

A CHECKLIST OF THE EPHEMEROPTERA OF NORTH AMERICA NORTH OF MEXICO

GEORGE F. EDMUNDS, JR. AND RICHARD K. ALLEN¹
University of Utah, Salt Lake City, Utah

The publication in 1935 of "The Biology of Mayflies" by J. G. Needham, J. R. Traver, and Yin-chi Hsu gave considerable impetus to the study of the North American mayfly fauna. The extensive researches on Ephemeroptera during the last twenty years have largely out-dated the checklist provided therein by Dr. Traver's monograph of the North American species. Many additional species have been described and some European species are now known to occur in North America. Some new genera have been described and others added to the known Nearctic fauna. The list of species has been reduced by a number of new synonymies and the placement of some as subspecies of other species. Other changes are a result of the transfer of species from one genus to another, and a rearrangement of higher categories to follow the system proposed by Edmunds and Traver (1954).

A few names have been included in the past in the North American checklist in the hope that they might be eventually correctly applied. In the few cases where we feel that there is no chance of positively applying these names we are indicating them as *nomina dubia*, with the intent of having the names suppressed later as provided for in the Copenhagen decisions of the International Commission of Zoological Nomenclature. Those names which we think can not be applied are *Ephemera noveboracana* Lichtenstein (1796), *Callibaetis hageni* Eaton (1885), *Ephemerella unicornis* Needham (1905), *Cloe quebecensis* Provancher (1876), *Ephemerella consimilis* Walsh (1862), and *Palingenia puella* Pictet (1843), and we declare these *nomina dubia* for the following reasons.

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Ephemera noveboracana Lichtenstein was apparently the first mayfly described from North America, but its authorship has been credited to Hagen (1862). Mr. D. E. Kimmins has examined the copy of Lichtenstein's paper at the British Museum and has informed us (*in litt.*) that Lichtenstein's name is available as of that date. The name has been regarded heretofore as a junior synonym of *Siphonurus luridipennis* (Burmeister, 1839), but it is actually prior to this name when it is credited to Lichtenstein's authorship. The species before Lichtenstein is unidentifiable from the description, no type is known to exist, and even the placement of this as a *Siphonurus* is extremely uncertain. *Callibaetis hageni* Eaton (*Baetis tessellatus* Hagen not Walker) never can be identified with certainty from the type subimago female. It is probable that Eaton's (1885) description applies to the species known as *Callibaetis carolus* Traver, but whether this is true of the type is uncertain. *Ephemerella unicornis* Needham may be the senior synonym of *E. simplex* McDunnough, but even by comparing fresh material from the type area with the type Burks (1953) was unable to place *E. unicornis* with any confidence. *Cloe quebecensis* Provancher is identifiable only to the genus *Ephemerella* from the female type (See Burks, 1953: 58) and also should be placed as a *nomen dubium*. *Ephemerella consimilis* Walsh is not recognizable from the original description and none of Walsh's specimens of this species are known to exist (See Burks, *op. cit.*: 57). According to Burks (*op. cit.*: 28) *Palingenia puella* (now *Tortopus puella*) can probably never be identified with certainty. The type has not, so far as is known, been located and compared with recently collected material, and the original description is not adequate.

During the compilation of this checklist we have been faced many times with conflicting taxonomic opinions. In many cases our own

experiences with the taxonomy of the forms has influenced our decisions, but generally we have followed the opinion of the last reviser.

We have included in the bibliography only those papers published since or not included in *The Biology of Mayflies*.

Superfamily HEPTAGENIOIDEA

Family Siphonuridae

Subfamily Siphonurinae

- AMELETUS Eaton, 1885: 210.
 aequivocus McDunnough, 1934: 164.
 alticolus McDunnough, 1934: 163.
 amator Mayo, 1939: 149.
 browni McDunnough, 1933: 278.
 celer McDunnough, 1934: 161.
 celeroides McDunnough, 1934: 162.
 connectina McDunnough, 1939: 50.
 connectus McDunnough, 1936: 209.
 cooki McDunnough, 1929: 174.
 dissitus Eaton, 1885: 210.
 exquisitus Eaton, 1885: 212.
 facilis Day, 1952: 24.
 falsus McDunnough, 1938: 30.
 imbellis Day, 1952: 23.
 lineatus Traver, 1932: 194.
 ludens Needham, 1905: 36.
 monta Mayo, 1952: 93.
 oregonensis McDunnough, 1933: 157.
 querulus McDunnough, 1938: 29.
 shepherdii Traver, 1934: 238.
 similior McDunnough, 1928: 9.
 sparsatus McDunnough, 1931: 89.
 subnotatus Eaton, 1885: 211.
 suffusus McDunnough, 1936: 210.
 tertius McDunnough, 1938: 27.
 tuberculatus McDunnough, 1939: 50.
 validus McDunnough, 1923: 50.
 vancouverensis McDunnough, 1933: 157.
 velox Dodds, 1923: 105.
 vernalis McDunnough, 1924: 115.
- EDMUNDSIUS Day, 1953: 19.
 agilis Day, 1953: 22.
- ACANTHAMETROPUS Tshernova, 1948: 1453 (= *Metreturus* Burks, 1953: 146, *New synonymy*).
 pecatonica Burks, 1953: 147, *New combination*.
- PARAMELETUS Bengtsson, 1908: 242.
 chelifer Bengtsson, 1908: 242.
 columbiae McDunnough, 1938: 31.
 croesus (McDunnough, 1923: 48).
 midas (McDunnough, 1923: 49).
- SIPHONISCA Needham, 1909: 72.
 aerodromia Needham, 1909: 72.
- SIPHONURUS Eaton, 1868: 89.
 alternatus (Say, 1824: 304).
annulata Walker, 1853: 567.
 autumnalis McDunnough, 1931: 89.
 barbaroides McDunnough, 1929: 174.
 barbarus McDunnough, 1924: 225.
 columbianus McDunnough, 1925: 187.
 decorus Traver, 1932: 182.
 inflatus McDunnough, 1931: 90.
 luridipennis (Burmeister, 1839: 801).
 marginatus Traver, 1932: 179.
 marshalli Traver, 1934: 236.
 mirus Eaton, 1885: 221.
 noveboracana Lichtenstein, 1796: III, 193, 52. *nomen dubium*.

- occidentalis Eaton, 1885: 218.
 phyllis McDunnough, 1923: 49.
 quebecensis (Provancher, 1878: 127).
triangularis Clemens, 1915: 250.
 rapidus McDunnough, 1924: 75.
 securifer McDunnough, 1926: 301.
 spectabilis Traver, 1934: 233.
maria Mayo, 1939: 145.
 typicus Eaton, 1885: 222.
berenice McDunnough, 1923: 49.
novangliae McDunnough, 1924: 75.

Subfamily Isonychiinae

- ISONYCHIA Eaton, 1871: 134.
 annulata Traver, 1932: 204.
 arida (Say, 1839: 42).
 aurea Traver, 1932: 224.
 bicolor (Walker, 1853: 552).
albomanicatus (Needham, 1905: 31).
 christina Traver, 1934: 240.
 circe Traver, 1934: 242.
 diversa Traver, 1934: 244.
 fattigi Traver, 1934: 245.
 georgiae McDunnough, 1931: 159.
 harperi Traver, 1934: 246.
 intermedia (Eaton, 1885: 207).
 matilda Traver, 1934: 248.
 notata Traver, 1932: 210.
 obscura Traver, 1932: 217.
 pacoleta Traver, 1932: 218.
 pictipes Traver, 1934: 250.
 rufa McDunnough, 1931: 162.
 sadleri Traver, 1934: 251.
 sayi Burks, 1953: 110.
 serrata Traver, 1932: 222.
 sicca campestris McDunnough, 1931: 161.
 sicca manca Eaton, 1871: 134.
 sicca sicca (Walsh, 1862: 371).
 similis Traver, 1932: 213.
 thalia Traver, 1934: 253.
 tusculanensis Berner, 1948: 117.
 velma Needham, 1932: 273.

Family Oligoneuriidae

Subfamily Oligoneuriinae

- HOMOBONEURIA Eaton, 1881: 192.
 ammophila (Spieth, 1938: 1), *New combination*
 LACHLANIA Hagen, 1868: 373.
 powelli Edmunds, 1951: 327.
 saskatchewanensis Ide, 1941: 154.

Family Heptageniidae

Subfamily Heptageniinae

- ANEPEORUS McDunnough, 1925: 190.
 rusticus McDunnough, 1925: 190.
 simplex (Walsh, 1863: 204).
- ARTHROPLEA BENGTSSON, 1908: 239.
 bipunctata (McDunnough, 1924: 76).
- CINYGMA Eaton, 1885: 247.
 dimicki McDunnough, 1934: 182.
 integrum Eaton, 1885: 248.
 lyriformis (McDunnough, 1924: 226).
- CINYGMULA McDunnough, 1933: 75.
 confusa (McDunnough, 1924: 131).
 gartrelli McDunnough, 1934: 182.
 kootenai McDunnough, 1943: 3.
 mimus (Eaton, 1885: 249).
 par (Eaton, 1885: 249).
hyalina McDunnough, 1924: 132, *New synonymy*.
 ramaleyi (Dodds, 1932: 101).
tollandi (Dodds, 1923: 109).
 reticulata McDunnough, 1934: 184.
 subaequalis (Banks, 1914: 615).
atlantica (McDunnough, 1924: 131), *New synonymy*.

- tarda* (McDunnough, 1929: 178).
tioga Mayo, 1952: 184.
uniformis McDunnough, 1934: 183.
- EPEORUS** EATON, 1881: 26.
 sg. *IRON* Eaton, 1883: pl. 24, fig. 44.
albertae McDunnough, 1924: 129.
 youngi Traver, 1935: 412.
deceptivus (McDunnough, 1924: 132).
dispar Traver, 1933: 161.
dulciana McDunnough, 1935: 103.
fragilis Morgan, 1911: 104.
 tenius Traver, 1935: 412.
frisoni Burks, 1946: 608.
hesperus (Banks, 1924: 424).
 sancta-gabriel Traver, 1935: 410, *New synonymy*.
langunitas Traver, 1935: 405.
longimanus (Eaton, 1885: 245).
 proprius Traver, 1935: 408.
namatus Burks, 1946: 607.
pleuralis (Banks, 1910: 201).
 fraudator Traver, 1935: 402.
 confusus Traver, 1935: 398.
punctatus McDunnough, 1925: 189.
rubidus Traver, 1933: 158.
subpallidus Traver, 1937: 54.
suffusus McDunnough, 1925: 189.
vitrea (Walker, 1853: 555).
 humeralis Morgan, 1911: 105.
 sg. *IRONODES* Traver, 1935: 32.
arctus Traver, 1935: 33.
californicus (Banks, 1910: 202).
flavipennis Traver, 1935: 33.
geminatus (Eaton, 1885: 250).
lepidus Traver, 1935: 35.
nitidus (Eaton, 1885: 246).
 sg. *IRONOPSIS* Traver, 1935: 36.
grandis (McDunnough, 1924: 130).
permagnus Traver, 1935: 37.
- HEPTAGENIA** Walsh, 1863: 197.
adaequata McDunnough, 1924: 120.
aphrodite McDunnough, 1926: 194.
criddlei McDunnough, 1927: 261.
cruentata Walsh, 1863: 205.
 reversalis McDunnough, 1924: 118.
diabasia Burks, 1946: 610.
dolosa Traver, 1935: 344.
elegantula (Eaton, 1885: 253).
 coxalis Banks, 1914: 615.
 querula McDunnough, 1924: 119.
flavescens (Walsh, 1862: 373).
hebe McDunnough, 1924: 122.
horrida McDunnough, 1926: 301.
inconspicua McDunnough, 1924: 118.
julia Traver, 1933: 149.
juno McDunnough, 1924: 121.
kennedyi McDunnough, 1924: 225.
lucidipennis (Clemens, 1913: 329).
maculipennis Walsh, 1863: 206.
manifesta (Eaton, 1885: 253).
marginalis Banks, 1910: 198.
minerva McDunnough, 1924: 121.
otiosa McDunnough, 1935: 104.
patoka Burks, 1946: 612.
perifida McDunnough, 1926: 301.
persimplex McDunnough, 1929: 179.
pulla (Clemens, 1913: 330).
rodocki Traver, 1935: 357.
rosea Traver, 1935: 358.
 rubroventris Traver, 1935: 359.
rusticalis McDunnough, 1931: 92.
simplicioides McDunnough, 1924: 120.
solitaria McDunnough, 1924: 119.
spinosa Traver, 1933: 153.
thetis Traver, 1935: 362.
townesi Traver, 1935: 363.
- unbratica* McDunnough, 1931: 92.
walshi McDunnough, 1926: 193.
- RHITHROGENA** Eaton, 1881: 23.
amica Traver, 1935: 373.
anomala McDunnough, 1928: 239.
brunnea (Hagen, 1875: 581).
 hageni Eaton, 1885: 253.
brunneotincta McDunnough, 1933: 280.
decora Day, 1954: 19.
doddsi McDunnough, 1926: 196.
exilis Traver, 1933: 166.
fasciata Traver, 1933: 170.
flavianula (McDunnough, 1924: 225).
fuscifrons Traver, 1933: 168.
futilis McDunnough, 1934: 187.
gaspeensis McDunnough, 1933: 279.
impersonata (McDunnough, 1925: 191).
jejuna Eaton, 1885: 252.
 fusca (Walker, 1853: 568), not Burmeister, 1839: 800.
morrisoni (Banks, 1924: 424).
pellucida Daggy, 1945: 333.
petulans (Seemann, 1927: 42).
robusta Dodds, 1923: 103.
rubicunda Traver, 1937: 46.
sanguinea Ide, 1954: 349.
uhari Traver, 1933: 165.
undulata (Banks, 1924: 425).
virilis McDunnough, 1934: 187.
- STENONEMA** Traver, 1933: 173.
alabamiae Traver, 1937: 79.
annexum Traver, 1933: 179.
areion Burks, 1953: 163.
ares Burks, 1953: 170.
bipunctatum (McDunnough, 1926: 191).
candidum Traver, 1935: 308.
carolina (Banks, 1914: 616).
exiguum Traver, 1933: 201.
femorum femorum (Say, 1823: 162).
femorum scitulum Traver, 1935: 330.
femorum tripunctatum (Banks, 1910: 199).
 birdi Traver, 1935: 306.
fuscum (Clemens, 1913: 254).
gildersleevei Traver, 1935: 315.
integrum (McDunnough, 1924: 9).
 bellum Traver, 1933: 202.
 wabasha Daggy, 1945: 378.
interpunctatum canadense (Walker, 1853: 569).
 ohioense Traver, 1935: 322.
interpunctatum frontale (Banks, 1910: 199).
 conjunctum Traver, 1935: 309.
 majus Traver, 1935: 320.
 proximum Traver, 1935: 325.
interpunctatum heterotarsale McDunnough, 1933: 42.
interpunctatum interpunctatum (Say, 1839: 41).
 affine Traver, 1933: 184.
 flaveola Pictet, 1843: 186.
 pallidum Traver, 1933: 181.
ithaca (Clemens and Leonard, 1925: 17).
lepton Burks, 1946: 614.
luteum (Clemens, 1913: 252).
mediopunctatum (McDunnough, 1926: 191).
metriotes Burks, 1953: 174.
minnetonka Daggy, 1945: 376.
modestum (Banks, 1910: 202).
nepotellum McDunnough, 1933: 20.
puadicum (Hagen, 1861: 39).
pulchellum (Walsh, 1862: 375).
rubromaculatum (Clemens, 1913: 256).
rubrum (McDunnough, 1926: 192).
smithae Traver, 1937: 77.
terminatum (Walsh, 1862: 376).
 placita Banks, 1910: 199).
varium Traver, 1933: 192.
vicarium (Walker, 1853: 565).
 tesselata (Walker, 1853: 566).
 rivulicolus (McDunnough, 1933: 40).

Subfamily **Pseudironinae**

- PSEUDIRON McDunnough, 1931: 91.
 centralis McDunnough, 1931: 91.
 meridionalis Traver, 1935: 437.

Family **Ametropodidae**Subfamily **Ametropodinae**

- AMETROPUS Albarda, 1878: 129.
 albrighti Traver, 1935: 431.
 neavei McDunnough, 1928: 9.

Subfamily **Metretopodinae**

- METRETOPUS Eaton, 1901: 253.
 borealis Eaton, 1871: 137.
 norvegicus Eaton, 1901: 254.

SIPHOPLECTON Clemens, 1915: 258.

- basale (Walker, 1853: 565).
 flexus (Clemens, 1913: 338).
 costalense Spieth, 1938: 1.
 interlineatum (Walsh, 1863: 190).
 signatum Traver, 1932: 186.
 speciosum Traver, 1932: 191.

Family **Baetidae**Subfamily **Baetinae**

APOBAETIS Day, 1955: 126.

- indepressus Day, 1955: 127.

BAETIS Leach, 1815: 137.

- adonis Traver, 1935: 680.
 akataleptos McDunnough, 1926: 188.
 alius Day, 1954: 32.
 amplius (Traver, 1932: 233).
 anachris Burks, 1953: 133.
 australis Traver, 1932: 230.
 baeticatus Burks, 1953: 129.
 bicaudatus Dodds, 1923: 110.
 minimus Dodds, 1923: 113, *New synonymy*.
 brunneicolor McDunnough, 1925: 173.
 cingulatus McDunnough, 1925: 216.
 cleptis Burks, 1953: 130.
 curiosus (McDunnough, 1923: 43).
 devinctus Traver, 1935: 684.
 diablus Day, 1954: 30.
 elachistus Burks, 1953: 127.
 endymion Traver, 1935: 686.
 ephippiatus Traver, 1935: 687.
 erebus Traver, 1935: 687.
 flavistriga McDunnough, 1921: 120.
 foemina McDunnough, 1936: 33.
 frivolus McDunnough, 1925: 174.
 frondalis McDunnough, 1925: 173.
 harti McDunnough, 1924: 7.
 herodes Burks, 1953: 130.
 hiemalis Leonard, 1950: 155.
 hudsonicus Ide, 1937: 221.
 incertans McDunnough, 1925: 220.
 insignificans McDunnough, 1926: 300.
 intercalaris McDunnough, 1921: 118.
 lasallei Banks, 1924: 425.
 intermedius Dodds, 1923: 110.
 jesmondensis McDunnough, 1938: 25.
 lapponica (Bengtsson, 1912: 111).
 leechi Day, 1954: 29.
 levitans McDunnough, 1925: 216.
 macdunnoughi Ide, 1937: 230.
 moffati Dodds, 1923: 112.
 nanus McDunnough, 1923: 42.
 ochris Burks, 1953: 132.
 pallidulus McDunnough, 1924: 8.
 palisadi Mayo, 1952: 95.
 parallelus Banks, 1924: 425.

parvus Dodds, 1923: 113.

- persecuta McDunnough, 1939: 52.
 phoebus McDunnough, 1923: 41.
 phyllis Burks, 1953: 134.
 piscatoris Traver, 1935: 697.
 pluto McDunnough, 1925: 218.
 posticatus (Say, 1824: 162).
 propinquus (Walsh, 1863: 207).
 dardanus McDunnough, 1923: 41.
 pygmaeus (Hagen, 1861: 54).
 quilleri Dodds, 1923: 112.
 rusticans McDunnough, 1925: 217.
 spiethi Berner, 1940: 52.
 spinosus McDunnough, 1925: 174.
 sulfurosus Day, 1954: 33.
 thermophilos McDunnough, 1926: 188.
 tricaudatus Dodds, 1923: 111.
 unicolor (Hagen, 1861: 54).
 hageni Eaton, 1885: 169.
 vagans McDunnough, 1925: 219.

- BAETODES Needham and Murphy, 1924: 55.
 species?, Edmunds, 1950: 203.

CALLIBAETIS Eaton, 1881: 196.

- americanus Banks, 1900: 250.
 brevicostatus Daggy, 1945: 388.
 californicus Banks, 1900: 249.
 carolus Traver, 1935: 663.
 coloradensis Banks, 1900: 250.
 doddsi Traver, 1935: 664.
 vitrea Dodds, 1923: 100 not Navas, 1918: 81.
 ferrugineus (Walsh, 1862: 379).
 floridanus Banks, 1900: 249.
 fluctuans (Walsh, 1862: 379).
 fuscus Dodds, 1923: 100.
 hageni (Eaton, 1885: 192), *nomen dubium*.
 tessellata Hagen, 1861: 50 not Walker, 1853: 566.
 hebes Upholt, 1936: 120.
 montanus Eaton, 1885: 196.
 nigritus Banks, 1918: 12.
 claudiae Edmunds, 1945: 169, *nomen nudum*.
 pacificus Seemann, 1927: 49.
 pallidus Banks, 1900: 251.
 pictus (Eaton, 1871: 122).
 pretiosus Banks, 1914: 615.
 semicostatus Banks, 1914: 614.
 signatus Banks, 1918: 11.
 skokianus Needham, 1903: 215.
 traveriae Upholt, 1937: 86.

CENTROPILUM Eaton, 1869: 132.

- album McDunnough, 1926: 189.
 asperatum Traver, 1935: 708.
 bellum McDunnough, 1924: 96.
 bifurcatum McDunnough, 1924: 96.
 caliginosum McDunnough, 1925: 175.
 conturbatum McDunnough, 1929: 171.
 convexum Ide, 1930: 222.
 elsa Traver, 1935: 713.
 fragile McDunnough, 1923: 42.
 hobbsi Berner, 1946: 77.
 infrequens McDunnough, 1924: 98.
 intermediale McDunnough, 1931: 87.
 oreophilum Edmunds, 1954: 1.
 ozburni McDunnough, 1924: 97.
 quaesitum McDunnough, 1931: 87.
 rivulare Traver, 1935: 716.
 rufostrigatum McDunnough, 1924: 95.
 bistrigatum Daggy, 1945: 389.
 selanderorum Edmunds, 1954: 2.
 semirufum McDunnough, 1926: 189.
 simile McDunnough, 1924: 97.
 venosum Traver, 1935: 718.
 victoriae McDunnough, 1938: 27.
 viridocularis Berner, 1940: 39.
 walshi McDunnough, 1929: 173.

CLOEON Leach, 1815: 137.

- dipterum (Linnaeus, 1761: 377). (Adventive).
- implicatum McDunnough, 1924: 113.
- inatum McDunnough, 1924: 113.
- ingens McDunnough, 1923: 44.
- insignificans McDunnough, 1925: 186.
- mendax (Walsh, 1862: 381).
- minor McDunnough, 1926: 190.
- rubropictum McDunnough, 1923: 43.
- simplex McDunnough, 1925: 185.
- triangulifer McDunnough, 1931: 88.
- vicinum (Hagen, 1861: 54).

NEOCLOEON Traver, 1932: 365.

- alamance Traver, 1932: 367.

PARDACLOEODES Day, 1955: 121.

- abitus Day, 1955: 122.

PSEUDOCLOEON Klapalek, 1905: 105.

- alachua Berner, 1940: 58.
- anoka Daggy, 1945: 391.
- bimaculatus Berner, 1946: 79.
- carolina (Banks, 1924: 426).
- chlorops (McDunnough, 1923: 45).
- cingulatum McDunnough, 1931: 85.
- dubium (Walsh, 1862: 380).
- elliotti Daggy, 1945: 392.
- etowah Traver, 1935: 726.
- futile McDunnough, 1931: 86.
- ida Daggy, 1945: 393.
- minutum Daggy, 1945: 394.
- myrsum Burks, 1953: 139.
- parvulum McDunnough, 1932: 210.
- punctiventris (McDunnough, 1923: 45).
- rubrolaterale McDunnough, 1931: 86.
- turbidum McDunnough, 1924: 113.
- veteris McDunnough, 1924: 8.
- virile (McDunnough, 1923: 46).

Superfamily LEPTOPHLEBIOIDEA

Family Leptophlebiidae

Subfamily Leptophlebiinae

- CHOROTERPES Eaton 1881: 194.
- albiannulata McDunnough, 1924: 221.
- basalis (Banks, 1900: 248).
- ferruginea Traver, 1934: 205.
- fusca Spieth, 1938: 4.
- hubbelsi Berner, 1946: 65.
- inornata Eaton, 1892: 6.
- nanita Traver, 1934: 203.
- oklahoma Traver, 1934: 204.
- terratoma Seemann, 1927: 46.

HABROPHLEBIA Eaton, 1881: 195.

- pusilla Traver, 1932: 118.
- vibrans Needham, 1908: 192.
- jocosa Banks, 1914: 614.

HABROPHLEBIODES Ulmer, 1920: 39.

- americana (Banks, 1903: 235).
- betteni (Needham, 1908: 194).
- annulata Traver, 1934: 199.
- brunneipennis Berner, 1946: 61.

LEPTOPHLEBIA Westwood, 1840: 31.

- sg. LEPTOPHLEBIA, sensu strictu.
- johnsoni McDunnough, 1924: 73.
- gracilis (Traver, 1932: 133).
- sg. BLASTURUS Eaton, 1881: 193.
- austrina (Traver, 1932: 129).
- collina (Traver, 1932: 124).
- cupida (Say, 1823: 163).
- hebes (Walker, 1853: 538).
- concinna (Walker, 1853: 553).
- pallipes (Walker, 1853: 553).
- ignava (Hagen, 1861: 47).

- grandis (Traver, 1932: 127).
- gravastella (Eaton, 1884: 102).
- intermedia (Traver, 1932: 136).
- nebulosa (Walker, 1853: 554).
- odonatus (Walsh, 1862: 372).
- pacifica (McDunnough, 1933: 155).
- vibex (Traver, 1934: 197).

PARALEPTOPHLEBIA Lestage, 1917: 340.

- adoptiva (McDunnough, 1929: 169).
- assimilis (Banks, 1914: 614).
- associata (McDunnough, 1924: 221).
- compar Traver, 1934: 193.
- bicornuta (McDunnough, 1926: 299).
- bradleyi (Needham, 1932: 274).
- brunneipennis (McDunnough, 1924: 221).
- cachea Day, 1954: 22.
- californica Traver, 1934: 195.
- clara (McDunnough, 1933: 155).
- debilis (Walker, 1853: 569).
- separata (Ulmer, 1920: 27).
- falcula Traver, 1934: 190.
- georgiana Traver, 1934: 191.
- gregalis (Eaton, 1884: 98).
- invalida (McDunnough, 1926: 297).
- guttata (McDunnough, 1924: 95).
- helena Day, 1952: 17.
- heteronea (McDunnough, 1924: 93).
- jeanae Berner, 1955: 245.
- moerens (McDunnough, 1924: 94).
- mollis (Eaton, 1871: 88).
- ontario (McDunnough, 1926: 299).
- packi (Needham, 1927: 45).
- pallipes (Hagen, 1875: 582).
- memorialis (Eaton, 1884: 98).
- placerti Mayo, 1939: 152.
- praepedita (Eaton, 1884: 99).
- quisquilia Day, 1952: 21.
- rufivenosa (Eaton, 1884: 99).
- sculleni Traver, 1934: 189.
- sticta Burks, 1953: 92.
- strigula (McDunnough, 1932: 209).
- swannanoa (Traver, 1932: 113).
- temporalis (McDunnough, 1926: 297).
- vaciva (Eaton, 1884: 97).
- volitans (McDunnough, 1924: 95).
- zayante Day, 1952: 20.

THRAULODES Ulmer, 1920: 33.

- arizonicus McDunnough, 1942: 117.
- speciosus Traver, 1934: 201.

TRAVERELLA Edmunds, 1948: 141.

- albertana (McDunnough, 1931: 82).
- presidiana (Traver, 1934: 199).

Family Ephemerellidae

Subfamily Ephemerellinae

- EPHEMERELLA Walsh, 1862: 377.
- aestiva McDunnough, 1931: 64.
- alleghehiensis Traver, 1934: 221.
- argo Burks, 1949: 232.
- attenuata McDunnough, 1925: 42.
- aurivillii (Bengtsson, 1908: 243).
- aaromi Eaton, 1908: 149.
- norda McDunnough, 1924: 223.
- concinna Traver, 1934: 219.
- autumnalis McDunnough, 1934: 158.
- bicolor Clemens, 1913: 336.
- bicoloroides McDunnough, 1938: 23.
- catawba Traver, 1932: 153.
- cherokee Traver, 1937: 71.
- choctawhatchee Berner, 1946: 71.
- cognata Traver, 1934: 231.
- coloradensis Dodds, 1923: 97.
- columbiella McDunnough, 1935: 97.
- conestee Traver, 1932: 168.

consimilis Walsh, 1862: 378, *nomen dubium*.
 cornuta Morgan, 1911: 114.
 cornutella McDunnough, 1931: 82.
 coxalis McDunnough, 1926: 186.
 deficiens Morgan, 1911: 111.
 atrescens McDunnough, 1925: 43.
 delantala Mayo, 1952: 94.
 depressa Ide, 1930: 212.
 doddsi Needham, 1927: 111.
 doris Traver, 1934: 208.
 dorothea Needham, 1908: 190.
 euterpe Traver, 1934: 213.
 excrucians Walsh, 1862: 377.
 semiflava McDunnough, 1926: 300.
 flavilinea McDunnough, 1926: 188.
 flavitincta McDunnough, 1934: 155.
 fratercula McDunnough, 1925: 213.
 frisoni McDunnough, 1927: 10.
 funeralis McDunnough, 1925: 210.
 glacialis Traver, 1934: 207.
 glacialis carsona Day, 1952: 32.
 grandis Eaton, 1884: 128.
 hecuba Eaton, 1884: pl. 40.
 heterocaudata McDunnough, 1929: 170.
 hirsuta Berner, 1946: 70.
 hystrix Traver, 1934: 212.
 spinosa Mayo, 1951: 122.
 inermis Eaton, 1884: 127.
 infrequens McDunnough, 1924: 223.
 ingens McDunnough, 1934: 154.
 invaria (Walker, 1853: 568).
 jacobi McDunnough, 1939: 49.
 lapidula McDunnough, 1935: 96.
 lata Morgan, 1911: 112.
 inflata McDunnough, 1926: 187.
 levis Day, 1954: 15.
 lita Burks, 1949: 235.
 lodi Mayo, 1952: 179.
 longicornis Traver, 1932: 164.
 lutulenta Clemens, 1913: 335.
 lineata Clemens, 1913: 336.
 maculata Traver, 1934: 216.
 margarita Needham, 1927: 114.
 micheneri Traver, 1934: 227.
 minimella McDunnough, 1931: 63.
 mollita McDunnough, 1930: 57.
 mollitia Seemann, 1927: 44.
 needhami McDunnough, 1925: 171.
 ora Burks, 1949: 235.
 pelosa Mayo, 1951: 121.
 proserpina Traver, 1934: 223.
 yosemite Traver, 1934: 225.
 prudenalis McDunnough, 1931: 40.
 quebecensis (Provancher, 1876: 267), *nomen dubium*.
 rotunda Morgan, 1911: 113.
 feminina Needham, 1924: 309.
 septentrionalis McDunnough, 1925: 171.
 serrata Morgan, 1911: 109.
 serratoides McDunnough, 1931: 83.
 sierra Mayo, 1952: 96.
 simplex McDunnough, 1925: 41.
 soquele Day, 1954: 18.
 sordida McDunnough, 1925: 42.
 spinifera Needham, 1927: 110.
 subvaria McDunnough, 1931: 84.
 temporalis McDunnough, 1924: 73.
 teresa Traver, 1934: 230.
 tibialis McDunnough, 1924: 224.
 angusta Traver, 1934: 211.
 trilineata Berner, 1946: 67.
 tuberculata Morgan, 1911: 112.
 unicornis Needham, 1905: 45, *nomen dubium*.
 (? = simplex McDunnough).
 verisimilis McDunnough, 1930: 57.
 vernalis Banks, 1914: 614.
 inconstans Traver, 1932: 149.
 walkeri Eaton, 1884: 129.
 fuscata (Walker, 1853: 570), not Stephens, 1835: 66.
 bispina Needham, 1905: 43.

wayah Traver, 1932: 172.
 wilsoni Mayo, 1952: 100.

Family Tricorythidae

Subfamily Leptohiphinae

LEPTOHYPHES Eaton, 1882: 208.
 species? Burks, 1953: 55.

TRICORYTHODES Ulmer, 1920: 51.

- albilineatus Berner, 1946: 72.
- allectus (Needham, 1905: 47).
- × atratus (McDunnough, 1923: 39).
- explicatus (Eaton, 1892: 11).
- fallax Traver, 1935: 634.
- × fictus Traver, 1935: 635.
- minutus Traver, 1935: 636.
- fallacina* McDunnough, 1939: 53, *New synonymy*.
- × peridius Burks, 1953: 48.
- × stygiatus McDunnough, 1931: 267.
- × texanus Traver, 1935: 638.

Superfamily CAENOIDEA

Family Caenidae

Subfamily Caeninae

- BRACHYCERCUS Curtis, 1834: 122.
 flavus Traver, 1935: 640.
 lacustris (Needham, 1918: 249).
 pallidus (Ide, 1930: 218), not Tshernova, 1928: 114.
 idei Lestage, 1931: 119, n. n. for *pallidus* Ide.
 maculatus Berner, 1946: 76.
 nitidus (Traver, 1932: 139).
 prudens (McDunnough, 1931: 264).

 CAENIS Stephens, 1835: 61.
 amica Hagen, 1861: 55.
 anceps Traver, 1935: 645.
 delicata Traver, 1935: 647.
 diminuta Walker, 1853: 584.
 forcipata McDunnough, 1931: 262.
 gigas Burks, 1953: 53.
 hilaris (Say, 1839: 43).
 jocosa McDunnough, 1931: 260.
 latipennis Banks, 1907: 14.
 punctata McDunnough, 1931: 259.
 ridens McDunnough, 1931: 256.
 simulans McDunnough, 1931: 263.
 tardata McDunnough, 1931: 260.

Family Neophemeridae

Subfamily Neophemerinae

- NEOEPHEMERA McDunnough, 1925: 168.
 bicolor McDunnough, 1925: 168.
 compressa Berner, 1956: 34.
 purpurea (Traver, 1931: 105).
 youngi Berner, 1953: 145.

Superfamily EPHEMEROIDEA

Family Potamanthidae

Subfamily Potamanthinae

- POTAMANTHUS Pictet, 1845: 197.
 diaphanus Needham, 1908: 193.
 distinctus Traver, 1935: 280.
 inequalis Needham, 1909: 74.
 myops (Walsh, 1863: 207).
 medius Banks, 1908: 259.
 neglectus Traver, 1935: 282.
 rufous Argo, 1927: 323.
 verticis (Say, 1839: 42).
 flaveola (Walsh, 1862: 377).
 walkeri Ide, 1935: 119.

Family Ephemeridae

Subfamily Ephemerinae

- EPHEMERA Linnaeus, 1758: 546.
 blanda Traver, 1932: 104.
 compar Hagen, 1875: 578.
 guttulata Pictet, 1843: 135.
 simulans Walker, 1853: 536.
 natata (Walker, 1853: 551).
 decora Walker, 1853: 537.
 traverae Spieth, 1938: 5.
 triplex Traver, 1935: 253.
 varia Eaton, 1883: 69.
- HEXAGENIA Walsh, 1863: 197.
 atrocaudata McDunnough, 1924: 92.
 bilineata (Say, 1824: 303).
 limbata limbata (Serville, in Guerin-Meneville, 1829: 34).
 variabilis Eaton, 1883: 55.
 limbata californica Upholt, 1937: 85.
 limbata occulta (Walker, 1853: 551).
 mingo Traver, 1931: 597.
 limbata venusta Eaton, 1883: 54.
 pallens Traver, 1935: 271.
 limbata viridescens (Walker, 1853: 551).
 angulata Walker, 1853: 564.
 munda affiliata McDunnough, 1927: 119.
 munda elegans Traver, 1931: 594.
 weewa Traver, 1931: 605.
 kanuga Traver, 1937: 29.
 munda marilandica Traver, 1931: 599.
 carolina Traver, 1931: 601.
 rosacea Traver, 1931: 607.
 munda munda Eaton, 1883: 53.
 munda orlando Traver, 1931: 608.
 recurvata Morgan, 1913: 395.
 rigida McDunnough, 1924: 90.
- PENTAGENIA Walsh, 1863: 196.
 robusta McDunnough, 1926: 185.
 vittigera (Walsh, 1862: 373).
 quadripunctata Walsh, 1863: 198.

Family Polymitarcidae

Subfamily Polymitarcinae

- EPHORON Williamson, 1802: 71.
 album (Say, 1824: 305).
 leukon Williamson, 1802: 71.

Subfamily Campsurinae

- CAMPSURUS Eaton, 1868: 83.
 decoloratus (Hagen, 1861: 43).
- TORTOPUS Needham and Murphy, 1924: 23.
 circumfluus Ulmer, 1942: 110.
 incertus (Traver, 1935: 286).
 primus (McDunnough, 1924: 7).
 manitobensis (Ide, 1941: 155).
 puella (Pictet, 1843: 145), *nomen dubium*.

Superfamily PROSOPISTOMATOIDEA

Family Baetiscidae

Subfamily Baetiscinae

- BAETISCA Walsh, 1862: 378.
 bajkovi Neave, 1934: 166.
 callosa Traver, 1931: 57.
 carolina Traver, 1931: 51.
 thomsenae Traver, 1937: 61.
 escambiensis Berner, 1955: 2.
 gibbera Berner, 1955: 11.
 lacustris McDunnough, 1932: 214.
 laurentina McDunnough, 1932: 214.
 obesa (Say, 1839: 43).
 rogersi Berner, 1940: 156.
 rubescens (Provancher, 1878: 127).

BIBLIOGRAPHY

- Albarda, H. 1878. Descriptions of three new European Ephemeroptera. Ent. Month. Mag. 15: 128-30.
- Banks, N. 1918. New neuropteroid insects. Bull. Mus. Comp. Zool. 62: 1-22, 26 figs.
- Bengtsson, S. 1908. Berattelse over en resa i entomologiskt syfte till mellersta Sverige Sommaren 1907. Kungliga Svenska Vetenskapsakademien Arsbok 6: 237-46.
 1912. New Ephemeroptera aus Schweden. Ent. Tidskr. 33: 107-17.
- Berner, L. 1940. Baetinae mayflies from Florida (Ephemeroptera). Florida Ent. 23: 33-45; 49-62, 2 pls.
 1940. *Baetisca rogersi*, a new mayfly from northern Florida. Canadian Ent. 72: 156-60, 5 figs.
 1946. New species of Florida mayflies (Ephemeroptera). Florida Ent. 28: 60-82, 1 pl.
 1948. A new species of mayfly from Tennessee. Ent. News, 59: 117-20, 3 figs.
 1950. The mayflies of Florida. Univ. Florida Studies, Biol. Sci. Series 4(4), XII+267 pp., 88 figs., 24 pls., 19 maps.
 1953. New mayfly records from Florida and a description of a new species. Florida Ent., 36: 145-9, 3 figs.
 1955. A new species of *Paraleptophlebia* from the southeast (Ephemeroptera, Leptophlebiidae). Proc. Ent. Soc. Washington 57: 245-7, 2 figs.
 1955. The southeastern species of *Baetisca*. Quart. Jour. Florida Acad. Sci. 18: 1-19, 23 figs.
 1956. The genus *Neoephemera* in North America (Ephemeroptera: Neoephemeridae). Ann. Ent. Soc. America 49: 33-42, 26 figs.
- Burks, B. D. 1946. New heptagenine mayflies. Ann. Ent. Soc. America 39: 607-15, 10 figs.
 1949. New species of *Ephemerella* from Illinois (Ephemeroptera). Canadian Ent. 79: 232-6, 7 figs. (Publication dated 1947).
 1953. The mayflies, or Ephemeroptera, of Illinois. Bull. Ill. Nat. Hist. Surv. 26(Art. 1): 1-216, 395 figs.
- Burmeister, H. 1839. Ephemerina, in Handbuch der Entomologie, Vol. II, part II, pp. 788-804. Berlin.
- Curtis, J. 1834. Descriptions of some nondescript British species of mayflies of anglers. Lond. and Edinb. Philos. Mag. 3(20): 120-5; (21): 212-18.
- Daggy, R. H. 1945. New species and previously undescribed naiads of some Minnesota mayflies (Ephemeroptera). Ann. Ent. Soc. America 38: 373-96, 2 pls., 4 text figs.
- Day, W. C. 1952. New species and notes on California mayflies (Ephemeroptera). Pan-Pacific Ent. 28: 17-39, 8 pls.
 1953. A new mayfly genus from California (Ephemeroptera). Pan-Pacific Ent. 29: 19-24, 2 pls.
 1954. New species and notes on California mayflies, II. Pan-Pacific Ent. 30: 15-29, 14 figs.
 1954. New species of California mayflies in the genus *Baetis*. Pan-Pacific Ent. 30: 29-34, 8 figs.
 1955. New genera of mayflies from California (Ephemeroptera). Pan-Pacific Ent. 31: 121-37, 27 figs.
- Eaton, A. E. 1868. An outline of a re-arrangement of the genera of Ephemeroptera. Ent. Month. Mag. 5: 82-91.
 1882. An announcement of new genera of the Ephemeroptera. Ent. Month. Mag. 18: 207-8.
 1901. Ephemeroptera collected by Herr E. Strand in South and Arctic Norway. Ent. Month. Mag. 37: 252-5, 2 figs.
- Edmunds, G. F. Jr. 1945. Ovoviviparous mayflies of the genus *Callibaetis* (Ephemeroptera: Baetidae). Ent. News 56: 169-71.
 1948. A new genus of mayflies from western North America (Leptophlebiinae). Proc. Biol. Soc. Washington 61: 141-8, 2 pls.
 1950. New records of the mayfly genus *Baetodes*, with notes on the genus. Ent. News 61: 203-5.
 1951. New species of Utah mayflies I. Oligoneuriidae (Ephemeroptera). Proc. Ent. Soc. Washington 53: 327-31, 1 pl.

1954. New species of Utah mayflies II. Baetidae, *Centroptilum* (Ephemeroptera). Proc. Ent. Soc. Washington 56: 1-4, 1 pl.
- Edmunds, G. F., Jr., and J. R. Traver.** 1954. An outline of a reclassification of the Ephemeroptera. Proc. Ent. Soc. Washington 56: 236-40.
- Hagen, H. A.** 1868. On *Lachlania abnormis*, a new genus and species from Cuba belonging to the Ephemera. Proc. Bost. Soc. Nat. Hist. 11: 372-4.
1875. Report on the Pseudo-Neuroptera and Neuroptera collected by Lieut. W. L. Carpenter in 1873, in Colorado. Report Geolog. Survey of Territories for 1873: 571-606.
- Ide, F. P.** 1930. Contribution to the biology of Ontario mayflies with descriptions of new species. Canadian Ent. 62: 204-13; 218-31, 3 pls.
1937. Descriptions of eastern North American species of Baetina mayflies with particular reference to the nymphal stages. Canadian Ent. 69: 219-31, 235-43, 5 pls.
1941. Mayflies of two tropical genera, *Lachlania* and *Campsurus*, from Canada with descriptions. Canadian Ent. 73: 153-6, 3 figs.
1954. The nymph of *Rhithrogena impersonata* (Ephemera) and a new closely related species from the same locality in Southern Ontario. Canadian Ent. 86: 348-56, 9 figs.
- Klapalek, F.** 1905. Plecopteren and Ephemeren aus Java, gesammelt von Prof. M. Kraepelin 1904. Mitt. Nat. Mus. Hamburg 22: 103-7, 1 fig.
- Leach, W. E.** 1815. Entomology. Brewster Edinburgh Encyclopaedia, Edinburgh, Vol. 9, Pt. 1, pp. 57-172.
- Leonard, J. W.** 1950. A new *Baetis* from Michigan (Ephemeroptera). Ann. Ent. Soc. America 43: 155-9, 1 fig., 1 pl.
- Lestage, J. A.** 1931. Notes à propos de l'homonymie de deux Éphéméroptères. Bull. Ann. Soc. Ent. Belg. 71: 119.
- Lichtenstein, A. A. H.** 1796. Catalogus musei zoologici ditissimi Hamburgi III Febr. 1796 auctionis lege distrahendi. Hamburg. 222 pp. (Catalogue Holthusien Museum collections.)
- Linnaeus, C.** 1758. Systema Naturae, 10th Edition. Pp. 824+2. Holmiae.
1761. Fauna Suecicae. 2nd Ed. Pp. 48+578 pages. Stockholm.
- McDunnough, J.** 1921. Two new Canadian mayflies (Ephemerae). Canadian Ent. 53: 117-20, 1 pl.
1936. A new arctic Baetid (Ephemeroptera). Canadian Ent. 68: 33-35, 1 pl.
1936. Further notes on the genus *Ameletus* with descriptions of new species (Ephemeroptera). Canadian Ent. 68: 207-11, 2 figs.
1938. New species of North American Ephemeroptera with critical notes. Canadian Ent. 70: 23-34, 1 pl., 2 figs.
1939. New British Columbian Ephemeroptera. Canadian Ent. 71: 49-54, 1 pl.
1942. An apparently new *Thraulodes* from Arizona (Ephemera). Canadian Ent. 74: 117.
1943. A new *Cinygmula* from British Columbia (Ephemeroptera). Canadian Ent. 75: 3, 1 fig.
- Mayo, V. K.** 1939. New western Ephemeroptera. Pan-Pacific Ent. 15: 145-154, 3 pls.
1951. New Western Ephemeroptera II. Pan-Pacific Ent. 27: 121-5, 1 pl.
1952. New Western Ephemeroptera, III. Pan-Pacific Ent. 28: 93-103, 3 pls.
1952. New Western Ephemeroptera, IV, with notes. Pan-Pacific Ent. 28: 179-86, 1 pl.
- Needham, J. G.** 1908. New data concerning mayflies and dragonflies of New York. New York State Mus. Bull. 124: 188-94, 1 pl.
1909. A peculiar new mayfly from Sacandaga Park. New York State Mus. Bull. 134: 71-75.
- Needham, J. G., J. R. Traver, and Yin-Chi Hsu.** 1935. The biology of mayflies with a systematic account of North American species. Comstock, Ithaca, N. Y.
- Provancher, L.** 1876. Petit fauna entomologique du Canada, Neuroptères, Fam. III, Éphémérides. Nat. Canad. 8: 264-8.
1878. Additions et corrections aux Neuroptères de la Province de Québec. Nat. Canad. 10: 124-47.
- Say, T.** 1823. Descriptions of insects belonging to the order Neuroptera Linn., Latr. collected by the expedition authorized by J. C. Calhoun, Secretary of War, under the command of Major S. H. Long. West. Quart. Rept. 2: 160-5.
1824. In Keating, W. H., Narrative of an expedition to the source of St. Peters River, Lake Winnipeg, Lake of Woods etc. etc. by order of The Hon. J. C. Calhoun, Secretary of War, under the command of Stephen H. Long, Major U.S.T.E. Vol. II, Appendix, pp. 303-5. Cary and Lea, Philadelphia.
1839. Descriptions of new North American neuropterous insects and observations on some already described. Jour. Acad. Nat. Sci. Phila. 8: 9-46.
- Serville, J. G. A.** 1829. In Guérin-Méneville, Iconographie Règne Animal de G. Cuvier, Vol. 3: 384; Insects, pl. 60, fig. 7.
- Spieth, H. T.** 1938. Two interesting mayfly nymphs with a description of a new species. Amer. Mus. Novitates 970: 1-7, 2 pls.
1938. Taxonomic studies on the Ephemera, I: Description of New North American species. Amer. Mus. Novitates 1002: 1-11, 8 figs.
- Stephens, J. F.** 1835. Illustrations of British entomology Vol. 6, 240 pp., 7 pls.
- Traver, J. R.** 1935. Part II. Systematic, pp. 237-739, in Needham, Traver, and Hsu, *op. cit.*
1937. Notes on mayflies of the Southeastern States (Ephemeroptera). Jour. Elisha Mitchell Sci. Soc. 53: 27-86, 1 pl.
- Tshernova, O. A.** 1928. Beitrag zur Kenntnis der Ephemeropteren des Oka-Bassins. Arb. Biol. Oka-Sta. Murom 5: 113-5, 2 figs.
1948. O novom rode i vide podenok iz basseina Amura (Ephemeroptera, Ametropodidae). Dokladi Akademii Nauk SSSR, novja serija, 40(8): 1453-5, 1 pl. (New genus and species of Mayfly from Amur-basin.)
- Ulmer, G.** 1920. Neue Ephemeropteren. Arch. Naturg (1919) 85, A 11: 1-80, 56 figs.
1942. Alte und neue Eintagsfliegen (Ephemeropteren) aus Sud- und Mittelamerika. Stettiner Ent. Zeit. 103: 98-128, 30 figs.
- Upholt, W. M.** 1936. A new species of mayfly from California (Ephemera: Baetidae). Pan-Pacific Ent. 12: 120-2, 1 fig.
1937. Two new mayflies from the Pacific Coast. Pan-Pacific Ent. 13: 85-88.