A Checklist of Japanese Ephemeroptera

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Abstract. Thirty families, 36 genera, and 140 species of Ephemeroptera were confirmed for the Japanese Islands (Hokkaido, Honshu, Shikoku, Kyushu, and Okinawa). Out of them, one genus and eight species were reported for the first time. The checklist incorporated 21 new synonyms (including one generic synonym), eight new combinations, and one new status. Five species were indicated as nominea dubia.

Key words: Ephemeroptera, checklist, Japan

Introduction

Considerable contributions to mayfly taxonomy in Japan were given by Goze's monograph (Goze, 1979a, 1979b, 1979c, 1979d, 1979e, 1980a, 1980b, 1980c, 1980d, 1980f, 1980g, 1980h), in which a total of 95 species and one subspecies were listed as Japanese mayflies. In the monograph, however, 25 out of 35 species and three out of five genera named by Matsumura (1904, 1911, 1911a, 1911b, 1912) were overlooked. On the other hand, a checklist of Japanese insects compiled by Y. Hirohashi (Entomological Laboratory of Kyushu University, 1990), which listed 103 species of Ephemeroptera for the Japanese Islands (Hokkaido, Honshu, Shikoku, Kyushu and Okinawa), included 20 of Matsumura's species but lacked 23 species named by Goze (1983). Besides, Makiyama (1998) declared that the Goze's species are to be nominea dubia because there were neither an indication nor designation of types for the new taxa.

Most of the species established by Matsumura in his earlier publications (Matsumura, 1904, 1911, 1912) are available since they were published with descriptions. However, some generic names are not available because of the lack of type designation (Hubbard, 1988, 1989). For establishing new species, Goze gave a diagnostic key to distinguish them from the other species (Goze, 1979a, 1980a, 1980b, 1980c, 1980d, 1980e, 1980f, 1980g, 1980h). Clearly, they are available enough since they satisfy Arts 9.1, 10.1, 11.1-5, and 13.1-11 of the International Code of Zoological Nomenclature (4th Ed).

This paper lists up to 140 valid species of Japanese mayflies based on comprehensive literatures reviewed. The families are phylogenetically arranged according to McCafferty (1996) with an additional family rank for Diplopteraidae (Klug et al., 1995). Within a family, genera and species are arranged alphabetically. Symbols used in the text are as follows: * newly recorded species; (1, 2) geographical distribution; ** arbitrary name in the original text; [3] obvious error of spelling; and *-* mark in the original literature.

The types in the present study are deposited in the following institutions: CERC (Center for Ecological Research, Kyoto University, Japan); IU (The collection in the Laboratory of Systematic Entomology, Hokkaido University, Japan); NW (Pure Women's University, Japan); INHS (Illinois Natural History Survey, USA).

Only following 5 species were listed as nominea dubia because there were no chance for them to be applied by the original names: i.e., Ephemeror nakamar Zasakura, 1941, Ephmera okazaki Ohtsuki, 1984, Amphilus iwadactylus Matsumura, 1931, and Ischnura microris Motschulsky, 1900. Ephemeror nakamar which had
already been known to be names dubious by Ishimura (1996). The names *Ephydromoros* kotzani and *Dromia* mitsukurii by Sato (1969) and Motomura (1969) respectively, lacked any descriptions or types, thus I cannot verify these species. *Ephydromoros* goni by Okazaki (1984) based on the egg stage, also cannot be verified. *Ameloria* insacculata cannot be verified from the original description and note of Matsunuma's specimen of the species exist in his collection.

**Checklist**

**Genus Chiasomerididae (Tobihiro-kageneru)**

**Genus Chinamphipera** Ulm, 1964 (Ryukyu-tobihiro-kageneru-zuka)

*Chinamphipera* sp. 1964 (Ryukyu-tobihiro-kageneru) [Japan (Kyushu: Amakusa-hama la., Okinawa: Okinawa-tomo, hagakki-jima la.)] analised Ulm, 1964 (Chinamphipera).

**Genus Chiasomer Eunice, 1881** (Hime-Tobihiro-kageneru-zoka)

*Subgenus Eunice* Barnard, 1922 (Toyo-shisei-tobihiro-kageneru-soku)

*Chiasomer* sp. 1944 (Hime-tobihiro-kageneru) [Japan (Honshu, Shikoku, Kyushu), China, Korea, Russia)

*Chiasomer* sp. 1964 (Chiasomer (Euniceidae)).


**Genus Chiasomeridae Ulm, 1939** (Kuro-Tobihiro-kageneru-zuka)

*Chiasomeridae* nigrola Kang & Yang, 1994 (Kuro-tobihiro-kageneru) [Japan (Okinawa: Bimome-jima la., hagakki-jima la.), Taiwan]

*nigrola* Kang & Yang, 1994 (Kuro-Tobihiro-

**Genus Paragamphipera** Ulm, 1927 (Tobihiro-kageneru-zuka)

*Paragamphipera* japa*ga* (Matsunuma, 1931) COMB. N. (Nam-tobihiro-kageneru) [Japan (Hokkaido, Honshu, Shikoku, Kyushu, Korea, Russia)]

*Paragamphipera* sp., 1931 (Paragamphipera).

**Note:** After examination of the type species of *Paragamphipera* Matsunuma, 1931 in the Matsunuma Collection, HU, I found that the species could not belong to Boreliidae but to Leptopodidae. Although I have not been successful in locating the holotype of *Paragamphipera* chocolate insacculata, 1937, I found the male specimen identified to *P. chocolate* by Inoishi in the Inoishi Collection, CR, and specimens which I collected in Higawa River, Shiga-ken, the type locality of *P. chocolate* are identical to *P. japonica* in the respect of size and morphology of genitalia. Therefore, I regard *P. chocolate* as a synonym of *P. japonica*.

*Paragamphipera* sp., 1931 (Toyo-shisei-tobihiro) [Japan (Honshu, Shikoku)]

spinoza Ulm, 1931b (Paragamphipera).
Paraepiplolepis setosa Imanishi, 1927 (Usamia-tobiro-kagerou) [Japan (Hokkaido, Honshu, Kyushu)]
(2) cincta Utano, 1928 (Paraepiplolepis); Imanishi, 1940 (Paraepiplolepis); Bas et al., 2000.
westoni Imanishi, 1937b (Paraepiplolepis).
"sp. n." Hiratsuka, 1955 (Paraepiplolepis).
"n. sp." Ota, 1962 (Paraepiplolepis).
"sp. PA" Ota, 1962 (Paraepiplolepis).
Goes Threadall Eaton, 1881 (Toneri-kagerou-exo).

*Therosoma foveolatum Kang & Yang, 1994 (Usamia-togata-kagerou) [Japan (Okinawa: Okinawa-Misaki, Taiwan):
*Faniana Kang & Yang, 1994a (Therosoma).

*Threadall grandis Goes, 1980 (Oo-togata-kagerou) [Japan (Hokkaido, Kyushu, Okinawa: Okinawa-choi,)
grandis Goes, 1980a (Threadall).
"sp." Utano, 1995 (Threadall).

*Threadall maculatus Kang & Yang, 1994 (Hime-togata-kagerou) [Japan (Okinawa: Okinawa, Tunisia,:
*misellaneous Kang & Yang, 1990b (Threadall).

Potamanthus (Kawa-kagerou-exo).

Goes Potamanthus Flett, 1943 (Kawa-kagerou-exo).

Subgenus Potamanthus Ulmer, 1920 (Kawa-kawa-kagerou-exo).

Potamanthus formosanus Eaton, 1892 (Kawa-kawa-kagerou) [Japan (Honshu, Shikoku, Kyushu),
Myanmar, China, Korea, Malaysia, Thailand, Vietnam].

*formosanus Eaton, 1892 (Potamanthus); Ulmer, 1920 (Potamanthus).

*formosanus Eaton, 1928 (Potamanthus) Misidentification.

*formosanus Eaton, 1928 (Potamanthus).

kumonii Imanishi, 1940 (Potamanthus).

Note: In Japan this species was described at first under the name of Potamanthus kawae (Linnéaeus, 1758) by Eaton (1892) from central Japan (Satagawa River and Tensuyawa River).

Imanishi (1940) regarded that P. kawae reported by Eaton (1892) did not belong to the subgenus
Potamanthus, but to Potamanthus and described a new species under the name of
Potamanthus (Potamanthus) kumonii Imanishi, 1940. Although I have not been successful in
examining Eaton’s P. kawae, it is highly probable that nymphs of Eaton’s P. kawae will eventually
prove to be nymphs of P. kawae. Eaton (1969) recorded adults of this species from Taiwan
and synonymized P. kumonii with P. formosanus, nevertheless the name P. formosanus has been used as
a valid name incorrectly (Utano, 1973; Goet, 1976, 1985) until the world revision of
Potamanthidae given by Bas & McCaffery (1993). Goes (1985) stated without precise data that
P. formosanus was distributed from Hokkaido to Kyushu. My observations suggest that
distribution of this species in Japan extends to northern part of Honshu (Aomori-ken) and not to
Sphenomorphus fuscus, 1843 (Kawamura-genro-izaka)

*Sphenomorphus fuscus*-Wa, 1987 (Okuwa-kamagoro) (Japan (Hyogo, China) in Sphenomorphus, 1987 (Sphenomorphus).

Sphenomorphus fuscus--McCall, 1981 (Sphenomorphus). Note: It has been believed for many years that a single species, *P. amoena*, was widely distributed in Japan (Gose, 1985). However, Kobayashi & Hattori (1990) reported the adults of *Sphenomorphus sp.* collected on the shores of Lake Biwa by light trap. The adults were also collected from Yokkaicho (Yokkaicho City Government, 1990) by me. In 1990, McCall (1991) described *Sphenomorphus sp.* as *P. fuscus* from the description and collecting data. I have examined *Sphenomorphus sp.* and found that it is compatible with *P. fuscus* but not *Sphenomorphus*. I have decided to include *Sphenomorphus fuscus* in this new species, *P. fuscus*.

**Ephemodonidae** (Mono-gageoru-ka)

Genus Ephemeron Linnaeus, 1758 (Mono-gageoru-ka)

*Ephemeron fumosum* Umez., 1919 (Tawara-mono-kamagoro) (Japan (Chikama: Chikuma, Nagano, Toyono-tamakka, Isobe, Mito, Mito-wa, Tajima-cho, Taian).

*Ephemeron fumosum* Umez., 1919 (Tawara-mono-kamagoro). Note: Based on type material examination of *E. fumosum*, the Metamora Collection, H.U. 1928 (H. or. 1928).

*Ephemeron orientalis* McCall, 1975 (Toyos-gon-kamagoro) (Japan (Hyogo, Honshu, Shikoku, Kyushu, Russian). Based on type material examination of *E. fumosum*, the Metamora Collection, H.U. 1928 (H. or. 1928).

*Ephemeron orientalis* EASTON, 1992 (Tawara-kamagoro) (Japan (Hyogo, Honshu, Shikoku, Kyushu, Russian).

*Ephemeron orientalis* EASTON, 1992 (Tawara-kamagoro). Note: Based on type material examination of *E. fumosum*, the Metamora Collection, H.U. 1928 (H. or. 1928).
morphological differences between the two. These two species are identical to E. strigata. Therefore, I recognize these three species, E. konuma, E. twissae, and E. jeronii as synonyms of E. strigata.

Ephemeror alatum Saito, 1969 nomen dubium.
alatum Saito, 1969 (Ephemeror) nomen dubium.

Polypterygidae (Shirosho-kagero-zaa)

Genus Ephemeror Williamsen, 1862 (Shirosho-kagero-zaa)

Ephemeror operculum Ishiwata, 1996 (Akutani-shiro-kagero) [Japan (Honshu)] operculum Ishiwata, 1996 (Ephemeror).

Ephemeror himonum Ishiwata, 1996 (Byakushira-kagero) [Japan (Honshu)] himonum Ishiwata, 1996 (Ephemeror).

Ephemeror japonicus Takahashi, 1954 (Oto-shiro-kagero) [Japan (Honshu, Shikoku, Kyushu), Korea, Russia (Far East)]
japonicus Takahashi, 1954 (Polypterygidae) [1]; Uono, 1935c (Polypterygidae) [1]; Lestage, 1938 (Polypterygidae); Uono, 1973 (Ephemeror).

"sp." Uono, 1956 (Polypterygidae); Uono, 1935c (Polypterygidae) [1].

"sp. X" Hashimoto, 1955 (Polypterygidae) [1].

Ephemeror nakamura Matsunaga, 1951 nomen dubium.
akamura Matsunaga, 1951 (Ephemeror) nomen dubium.

Cassidae (Himeshiro-kagero-zaa)

Genus Brachpteryx Curtis, 1834 (Mitsutome-hime-kagero-zaa)

Brachpteryx japonica Carse, 1900 (Mitsutome-hime-kagero) [Japan (Honshu)]
japonica Carse, 1900 (Brachpteryx).japonica Bee, 1997 (Brachpteryx).

Genus Cernb Stephens, 1835 (Himeshiri-kagero-zaa)

Cernb adscendens (Linnæus) 1758 (Himeshiri-kagero) [Japan (Honshu)]

Cernb sinicor Maldonado, 1996 (Biwakushiro-kagero) [Japan (Honshu), China, Korea].
sinicor Maldonado, 1996 (Cernb).

Ephemeroridae (Makura-kagero-zaa)

Genus Cassidinae Alles, 1971 (Toyo-makura-kagero-zaa)

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Dravida ibimanae Makusha, 1931
(Yojobo-maderu-kagororo) [Japan (Hokkaido, Hokkaido, Shikoku, Kyushu), Korea (Jeju Island), Russia (Kurile Islands)]

Dravida ibinanae Makusha, 1931 (Dravida)
cryptomena n., nec Imashiro, 1974.
"sp. x" Imashiro, 1945 (Eosophrya).
ibinanae [1]: Edmundo, 1959 (Eosophrya (Dravida)).
yoboro n., nec Imashiro, 1961 (Dravida).
Note: Eosophrya yoboro was first reported as "Eosophrya n." based on the nymph by Imashiro (1945). In 1959, Edmundo reported the nymph "Eosophrya n." as E. yoboro n. and have erroneously used E. yoboro n. as a synonym of Eosophrya cryptomena Imashiro without explanation. Therefore, E. yoboro n. should be known by the same name E. cryptomena n., nec Imashiro (1974). All, nec note under Dravida cryptomena, above.

Although I have not been successful in locating the holotype of E. yoboro n. (type where, Goe personal communication), I have collected specimens from Gojuchi, Nishinomiya, the type locality of E. yoboro n. All of these are identical to D. ibinanae in the respects of size, epidermation, and ratio of known to unknown as D. ibinanae. Therefore E. yoboro n. is valid and should be synonymized with D. ibinanae.

Dravida ibinanae (Allen, 1917) (Koso-maderu-kagororo) [Japan (Honshu, Shikoku, Kyushu), Korea (Jeju Island), Russia (Kurile Islands)]
kohinor Allen, 1917 (Eosophrya (Dravida)).
kohinor [1]: Allen, 1959 (Dravida (Ishiwata)).

Dravida yoboro (Makusha, 1931) (Fumato-maderu-kagororo) [Japan (Hokkaido, Honshu, Shikoku, Kyushu), Korea (Jeju Island), Russia (Kurile Islands)]

Dravida sakurahime (Makusha, 1933) (Fumato-maderu-kagororo) [Japan (Hokkaido, Honshu, Shikoku, Kyushu), Korea (Jeju Island), Russia (Kurile Islands)]

Dravida okekimono (Takamatsu, 1949) (En-mukoto-maderu-kagororo) [Japan (Hokkaido, Honshu, Shikoku, Kyushu), Korea (Jeju Island), Russia (Kurile Islands)]

Eosophrya kawadei (Usui, 1951) (Eosophrya (Dravida)).

Eosophrya kawadei (Usui, 1951) (Eosophrya (Dravida)), Ishiwata, 1961 (Dravida).

Eosophrya kawadei (Usui, 1951) (Eosophrya (Dravida)).

Eosophrya kawadei (Usui, 1951) (Eosophrya (Dravida)).

Eosophrya kawadei (Usui, 1951) (Eosophrya (Dravida)).
Euphyraea esculenta Lamarck, 1937 (Hokkaido-maeda-kagura) (Japan (Hokkaido, Shikoku, Kyushu), China, Korea, Russia)

described by Inoue, 1937 (Euphyraea).

described by Tanaka, 1938 (Euphyraea).

Not: I have examined the type of Euphyraea (Euphyraea) japonica, 1937, in IMS. Although type series of Euphyraea esculenta Lamarck, 1937 are not preserved in the Institute Collection, CEBK (Shibata, personal observation), based on exuviae of adult specimens reared from nymph collected from the type locality, Mt. Aki, Kyushu, I regard E. japonica as a synonym of E. esculenta.

Euphyraea esculenta (Bengston, 1958) (Kisima-maeda-kagura) (Japan (Hokkaido, Honshu), Korea, North America, Central and South America, North America)

Euphyraea esculenta Bengston, 1958 (Chukotka-Polar); Allen & Emmons, 1965 (Euphyraea (Euphyraea)); Iwata, 1972 (Euphyraea); Gose, 1988 (Euphyraea (Euphyraea)).

not: I have examined the type series of Euphyraea esculenta (Bengston, 1958) in IMS. Although type series of Euphyraea esculenta (Bengston, 1958) are not preserved in the Institute Collection, CEBK (Shibata, personal observation), based on exuviae of adult specimens reared from nymph collected from the type locality, Mt. Aki, Kyushu, I regard E. esculenta as a synonym of E. esculenta.

Euphyraea coryne Gose, 1988 (Euphyraea) (Thunb-maeda-kagura) (Japan (Hokkaido, Shikoku, Kyushu))

Note: Inoue (1958) noted that: "Euphyraea coryne Gose, 1988 (Euphyraea)" is a junior homonym for Euphyraea coryne Mosqu, 1911. However, when Gose (1988, October 15) described his E.
Ephemera groen Otsuka, 1954 *Ephemera* daeschii.

groen Otsuka, 1954 (*Ephemera*) *Ephemera* daeschii.

Genus incertae sedis

Ephemera solignulata McLachlan, 1875 (Honsa-rana-kagerou) [Japan (Honshu), China (77)] *Ephemera* solignulata McLachlan, 1875 (Larupalaeba); Japan, 1885 (*Ephemera*).

Amatase (Hime-fuza-kagerou-ka)

Genus Amatase Katoh, 1887 (Hime-fuza-kagerou-aka)

Chironomus Navia, 1915.

Amatase amaurus (Navia, 1915) Kaneda et al. (Hokkaido-fuza-kagerou) [Japan (Hokkaido)]

Amatase bicornis (Chironomus, 1915) Kaneda et al. [Edomishi, 1960 (Amatase).]

Amatase ciliata (Matsutani, 1931) (Matsutani-fuza-kagerou) [Japan (Hokkaido, Honshu, Hokkaido), Kyushu, Korea, Russia]

Amatase matsutani (Matsutani, 1931) (Matsutani-fuza-kagerou) [Japan (Hokkaido), Honshu, Hokkaido, Kyushu, Korea, Russia]

Amatase matsutani (Matsutani, 1932) (Matsutani-fuza-kagerou) [Japan (Hokkaido, Honshu, Hokkaido, Kyushu, Korea, Russia]

Amatase matsutani (Matsutani, 1932) (Matsutani-fuza-kagerou) [Japan (Hokkaido, Honshu, Hokkaido, Kyushu, Korea, Russia]

Amatase mitsunaga (Matsutani, 1933) (Kurok-bume-fuza-kagerou) [Japan (Honshu), Hokkaido, Honshu, Hokkaido, Kyushu, Korea, Russia, Japan, 1933 (Amatase).

Amatase matsunaga (Matsutani, 1935) (Kurok-bume-fuza-kagerou) [Japan (Honshu), Hokkaido, Honshu, Hokkaido, Kyushu, Korea, Russia, Japan, 1935 (Amatase).

Amatase mitsunaga (Matsutani, 1935) (Kurok-bume-fuza-kagerou) [Japan (Honshu), Hokkaido, Honshu, Hokkaido, Kyushu, Korea, Russia, Japan, 1935 (Amatase).

Baeumcke (Ko-kagerou-ka)

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Japanica, Imai, 1930 (Acmevella). 
Japanese: Yana, 1924 (acmevella). 
Note: Acmevella, japonica Linnonlaitila, 1930 is a junior synonym of Pseudocoleus sino-maximus (see the note of the genus Pseudocoleus) and Pseudocoleus japonicus C. (Kjellberg, 1987). Synonymy is rsa, acmevella nomen-i-japonica. 1962 with Basadella japonica (Kjellberg, 1962). I have examined japanese specimens of both species, and found that the species is much different from P. japonicus. In having the mean number of posterior sections of each tergum. According to Kjellberg (1987), P. japonicus is distinguished from P. japonica by the presence of a posterior basal segment of males genitalic forms. However, my examination of the tergum materials of P. japonica denied the presence of tergum sections. Although the type material of both P. japonica and P. japonicus was missing (personal observation and Gose, personal communications, respectively), I recognize that Basadella japonica should be considered as a synonym of Basadella japonica.

Genus Basidactylus Linnonlaitila, 1930 (ko-kakugensu-i). 
Note: The genus Basidactylus is to be split into many subgroups by many authors. Waltz et al. (1964) and McCafferty & Waltz (1990) created a new genus and gave different names based on morphological differences in nympha. Kjellberg (1987) reviewed the Japanese species of Basidactylus and presented a synonym list of seven nominal species together with 30 informal species (26 species in total). It is also assigned to some species groups. Although twenty-two species are listed here, genetic or systematic assignment is not given. Further taxonomic studies, including genetic or systematic assignment are needed.

Basidactylus Linnonlaitila, 1930 (ko-kakugensu-i). 

Basidactylus Imai, 1937 (ko-kakugensu-i). (Japanese) (Horitsu) (Basionym: acmevella Imai, 1976 (Basionym).)

Basidactylus indicus J. K. (a-kakugensu-i). (Japanese) (Horitsu) (Basionym: Imai, 1976 (Basionym).)

Basidactylus indicus J. K. (a-kakugensu-i). (Japanese) (Horitsu) (Basionym: Imai, 1976 (Basionym).)

Basidactylus indicus J. K. (a-kakugensu-i). (Japanese) (Horitsu) (Basionym: Imai, 1976 (Basionym).) (Chouzaya, 1968 (Basionym).)

Basidactylus indicus J. K. (a-kakugensu-i). (Japanese) (Horitsu) (Basionym: Imai, 1976 (Basionym).) (Chouzaya, 1968 (Basionym).)

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Genus Promatsumara Hubbard, 1968 (Matsuura-co-kagero-zoku)  
Promatsumara Matsumura, 1951a, nom. provo.; not available, no type designated.  
Promatsumara Hubbard, 1988, replacement name for Promatsumara Matsumura, 1951a nec  
Proclus Séguyana, 1915.

Promatsumara nipponica (Matsumura, 1935) (Matsuura-co-kagero-zoku) [Japan (Hokkaido)]  
nipponica Matsumura, 1951a (Promatsumara; Hubbard, 1988 (Promatsumara)).

Dipironomima (Gagoono-kagero-zoku)

Genus Dipironomima McLachlan, 1972 (Gagoono-kagero-zoku)  
Dipironomima McLachlan, 1972b

Dipironomima nipponica McLachlan, 1972 (Gagoono-kagero-zoku) [Japan (Hokkaido, Shikoku, Kyushu)]  
nipponica McLachlan, 1972 (Dipironomima).  
Matsura Matsumura, 1951a (Dipironomima).

Siphonostate (Futa-kagero-zoku)

Genus Siphonostate Eoton, 1986 (Futa-kagero-zoku)

Siphonostacta Eoton, 1986 (On-futak-sagoro-zoku) [Japan (Hokkaido, Honshu, Shikoku), China]  
eoton Matsumura, 1951a (Siphonostate (7)).

Siphonostacta Matsumura, 1951 (Siphonostate).  
Siphonostate Eoton, 1986 (On-futak-sagoro-zoku) [Japan (Hokkaido, Honshu, Shikoku), China]  
Eoton Matsumura, 1951a (Siphonostate (7)).

Siphonostate Eoton, 1986 (On-futak-sagoro-zoku) [Japan (Hokkaido, Honshu, Shikoku), China]  
Eoton Matsumura, 1951a (Siphonostate (7)).

Siphonostate Eoton, 1986 (On-futak-sagoro-zoku) [Japan (Hokkaido, Honshu, Shikoku), China]  
Eoton Matsumura, 1951a (Siphonostate (7)).

Siphonostate Eoton, 1986 (On-futak-sagoro-zoku) [Japan (Hokkaido, Honshu, Shikoku), China]  
Eoton Matsumura, 1951a (Siphonostate (7)).

Siphonostate Eoton, 1986 (On-futak-sagoro-zoku) [Japan (Hokkaido, Honshu, Shikoku), China]  
Eoton Matsumura, 1951a (Siphonostate (7)).

Siphonostate Eoton, 1986 (On-futak-sagoro-zoku) [Japan (Hokkaido, Honshu, Shikoku), China]  
Eoton Matsumura, 1951a (Siphonostate (7)).

Siphonostate Eoton, 1986 (On-futak-sagoro-zoku) [Japan (Hokkaido, Honshu, Shikoku), China]  
Eoton Matsumura, 1951a (Siphonostate (7)).

Siphonostate Eoton, 1986 (On-futak-sagoro-zoku) [Japan (Hokkaido, Honshu, Shikoku), China]  
Eoton Matsumura, 1951a (Siphonostate (7)).

Siphonostate Eoton, 1986 (On-futak-sagoro-zoku) [Japan (Hokkaido, Honshu, Shikoku), China]  
Eoton Matsumura, 1951a (Siphonostate (7)).
Genus Ctenogma. McDunnog, 1933 (Myiomyza-tenuipes-kagero-ana)

Note: The first comprehensive study of the genus Ctenogma in Russia far East and Central Asia was given by Takahara & Belov (1982), who demonstrated the similarity of the two genera, Ctenogma and Blidhograma. Kluge (1982, 1993) regarded Ctenogma as a subgenus of the genus Blidhograma, because there are few morphological differences in adults. In Japan and North America, however, no comparative works on Ctenogma have been carried out.

Ctenogma adacta (Imajishi, 1935) (Claro-miyama-tanigawa-kagero) (Japan (Hokkaido, Shikoku)) adacta Imajishi, 1935 (Ctenogma; Takahara & Belov, 1982 (Ctenogma)).

Ctenogma com (Ushiro, 1927) (En-miyama-tanigawa-kagero) (Japan (Hokkaido, Mongolia, Russia)) com (Ushiro, 1927 (Ctenogma)); com (Ushiro & Okamoto, 1922 (Ctenogma)); com (Takahara & Belov, 1982 (Ctenogma)); Kluge, 1982 (Blidhograma (Ctenogma)); Takahara, 1999 (Ctenogma).

Ctenogma dora (Imajishi, 1935) (Senju-miyama-tanigawa-kagero) (Japan (Hokkaido)) dora Imajishi, 1935 (Ctenogma; Takahara & Belov, 1982 (Ctenogma).

Ctenogma hieron (Imajishi, 1935) (Miyama-tanigawa-kagero) (Japan (Hokkaido, Shikoku)) sp. nov. 7 Ushiro, 1922 (Ctenogma); sp. nov. 8 Ushiro, 1922 (Ctenogma); sp. nov. Imajishi, 1935 (Ctenogma; Takahara & Belov, 1982 (Ctenogma)); Kluge, 1982 (Blidhograma (Ctenogma)); Imajishi, 1993 (Ctenogma); Takahara & Belov, 1982 (Ctenogma).

Ctenogma patroica Kluge, 1980 (Kuro-miyama-tanigawa-kagero) (Japan (Hokkaido, Russia)) patroica Kluge, 1980 (Ctenogma); Kluge, 1982 (Blidhograma (Ctenogma); Kluge et al., 1993 (Ctenogma).

Ctenogma supravicalis (Matsumura, 1904) (Ctenogma) (Japan (Hokkaido, Honshu, Korea, Russia)) supravicalis Matsumura, 1904 (Ctenogma); supravicalis Matsumura, 1933 (Ctenogma); supravicalis (Ctenogma); supravicalis Matsumura, 1931b (Ctenogma); supravicalis (Ctenogma); supravicalis Matsumura, 1931b (Ctenogma).

Note: After examination of type specimens of Sphephora supravicalis Matsumura, 1904, I found that this is a valid species and a senior synonym of Ctenogma supravicalis Takahara, 1952. This species was previously synonymized with Amelius caeruleus by Imajishi (1935).

Ctenogma verticalis (Imajishi, 1935) (Haruo-miyama-tanigawa-kagero) (Japan (Hokkaido, Shikoku)) verticalis Imajishi, 1935 (Ctenogma; Takahara & Belov, 1982 (Ctenogma)).

Genus Echydnuma Kluge, 1984 (Tangawa-kagero-ana)

Note: The concept of the genus Echydnuma by Kluge (1984) is adopted here until more
Kyuhoji

zohninai Takahashi, 1929 (Eosophus).

nazukiman Matsunuma, 1931 e (Cynops) SYU. N.

Note: After examination of type specimens of Cynops nazukiman Matsunuma, 1931, I found that this is a junior synonym of Eosophus zohninai Takahashi, 1929. Imaisaki (1934) examined this specimen in the Matsunuma Collection and labeled "Eosophus zohninai". There are, however, no synonyms in his listings.

Eosophus zohninai (Matsunuma, 1931) COMB. N. (Sekiri-tengawa-kageru) [Japan (Hokkaido, Honshu, Shikoku, Okinawa-Honsu)]

zohninai Matsunuma, 1931 e (Cynops),
yohubai Utano, 1938 (Eosophus) Misidentification.


Eosophus yohubai Takahashi, 1924 (Shiro-tengawa-kageru) [Japan (Hokkaido, Shikoku, Kyushu)]
yohubai Takahashi, 1924 (Eosophus).

japanica Utano, 1928 (Eosophus).

levai: Ishihara, 1997 (Eosophus) Misidentification.

Genus Eosophus Eaton, 1881 (Hirata-kageru-zoku)

Eosophus ancusus Imaisaki, 1934 (Kuro-hirata-kageru) [Japan (Hokkaido, Honshu, Shikoku), Korea, Russia]

ancusus Imaisaki, 1934 (Eosophus), Shtobushkova, 1978 (Java), Kluge, 1988 (Eosophus)

Eosophus camerarius Imaisaki, 1939 STAT. N. (Kumuru-urata-kageru) [Japan (Hokkaido),
curvatus f. camerarius Imaisaki, 1939 (Eosophus),
curvatus camerarius: Takemoto, 1990 (Eosophus)

curvatus Matsunuma, 1931 (Uono-urata-kageru) [Japan (Hokkaido, Honshu, Shikoku, Kyushu)]

"sp. ?" Utano, 1928 (Java),
curvatus Matsunuma, 1931 e (Eosophus),
semi sp.?, no Matsunuma, 1931 (Eosophus).

Note: This species was briefly reported at nymphal stage under the name "sp. ?" by Utano (1928). Imaisaki (1934) erroneously assigned this species to the nymph of Eosophus semi (Matsunuma) and described the adults.

Eosophus orientalis Braasch, 1903 (Kiiro-hirata-kageru) [Japan (Okinawa: Ishigaki-jima ls.,

Hiburi-jima ls.), Taiwan],

pri Eaton, 1885 (Eosophus), Utano, 1912 (Eosophus), Utano, 1928, 1929 (Eosophus), Imaisaki, 1934 (Eosophus) Misidentification.

orientalis Braasch 1811 (Eosophus),

i.e., Utano, 1929, 1928 (Eosophus).

Eosophus hiroshi Imaisaki, 1934 (Otsu-hirata-kageru) [Japan (Honshu),

hiroshi Imaisaki, 1934 (Eosophus).

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Euphractus sexcinctus Takahashi, 1925 (Nami-bitsu-kagerou) [Japan (Hokkaido, Honshu, Shikoku, Kyushu)]

Takamura T. 1934 (Euphractus)

Euphractus sexcinctus Utida, 1928 (Shiokaze-bitsu-kagerou) [Japan (Honshu, Hokkaido, Shikoku, Kyushu)]

Utida T. 1928 (Euphractus) [Kitaichi, 1928 (Euphractus)]

Euphractus sexcinctus Makino, 1921 (Euphractus) [Japan (Hokkaido, Honshu, Shikoku, Kyushu)]

Makino S. 1921 (Euphractus) [Kitaichi, 1928 (Euphractus)]

注: 一部に誤認を含む種の分類は、日本における種の分類を含む、種の分類を含む、種の分類を含む、種の分類を含む、種の分類を含む。
1968. *Euphorbia* Goeze (1796) synonymized *E. nana* with *E. nana*, and provided drawings of the male gametophyte of *C. nana* under the name *E. nana*. I could not examine the type specimen of *E. nana* because no type specimen has been preserved in the herbarium collection, CJBH. However, my examination of dried material of *R. nana* showed the presence of first spores on the vascular thorns, absence of bile ducts in the stem, and wide separation of petals, which were the diagnostic characters of *R. nana*.

Grue (1968) originally described *gojuyoshi* under the genus *Euphorbia* that had four spores on the vascular thorns. This should be transferred to the genus *Rhodora* because of the following character figured by Grue: the capitulum of *Rhodora* consists of a series of vesicles (containing two pairs) (Grue's 1968 fig. 14), instead of four pairs of two pairs and one-third length of segment 2 (fig. 16) and petals-wide separated to base (fig. 17). These are unique characteristics among species *Rhodora*. I have not been successful in learning the biology of *R. gojuyoshi*, but I have collected specimens from *gojuyoshi*. Nara-ken, the type locality of *R. gojuyoshi*. All of these are identical to *R. rhodora* in the respect of body size, coloration, and detail morphology of male gametophyte. Therefore, I regard that both *R. nana* and *R. gojuyoshi* as synonyms of *R. rhodora*.

**Genus incurvature**

_Ectenospermae incertae sedis, 1933_ (Futabehi-taishigawakagetsu) [Japan (Honshu)]

*Ectenosperma incertae sedis, 1933_ (Ectenosperma incertae sedis, 1933)

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**References**


Goeze, K. 1891. Description of two new species of Baetidae from Japan (Ephemeroptera). Arch. 33: 118-220.
