedrum, Farriskilen (L. R. N.). Aust-Agder: Tromøy (S. S.). Hordaland: Voss, Melsvannet (L. R. N.). Møre og Romsdal: Venge gård (L. R. N.). S. Trøndelag: Orkland, Hemnekjølen (R. B.), Strinda, Nidelven (R. B.). N. Trøndelag: Skogn, Movann (R. B.). Finnmark: Kautokeino (Zett.).

*Procloeon bifidum* BGTN. 1912.

(Bgtn. 1912, pg. 109 and 1914, pg. 218. Sch. pg. 48 and 92. Ulm. pg. 23.)

Akershus: Drøbak (L. R. N.). Hedmark: Ytre Rendal, Storsjøen (S. S.). S. Trøndelag: Strinda, Nidelven (R. B.).

*Parameletus chelifer* BGTN. 1908.

(Bgtn. 1908, pg. 242; 1909, pg. 13—15; 1930, pg. 13—17.)

Opland: Jerkin (W. M. S.), Jotunheimen (E. Widmark). Buskerud: Uvdal, Hardangervidda (A. B.). Finnmark: Kara-

sjok (J. S. S.), Kistrand, Fästningsstuen (S. R.), Jotkajavre (S. R.), Alta, Bojobäske (S. R.).

*Parameletus minor* BGTN. 1909.

(Bgt. 1909, pg. 15—16; 1930, pg. 13—17.)

Finnmark: Karasjok (J. S. S.).

*Metretopus borealis* ETN.

syn.: *Heptagenia borealis* Etn. 1871, *Rhithrogena borealis* Etn. 1885, *Metretopus norwegicus* Etn. 1901.

(Etn. Trans. Entomol. Soc. 1871; Etn. 1885, pg. 255; Etn. monthly mag. 1901, pg. 154.)

Hedmark: Trysil, Osensjøen (S. S.). Buskerud: Ål (E. S.). S. Trøndelag: Singsås, Kotsøy (R. B.), Orkland, Hemnekjølen (R. B.). Troms: Øvrebygd (S. R.). Finnmark: Kistrand, Ravnastuen (S. R.), Skoganvarre (S. R.), Kautokeino, Karesuando (Chapman).

*Metretopus alter* BGTN. 1928.

(Bgt. 1928, Tromsø Museums årshäfte (vol. 51, nr. 2, pg. 15).)

Troms: Øvrebygd, Råvann (S. R.).

*Heptagenia sulphurea* MÜLL. 1776.

(Etn. pg. 268, pl. XXIV 45. Sch. pg. 28 and 80. Ulm. pg. 29.)

Akershus: Tøyen (H. S.), Frogner (L. E.). Buskerud: Ål (E. S.). Rogaland: Klepp, Vassvik (F. J.). Hordaland: Vossestrand, Opheim (Etn.). S. Trøndelag: Brekken, Brekkebygd (P. G.), Singsås, Kotsøy (R. B.), Orkland, Orkla (K. D.), Hemnekjølen (R. B.), Hølonda, Anøya (R. B.), Rissa, Skauga (R. B.).

*Heptagenia dalecarlica* BGTN. 1912.

(Bgt. 1912, pg. 116.)

Akershus: Fet (H. S.), Aker, Heggelivann (A. B.). Hedmark: Sollia, Atnaoset (R. B.). Opland: Biri, Birisjøen (O. O.), V. Gausdal, Vinge (R. B.), Nord-Fron, Vinstra (Å. R.). Buskerud: Modum (H. S.). S. Trøndelag: Orkland, Hemnekjølen (R. B.), Strinda, Nidelven (R. B.). Troms: Øvrebygd, Frihetsli (S. R.), Balsfjord, Fjellfrøskvann (S. R.). Finnmark: Kautokeino (Zett.), Polmak (S. R.), Kistrand, Jotkajavre (S. R.), Alta, Bosekop (S. R.).

*Edyonurus fusco-griseus* RETZ. 1783.

(Etn. pg. 291. Sch. pg. 25 and 79. Ulm. pg. 33.)

Østfold: Idd, Hobølelven (S. S.). Akershus: Ullensaker (W. M. S.). Hedmark: Kongsvinger (L. R. N.). Opland: Lunner, Stryken (S. S.). S. Trøndelag: Orkland, Orkla (S. S.), Strinda, Jonsvann (R. B.). N. Trøndelag: Steinkjer (R. B.).

*Ecdyonurus joernensis* BGTN. 1909.

(Bgt. 1909, pg. 19.)

Akershus: Frogner (L. E.). Hedmark: Sollia, Atnaoset (R. B.). S. Trøndelag: Singsås, Kotsøy (R. B.), Orkland, Hemne-kjølen (R. B.), Hølonda, Ånøya (R. B.), Strinda, Nidelven (R. B.). Troms: Balsfjord, Fjellfrøskvann (S. R.).

*Arthroplea congener* BGTN. 1908.

(Bgt. 1908, pg. 239; 1930, pg. 41.)

Østfold: Idd, Mjær (S. S.). Akershus: Ås, Ski (S. S.). Hedmark: Trysil, Osensjøen (S. S.). Buskerud: Rollag, Tråen (L. R. N.). S. Trøndelag: Strinda, Liantjern (R. B.), Vikerauntjern (R. B.).

*Caenis horaria* LIN. 1736.

(Etn. pg. 142, pl. XV 26. Sch. pg. 61 and 101. Ulm. pg. 15—17.)

S. Trøndelag: Orkland, Hemnekjølen (R. B.), Hølonda, Malmsjøen (R. B.).

*Caenis moesta* BGTN. 1917.

(Bgt. 1917, pg. 182.)

Østfold: Hobøl, Hobølelven (S. S.).

*Siphonurus aestivalis* ETN. 1902.

(Etn. Entomologist's Monthly Magazine 1903, pg. 30. Sch. pg. 35 and 86. Ulm. pg. 26—27. Lestage 1919, pg. 164.)

Østfold: Idd, Mjær (S. S.). Akershus: Sørumselva (Etn.). Opland: Lunner, Stryken (S. S.), Nordre Fron, Sikkilsdal (H. K.), Østre Slidre, Vassbotn (B. J.), Fokstua (H. S.). Buskerud: Rollag, Tråen (L. R. N.), Nore/Uvdal, Pålbufjord (S. S.), Ål, Skurdalsfjord (S. S.). S. Trøndelag: Brekken, Brekkebygda (P. G.), Kongsvoll (W. M. S.), Orkland, Hemnekjølen (R. B.). Troms: Målselv, Bjerkeng (S. R.), Råvann (S. R.). Finnmark: Kauto-

keino, Carasjjavre (S. R.), Kistrand, Jotkajavre (S. R.), Fästningsstuen (S. R.), Levnasjavre (S. R.).

*Siphonurus Zetterstedti* BGTN. 1903.<sup>1</sup>

(Bgt. 1903, pg. 131; 1909, pg. 9—10; 1917, pg. 189; 1930, pg. 11—12.)

Opland: V. Gausdal, Haugaseterbekk (O. M.), Østre Slidre, Solskinnstjern (B. J.), Uvdal, Ossjøen (S. S.), Dovre, Fokstua (F. J.). Buskerud: Hallingdal, Nes (H. S.), Hønefoss (H. S.). S. Trøndelag: Singsås, Kotsøy (R. B.), Orkland, Hemnekjølen (R. B.), Strinda, Jonsvann (R. B.). Troms: Øvrebygd, Frihetsli (S. R.). Finnmark: Kistrand, Jotkajavre (S. R.), Fästningsstuen (S. R.), Skoganvarre (S. R.), Alta, Bojobäske (S. R.), Sørøysund (S. R.).

*Siphurella Linnaeana* ETN.-BGTN.

(Etn. *Siphurus Linnaeanus*. Etn. pg. 217. Bgt. 1909, pg. 11—12; 1930, pg. 8—11. Sch. pg. 36 and 87. Ulm. pg. 26. Lestage 1924, pg. 47—53.)

Østfold: Hobøl, Hobøelven (S. S.). Akershus: Tøyen (H. S.). Hedmark: Kongsvinger (L. R. N.), Brandval, Nuguren (S. S.), Trysil, Osensjøen (S. S.), Ytre Rendal, Storsjøen (S. S.), Øvre Rendal (S. S.). Opland: Nord-Aurdal, Fagernes (H. S.), N. Land (H. S.), V. Gausdal, Forundringstjern (L. R. N.), Dovre (H. S.). Buskerud: Øvre Sandsvær/Kongsberg (L. R. N.), Nore/Uvdal, Pålbufjord (S. S.), Ål, Skurdalsfjord (S. S.). Vestfold: Tønsberg, Gjennestadvann (S. S.). Telemark: Bamble, Nysteintjern (S. S.). Aust-Agder: Arendal, Molandsvann (S. S.), Risør, Lunntjern (S. S.), Søndeled, Auslandsvann (K. D.), Bygland, Jordellsvann (S. S.). Rogaland: Suldal, Lundegård (L. R. N.). S. Trøndelag: Orkland, Hemnekjølen (R. B.). Nordland: Hattfjelldal (E. S.).

*Ameletus inopinatus* ETN. 1887.

(Etn. pg. 307, pl. LXV 13. Sch. pg. 38 and 89. Ulm. pg. 27.)

Opland: Vang, Nystuen (Etn.), Nord-Fron, N. Sjødalsvann (O. O.). Rogaland: Klepp, Reve (F. J.), Jæren (F. J.). S. Trøndelag: Strinda, Nidelven (R. B.). Nordland: Hattfjelldal (E. S.). Troms: Øvrebygd, Dividal (S. R.), Lille Ruostavann (S. R.), Frihetsli (S. R.), Målselv, Nordnes (S. R.). Finnmark: Kautokeino, Carasjjavre (S. R.), Kistrand, Lakselv (S. R.), Fästningsstuen (S. R.), Jotkajavre (S. R.), Alta, Bojobäske (S. R.), Tsävdne (S. R.).

<sup>1</sup> By Petersen, Ulmer and Lestage declared syn.: *S. lacustris*.

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