

Enumeration of the Cyanophyta (blue-green algae) of Japan

2. Nostocales and Stigonematales

Isamu Umezaki* and Masayuki Watanabe**

* Fukui Prefectural University, Gakuen-cho 1-1, Obama, 917 Japan

** Department of Botany, National Science Museum, Tsukuba, 305 Japan

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In the present contribution are enumerated all the species of the blue-green algae belonging to the orders of Nostocales and Stigonematales, which were reported to occur in Japan. In the Nostocales are listed 4 families, 28 genera and 161 species. The Microchaetaceae includes 6 genera and 19 species, the Nostocaceae 13 genera and 86 species, the Rivulariaceae 6 genera and 37 species and the Scytonemataceae 3 genera and 19 species. The following two new combinations are established. Nostocaceae: *Hydrocoryne enteromorphoides* (Grun. ex Born. & Flah.) comb. nov. (= *Hormothamnium enteromorphoides* Grun. ex Born. & Flah. 1886), Scytonemataceae: *Scytonematopsis pilosa* (Harv. ex Born. & Flah.) comb. nov. (= *Calothrix pilosa* Harv. ex Born. & Flah. 1886). In the Stigonematales are listed 6 families, 13 genera and 30 species. The Borzinemataceae comprises 2 genera and 2 species, the Capsosiraceae one genus and one species, the Fischerellaceae 2 genera and 5 species, the Mastigocladaceae 5 genera and 11 species, Nostocopsaceae 2 genera and 2 species, and the Stigonemataceae one genus and 9 species.

Key Index words: blue-green algae—Cyanophyta—Nostocales—Stigonematales—list—Japan

III. Nostocales (Borzi 1914) Geitl. 1925

1. Microchaetaceae Lemm. 1910

(1) Microchaetoideae Kom. & Anagn. 1989

Fortiea J. De Toni 1936

Syn.: *Leptobasis* Elenk. 1915, non *Leptobasis* Dulac. 1867

F. bossei (Frémy) Desik. 1959

Basion.: *Fremyella Bossei* Frémy 1942

Ref.: Hiramatsu 1967; M. Watanabe and Niiyama 1990

Microchaete Thur. ex Born. & Flah. 1886

Syn.: *Fremyella* J. De Toni 1936

M. bulbosa Copel. 1936

Syn.: *Fremyella bulbosa* (Copel.) J. De Toni 1947

Ref.: Yoneda 1941a, 1952a; Emoto and Yoneda 1941a; Hirose and Hirano 1977

M. grisea Thur. ex Born. & Flah. 1886

Syn.: *Fremyella grisea* (Thur.) J. De Toni 1936

Ref.: Umezaki 1961; Takata and Hirose 1971

M. investiens Frémy 1929

Syn.: *Fremyella investiens* (Frémy) J. De Toni 1936

Ref.: Hirose and Hirano 1977

M. tenera Thur. ex Born. & Flah. 1886

Syn.: *Fremyella tenera* (Thur.) J. De Toni 1936

Ref.: Higashi and Okada 1927; Yoneda 1939a, d, 1952a, 1953a; Emoto and Yoneda 1942; Hiramatsu 1967; Hirose and Hirano 1977

M. thermalis Emoto & Yoneda 1940b

Ref.: Emoto & Yoneda 1940b; Yoneda 1952a; Hirose and Hirano 1977

M. uberrima Cart. 1926

Syn.: *Fremyella uberrima* (Cart.) J. De Toni 1936

Ref.: Akiyama 1961, 1965a

M. vitiensis Ask. ex Born. & Flah. 1886

Syn.: *Fremyella vitiensis* (Ask.) J. De Toni 1936

- Ref.: Umezaki 1961
- (2) Tolypotrichoideae Kom. & Anagn. 1989
- Coleodesmium* Borzi ex Geitl. 1942
Syn.: *Desmonema* Berk. & Thw. ex Born. & Flah. 1886
- C. sagarmathae* Kom. & M. Watanabe 1990
Ref.: Komárek and M. Watanabe 1990
- C. wrangelii* (Ag.) Born. & Flah. 1886
- C. wrangelii* var. *wrangelii*
Ref.: Higashi and Okada 1927
- C. wrangelii* var. *floccosum* (Borzi) Kom. & M. Watanabe 1990
Basion.: *Coleodesmium floccosum* Borzi 1879
Ref.: M. Watanabe et al. 1984 (as *Coleodesmium wrangelii*); Ioriya et al. 1984 (as *Coleodesmium wrangelii*); Komárek and M. Watanabe 1990
- Hassallia* Berk. ex Born. & Flah. 1886
Syn.: *Tolypothrix* sect. *Hassallina* Kirchn. in Engl. & Prantl 1900
- H. byssoidea* (Ag.) Hass. ex Born. & Flah. 1886
- H. byssoidea* var. *byssoidea*
Syn.: *Tolypothrix byssoidea* (Ag.) Kirchn. in Engl. & Prantl 1900
Ref.: Yoneda 1937, 1950, 1952a; Emoto and Hirose 1940b; Hiramatsu 1967, 1973; Nakano 1970; Yamagishi 1972; Hirose and Hirano 1977
- H. byssoidea* var. *saxicola* Grun. ex Born. & Flah. 1886 (as forma β)
Syn.: *Tolypothrix byssoidea* (Ag.) Kirchn. f. *saxicola* Grun. ex Forti 1907
Ref.: Yoneda 1950
- Tolypothrix* Kütz. ex Born. & Flah. 1886
- T. campylonemoides* Ghose 1923
Ref.: Hiramatsu 1973
- T. distorta* Kütz. ex Born. & Flah. 1886
Ref.: Akiyama 1965a; Hiramatsu 1967; Negoro 1973; Hirose and Hirano 1977; M. Watanabe and Niiyama 1990
Syn.: *Tolypothrix distorta* var. *penicillata* (Ag.) Lemm. 1907
Ref.: Negoro 1973
- T. fragilis* (Gardn.) Geitl. 1932
Basion.: *Hassallia fragilis* Gardn. 1927 ("Hassalia")
Ref.: Akiyama 1965b; Hirose and Hirano 1977
- T. lanata* (Desv.) Ag. ex Born. & Flah. 1886
Ref.: Hirose 1938; Yoneda 1953a; Horikawa et al. 1969; Hirose and Hirano 1977
- T. limbata* Thur. ex Born. & Flah. 1886
Ref.: Akiyama 1965a; Hirose and Hirano 1977
Syn.: *Tolypothrix limbata* var. *cylindrica* Ghose 1932
Ref.: Mori 1971
- T. rechingeri* (Wille) Geitl. 1925 ("Rechingeri")
Ref.: Higashi and Okada 1927
- T. tenuis* Kütz. ex Born. & Flah. 1886
- T. tenuis* var. *tenuis*
Ref.: Hirose 1938; Yoneda 1939a, d, 1953a; Kobayasi 1958; Hirano 1960; Kobayasi et al. 1962; Akiyama 1965a; Hiramatsu 1967, 1973; A. Watanabe 1970; Negoro 1973; Hirose and Hirano 1977; Yamagishi 1972, 1985
- T. tenuis* var. *wartmanniana* (Rabenh.) Hansg. 1892 ("Wartmanniana")
Ref.: Hirose 1938; Hirose and Hirano 1977
- Petalonema* Berk. ex Kirchn. 1898
Syn.: *Croatella* Erceg. 1925
- P. densum* A. Br. ex Mig. 1907
Ref.: Yoneda 1939a
Syn.: *Scytonema densum* (A. Br.) Born. ex Born. & Flah. 1886
Ref.: Hirose and Hirano 1977
2. Nostocaceae Dumort. 1829
- (1) Anabaenoideae (Born. & Flah.) Kirchn. 1900
- Anabaena* Bory ("Anabaina") ex Born. & Flah. 1886
- A. aequalis* Borge 1906
Ref.: Fukushima 1952, 1954; Hirano 1963; Mizuno 1964; Hirose and Hirano 1977
- A. affinis* Lemm. 1897
Ref.: Akatsuka 1951; Yamaguti 1956; Mizuno 1964; Akiyama 1965a; Muraya-

- ma and Saisho 1967; Hirose and Hirano 1977; Imazu 1979, 1981, 1986, 1987; M. Watanabe and Chihara 1980; M. Watanabe 1984; Negoro 1991a
 Syn.: *Anabaena catenula* (Kütz.) Born. & Flah. var. *affinis* (Lemm.) Geitl. 1932
 Ref.: Fukushima 1951; M. Watanabe 1971
- A. *augstumalis*** Schmidle 1899
A. *augstumalis* var. ***augstumalis***
 Ref.: Hirose 1938; Yoneda 1953a; Hirano 1956a, 1958; Hirose and Hirano 1977
- A. *augstumalis*** var. ***marchica*** Lemm. 1905
 Ref.: Yoneda 1953a; Hirano 1962; Mizuno 1964; Hirose and Hirano 1977
- A. *ballyungii*** Banerji 1938
 Ref.: Akiyama 1977
- A. *circinalis*** Rabenh. ex Born. & Flah. 1886
 Ref.: Hirano 1956b; M. Watanabe 1971; M. Watanabe and Niiyama 1990
 Syn.: *Anabaena Hassallii* Wittr. ex Lemm. 1907
 Ref.: Okada 1939b; Akatsuka 1951
- A. *citrispora*** M. Watanabe 1992
 Ref.: M. Watanabe 1992
- A. *crassa*** (Lemm.) Kom.-Legn. & Cronb. 1992
 Basion.: *Anabaena spiroides* var. *crassa* Lemm. 1898
 Syn.: *Anabaena spiroides* f. *crassa* (Lemm.) Elenk. 1938
 Ref.: Okada 1939b; Kokubo 1944; Yamaguti 1956; Iwai 1963; Mizuno 1964; Negoro 1968, 1971, 1991a; M. Watanabe 1971, 1984; Hirose and Hirano 1977; M. Watanabe and Chihara 1980; M. Watanabe and Niiyama 1990
- A. *cylindrica*** Lemm. 1896
 Ref.: T. Watanabe 1956; M. Watanabe 1971; Hirose and Hirano 1977
- A. *flos-aquae*** Bréb. ex Born. & Flah. 1886 (“*Flos-aquae*”)
A. *flos-aquae* f. ***flos-aquae***
 Ref.: Hattori 1908; Higashi and Okada 1927; Ueno 1934; Yamada 1935; Miyauchi 1935; Negoro 1937a, 1973; Kokubo 1944; Kokubo and Kawamura 1948; Hirose 1950; Akatsuka 1951; Yoneda 1953b; Hirano 1956a, 1960; Hada 1960; Mizuno 1964; M. Watanabe 1971; Kurasawa and Okino 1975; Hirose and Hirano 1977; M. Watanabe and Chihara 1980
 Syn.: *Anabaena circinalis* (Kütz.) Hansg. ex Lemm. 1907
 Ref.: Ueno 1933; Akatsuka 1951; Ochiai 1962a; Fukushima 1954; Mizuno 1964; Hirose and Hirano 1977
 Syn.: *Anabaena flos-aquae* Bréb. var. *gracilis* Kleb. 1895
 Ref.: M. Watanabe 1971
 Syn.: *Anabaena flos-aquae* Bréb. var. *intermedia* Woron. f. *spiroides* Woron. 1923
 Ref.: Akatsuka 1951; M. Watanabe 1971
- A. *iyengarii*** Bharadw. 1935 (“*Iyengarii*”)
A. *iyengarii* Bharadw. var. ***tenuis*** C. B. Rao 1937
 Ref.: Emoto and Hirose 1942e; Yoneda 1952a; Hirose and Hirano 1977
- A. *lapponica*** Borge 1913
 Ref.: Kobayasi 1958; Kobayasi et al. 1962; Hirano 1962; Mizuno 1964; M. Watanabe 1971; Hirose and Hirano 1977
- A. *laxa*** A. Br. ex Born. & Flah. 1886
 Syn.: *Anabaena inaequalis* (Kütz.) Born. & Flah. 1886
 Ref.: Fukushima 1952, 1954; Nakano 1970; M. Watanabe 1971; Hiramatsu 1973; Hirose and Hirano 1977
- A. *lemmermannii*** P. Richt. 1903 (“*Lemmermannii*”)
 Syn.: *Anabaena flos-aquae* f. *lemmermannii* (P. Richt.) Canab. 1929 (“*Lemmermannii*”)
 Ref.: Akatsuka 1951
- A. *macrospora*** Kleb. 1895
A. *macrospora* var. ***macrospora***
 Ref.: Negoro 1936, 1959, 1967, 1973; Akatsuka 1951; Hirose and Hirano 1977; M. Watanabe et al. 1985
- A. *macrospora*** var. ***crassa*** Kleb. 1895
 Ref.: Negoro 1968; Hirose and Hirano 1977
- A. *mendotae*** Trelease 1889
 Syn.: *Anabaena flos-aquae* Bréb. f. *treleasii* (Born. & Flah.) Elenk. 1938 (“*Treleasii*”)
 Ref.: Negoro 1937a; T. Watanabe 1956; M. Watanabe 1971, 1984; M. Watanabe and Niiyama 1990

- A. minderi* Huber-Pestal. 1938 ("Minderi")
Ref. Negoro 1973
- A. oscillarioides* Bory ex Born. & Flah. 1886
- A. oscillarioides* var. *oscillarioides*
Ref.: Okada 1936, 1939b; Yoneda 1953a;
Onuki 1950; Hiramatsu 1967; Hirose
and Hirano 1977
- A. oscillarioides* var. *stenospora* Born. & Flah.
1886
Ref.: M. Watanabe 1971
- A. planctonica* Brunnth. 1933
Syn.: *Anabaena solitaria* f. *planctonica*
(Brunnth.) Kom. 1958
Ref.: Kokubo 1944; Hirose 1950; Onuki
1950; Akatsuka 1951; Mizuno 1964;
Akiyama 1965a; Negoro 1973; Hirose
and Hirano 1977; Yamagishi et al. 1982;
M. Watanabe 1971 (as *A. scheremetievi* f.
ovospora), 1984, 1992; M. Watanabe
and Niiyama 1990
Syn.: *Anabaena limnetica* G. M. Smith 1916
Ref.: Akatsuka 1951
Syn.: *Anabaena solitaria* f. *solitaria* sensu
Kom. 1958
Ref.: M. Watanabe and Chihara 1980
- A. saaremaaensis* Skuja 1929
Ref.: M. Watanabe 1971
- A. sedovii* Kossinsk. 1933 ("Sedovii")
Ref.: Kokubo 1944
- A. smithii* (Kom.) M. Watanabe 1992
Basion.: *Anabaena solitaria* Kleb. f. *smithii*
Kom. 1958
Ref.: M. Watanabe 1971 (as *A. scheremetievi*
var. *recta* f. *ovalispora* Elenk.), 1984,
1992; Hirose and Hirano 1977 (as *A.*
scheremetievi)
Syn.: *Anabaena Scheremetievi* Elenk. var. *recta*
Elenk. f. *rotundospora* Elenk. 1938
Ref.: Negoro 1937a; Okada 1939b; Hirano
1954; T. Watanabe 1968b
- A. solitaria* Kleb. 1895
Ref.: Umezaki 1983
- A. sphaerica* Born. & Flah. 1886
Ref.: Kobayasi 1958; Kobayasi et al. 1962;
Hirose and Hirano 1977
- A. spiroides* Kleb. 1895
Ref.: Hirose 1938; Kokubo and
Kawamura 1948; Yoneda 1953b; Onuki
1950; Akatsuka 1951; Hirano 1956b;
Negoro 1967, 1973; M. Watanabe 1971;
Akiyama 1977; Hirose and Hirano 1977;
Wakabayashi and Ichise 1982; M.
Watanabe and Chihara 1980; M.
Watanabe 1984
- A. subcylindrica* Borge 1921
Ref.: T. Watanabe 1956; Akiyama 1965a;
M. Watanabe 1971; Hirose and Hirano
1977
- A. torulosa* (Carm.) Lagerh. ex Born. & Flah.
1886
Ref.: Imazu and Hirose 1961; Hirose and
Hirano 1977
- A. verrucosa* Peters. 1928
Ref.: Kobayasi 1958; Kobayasi et al. 1962;
Hirano 1962; Hirose and Hirano 1977
- A. viguieri* Denis & Frémy 1923 ("Viguieri")
Syn.: *Anabaena affinis* f. *viguieri* (Denis &
Frémy) Kom. 1958
Ref.: Hirose and Hirano 1977; M.
Watanabe 1992
- Anabaenopsis* (Wolosz.) Mill. 1923
- A. arnoldii* Aptek. 1926 ("Arnoldii")
Ref.: Okada 1936, 1939b; Negoro 1973;
Hirose and Hirano 1977; Umezaki 1983
Syn.: *Anabaenopsis doliiiformis* Noda 1963
Ref.: Noda 1963
- A. circularis* (G. S. West) Wolosz. & Mill. in
Mill. 1923
Basion.: *Anabaena flos-aquae* Bréb. ex Born.
& Flah. var. *circularis* G. S. West 1907
Ref.: Akatsuka 1951; A. Watanabe and
Yamamoto 1967; Negoro 1973
Syn.: *Anabaenopsis circularis* (G. S. West)
Mill. f. *recta* Fukushima 1954
Ref.: Fukushima 1954
- A. elenkinii* Mill. 1923 ("Elenkini")
Ref.: Akatsuka 1951
- A. milleri* Woron. 1929 ("Milleri")
Ref.: Akatsuka 1951
- A. nadsonii* Woron. 1929 ("Nadsonii")
Ref.: Akatsuka 1951
- A. tanganyikae* (G. S. West) Mill. 1923
Basion.: *Anabaena tanganyikae* G. S. West
1907
Ref.: Akatsuka 1951

Aphanizomenon Morr. ex Born. &
Flah. 1886

- A. aphanizomenoides* (Forti) Horec. & Kom. 1979
Basion.: *Anabaena aphanizomenoides* Forti 1912
Ref.: Akatsuka 1951; Akiyama 1977; Hirose and Hirano 1977; Negoro and Aoki 1991
- A. elenkinii* Kisel. 1951 ("Elenkinii")
Syn.: *Aphanizomenon elenkinii* Kisel. var. *gracile* Kascht. 1955
Ref.: Hirano 1958
- A. flos-aquae* Ralfs ex Born. & Flah. 1886 ("Flos-aquae")
- A. flos-aquae* var. *flos-aquae*
Ref.: Higashi and Okada 1927; Higashi 1933c; Miyauchi 1935; Kokubo 1944; Hirose 1950; Akatsuka 1951; Hirano 1956b; Mizuno 1964; Negoro 1973; Akiyama 1977; Hirose and Hirano 1977; M. Watanabe and Chihara 1980; Umezaki 1987; M. Watanabe 1991
- A. gracile* Lemm. 1907
Basion.: *Aphanizomenon Flos-aquae* var. *gracile* Lemm. 1890
Ref.: M. Watanabe and Chihara 1980; Yamagishi et al. 1982
Syn.: *Aphanizomenon Flos-aquae* var. *Klebah-nii* Elenk. 1909
Ref.: Negoro 1937a; Hirose 1950; Hirano 1960; Hirose and Hirano 1977; M. Watanabe 1991
- A. paraflexuosum* M. Watanabe 1991
Ref.: M. Watanabe 1991
- A. yezoense* M. Watanabe 1991
Ref.: M. Watanabe 1991

Cylindrospermopsis Seenayya &
Subba Raju 1972

- C. raciborskii* (Wolosz.) Seenayya & Subba Raju 1972
Basion.: *Anabaenopsis Raciborskii* Wolosz. ex Geitl. 1925
Ref.: Negoro 1935, 1936, 1973, 1991b; Akatsuka 1951; Fukushima 1949, 1955a; Ochiai 1960; Hirose and Hirano 1977; Umezaki 1992

Cylindrospermum Kütz. ex Born. &
Flah. 1886

- C. alatosporum* Fritsch 1918
Ref.: Hirose and Hirano 1977
Syn.: *Cylindrospermum oblongum* Yoneda 1942a
Ref.: Yoneda 1942a
- C. catenatum* Ralfs ex Born. & Flah. 1886
Ref.: Yoneda 1942a; Hirose and Hirano 1977
- C. licheniforme* (Bory) Kütz. ex Born. & Flah. 1886
Ref.: Yoneda 1938b, 1952a; Hirose and Hirano 1977
- C. majus* Kütz. ex Born. & Flah. 1886
Ref.: Hirose 1938; Yoneda 1942a, 1952a; Akiyama 1965a, b; Hiramatsu 1967; Hirose and Hirano 1977; M. Watanabe and Niiyama 1990
- C. muscicola* Kütz. ex Born. & Flah. 1886
- C. muscicola* var. *muscicola*
Ref.: Yoneda 1938b, 1952a; Ochiai 1962b
- C. stagnale* (Kütz.) Born. & Flah. 1886
Ref.: Higashi and Okada 1927; Yoneda 1938a, 1952a, 1953a; Hirose 1938; Fukushima 1952, 1954; Hirano 1962; Hiramatsu 1967, 1973; Negoro 1973; Hirose and Hirano 1977; Yamagishi 1985
Syn.: *Cylindrospermum echigoense* Noda 1971
Ref.: Noda 1971
- C. tropicum* W. & G. S. West 1902
Ref.: Akatsuka 1951
- Hydrocoryne* Schwabe ex Born. & Flah. 1886
Syn.: *Hormothamnium* Grun. ex Born. & Flah. 1886 ("*Hormothamnion*"), *Anabaenothrix* Randh. 1936
- H. enteromorphoides* (Grun. ex Born. & Flah.) comb. nov.
Basion.: *Hormothamnium enteromorphoides* Grun. ex Born. & Flah., Ann. Sci. Nat. VII. Bot. 7: 260, 1886
Ref.: Higashi and Okada 1927; Umezaki 1961; Umezaki and Kamura 1977
- H. spongiosa* Schwabe ex Born. & Flah. 1886
Ref.: Higashi and Okada 1927; Hirose 1938; Hirose and Hirano 1977

- Raphidiopsis* Fritsch & Rich 1929
- R. mediterranea* Skuja f. *major* Yoneda 1953b
Ref.: Yoneda 1953b
Syn.: *Raphidiopsis mediterranea* var. *grandis* Hill 1970
Ref.: M. Watanabe and Chihara 1980; M. Watanabe 1985
- Richelia* Johs.-Schmidt 1901
- R. intracellularis* Johs.-Schmidt 1901
Ref.: Okamura 1916; Higashi and Okada 1927; Akatsuka 1951; Tokida and Masaki 1959; Umezaki 1961; Marumo 1966; Yoneda 1966; Yabu 1971; Yamaji 1984
- Wollea* Born. & Flah. 1886
- W. saccta* (Wolle) Born. & Flah. 1886
Ref.: Higashi and Okada 1927
- (2) Nostocoideae (Borzi 1914) Kom. & Anagn. 1989
- Aulosira* Kirchn. ex Born. & Flah. 1888
- A. fertilissima* Ghose 1923
Ref.: Hiramatsu 1973
- A. implexa* Born. & Flah. 1886
Ref.: Yoneda 1942a, 1952a, 1953a, 1962a; Emoto and Yoneda 1941b; Hirose and Hirano 1977; Mifune and Hirose 1983a
- A. laxa* Kirchn. ex Born. & Flah. 1886
Ref.: Akiyama 1965a
- A. major* Emoto & Hirose 1940a
Ref.: Emoto and Hirose 1940a; Yoneda 1952a; Hirose and Hirano 1977
- A. prolifera* Bharadw. 1933
Ref.: Akiyama 1965b; Mori 1971; Hirose and Hirano 1977
- Nodularia* Mert. ex Born. & Flah. 1886
- N. harveyana* (Thw. in Harv.) Thur. ex Born. & Flah. 1886 ("Harveyana")
Ref.: Umezaki 1961; Hirose 1964; Mizuno 1964; Hiramatsu 1967; Hirose and Hirano 1977
Syn.: *Nodularia Harveyana* var. *sphaerocarpa* (Born. & Flah.) Elenk. 1916
Ref.: Negoro 1936, 1973; Hirose and Hirano 1977
- N. spumigena* Mert. ex Born. & Flah. 1886
Ref.: Yoneda 1937; Okada 1939b; Akatsuka 1951; Mizuno 1964; Akiyama 1965a, b; Nakano 1970; Negoro 1973
Syn.: *Nodularia spumigena* var. *major* (Kütz.) Born. & Flah. 1886
Ref.: Hirose and Hirano 1977
Syn.: *Nodularia spumigena* var. *minor* Fritsch 1912
Ref.: Higashi and Okada 1927
- Nostoc* Vauch. ex Born. & Flah. 1886
(as *Nostoc* Geoffroy ex Linn. pro synonym. 1753, according to Drouet 1978, p. 21)
- N. carneum* (Lyngb.) Ag. ex Born. & Flah. 1886
Ref.: Yoneda 1938b, c, 1952a; Emoto and Hirose 1942a; Hirose 1962; Hiramatsu 1967; Hirose and Hirano 1977
- N. coeruleum* Lyngb. ex Born. & Flah. 1886
Ref.: Yoneda 1941a, 1953a; Hirose 1962; Hirano 1962; Mori 1971; Hirose and Hirano 1977; Yamagishi 1985
- N. commune* Vauch. ex Born. & Flah. 1886
- N. commune* var. *commune*
Ref.: Martens 1866; Toyama 1890; Okamura 1902, 1936; Matsumura 1904; Higashi and Okada 1927; Higashi 1933a; Hirose 1938, 1962, 1965; Yoneda 1938a, 1950, 1953a, 1962b, 1966; Okada 1939b, 1953b; Kobayasi 1958; Dawson 1959 (Harvey's manuscript); Umezaki 1961; Akiyama 1961, 1965a; Kobayasi et al. 1962; Nakano 1970; A. Watanabe 1970; Negoro 1973; Hirose and Hirano 1977; Yamagishi 1985
- N. commune* var. *flagelliforme* (Berk. & Curt.) Born. & Flah. 1886
Syn.: *Nostoc flagelliforme* Berk. & Curt. 1857
Ref.: Yendo 1912; Okamura 1913, 1934b; Hisauchi 1969; S. Ueda et al. 1963; Hirose 1965; Yoneda 1966; A. Watanabe 1970
- N. conglomeratum* Hirose 1962
Ref.: Hirose 1962; Hirose and Hirano 1977
- N. ellipso sporum* (Dasmaz.) Rabenh. ex Born. & Flah. 1886

- Ref.: Yoneda 1941a; Emoto and Hirose 1942c (as *Nostoc carneum* Ag.); Hirose 1962; Hiramatsu 1967, 1973; Hirose and Hirano 1977
- N. kihlmanii* Lemm. 1900 ("Kihlmani")
- N. kihlmanii* var. *doliiforme* Hirose 1962
Ref.: Hirose 1938 (as *Nostoc kihlmani* Lemm.), 1962; Hirose and Hirano 1977
- N. kihlmanii* var. *vaginatum* Hirose 1962
Ref.: Hirose 1962; Mizuno 1964; Hirose and Hirano 1977
- N. linckia* (Roth) Born. ex Born. & Flah. 1886 ("Linckia")
Ref.: Hirose 1938, 1962; Yoneda 1941a, 1953a; Fukushima 1952; Mizuno 1964; Hiramatsu 1967; Hirose and Hirano 1977; Noda 1987
- N. macrosporum* Menegh. ex Born. & Flah. 1886
Ref.: Yoneda 1939a, 1952a; Emoto and Yoneda 1941a; Hirose 1962; Hirose and Hirano 1977
- N. microscopicum* Carm. ex Born. & Flah. 1886
Ref.: Yoneda 1939a; Hirose 1962; Mifune et al. 1966; T. Watanabe 1968a; Nakano 1970; Hiramatsu 1973; Hirose and Hirano 1977
- N. minutum* Desmaz. ex Born. & Flah. 1886
Ref.: Hirano 1962; Mori 1971
- N. muscorum* Ag. ex Born. & Flah. 1886
Ref.: Yoneda 1942a, e, 1952a; Emoto and Yoneda 1942; Hirose 1962; Hirose and Hirano 1977
- N. paludosum* Kütz. ex Born. & Flah. 1886
Ref.: Dickie 1877; Matsumura 1904; Yoneda 1938a, 1953a; Hirano 1954, 1962; Hirose 1962; Mizuno 1964; T. Watanabe 1968a; Mori 1971; Yamagishi 1972; Hirose and Hirano 1977
- N. parmelioides* Kütz. ex Born. & Flah. 1886
Ref.: Fukushima 1952; Hirose 1962; Akiyama 1965a; Hiramatsu 1967; T. Watanabe 1968c; Hirose and Hirano 1977
- N. planctonicum* Poretz. & Tschern. 1929
Ref.: Negoro 1973
- N. pruniforme* Ag. ex Born. & Flah. 1886
Ref.: Yoneda 1966
- N. punctiforme* (Kütz.) Hariot 1891
Ref.: Emoto and Hirose 1942c; Yoneda 1952a, 1953a; Hirose 1962; Hiramatsu 1973; Hirose and Hirano 1977
- N. rivulare* Kütz. ex Born. & Flah. 1886
Ref.: Yoneda 1938a; Hirose 1962; Negoro 1973; Hirose and Hirano 1977
- N. sphaericum* Vauch. ex Born. & Flah. 1886
- N. sphaericum* var. *sphaericum*
Ref.: Yoneda 1938a, 1950; Hirose 1938, 1962; Fukushima 1952; Hirano 1962; T. Watanabe 1968c; Mori 1971; Hirose and Hirano 1977
- N. sphaericum* var. *cylindrosporum* Hirose 1962
Ref.: Hirose 1962; Hirose and Hirano 1977
- N. spongiaeforme* Ag. ex Born. & Flah. 1886
Ref.: Yoneda 1940a; Hirose 1962; Hiramatsu 1967; Negoro 1973
- N. torulosum* Hirose 1962
Ref.: Hirose 1962; Mizuno 1964; Hirose and Hirano 1977
- N. verrucosum* Vauch. ex Born. & Flah. 1886
Ref.: Tomaya 1890; Koizumi 1919; Higashi 1933a; Kobayasi and Watari 1934; Okada 1939b; Yoneda 1939a, 1962b, 1966; Mifune 1957; Hirose 1962; Kobayasi et al. 1962; Akiyama 1965a; Hiramatsu 1967; A. Watanabe 1970; Negoro 1973; Hirose and Hirano 1977
- Trichormus* (Ralfs ex Born. & Flah.)
Kom. & Anagn. 1989
Basion.: *Anabaena* Bory sect. *Trichormus* Ralfs ex Born. & Flah. 1886
- T. azollae* (Strasb.) Kom. & Anagn. 1989
Basion.: *Anabaena Azollae* Strasb. ex Wittr., Nordst. & Lagerh. 1896
Ref.: Okamura 1902; Matsumura 1904; Kobayasi and Watari 1934; Okada 1953b; Akiyama 1965a; S. Ueda et al. 1963; Yoneda 1966; Hiramatsu 1973; Negoro 1973; Hirose and Hirano 1977
- T. catenulus* (Kütz. ex Born. & Flah.) Kom. & Anagn. 1989
Basion.: *Anabaena catenula* (Kütz.) Born. & Flah. 1886
Ref.: Fukushima 1951, 1954; Yoneda

- 1953b; Mizuno 1964
- T. cycadearum** (Reinke) Kom. & Anagn. 1989
 Basion.: *Anabaena Cycadearum* Reinke in Tilden 1896
 Ref.: Higashi and Okada 1927; Yamada 1935; Okada 1953b; S. Ueda et al. 1963; Yoneda 1966; Nakano 1970; Negoro 1973; Hirose and Hirano 1977
 Syn.: *Nostoc cycadae* A. Watanabe & Kiyohara 1963, nom. nud.
 Ref.: A. Watanabe and Kiyohara 1963
- T. thermalis** (Vouk) Kom. & Anagn. 1989
 Basion.: *Anabaena thermalis* Vouk 1916
 Syn.: *Anabaena Voukii* J. De Toni 1936
 Ref.: Emoto and Hirose 1942f; Yoneda 1952a; Mifune et al. 1959; Akiyama 1965a; Hirose and Hirano 1977
- T. variabilis** (Kütz. ex Born. & Flah.) Kom. & Anagn. 1989
 Basion.: *Anabaena variabilis* Kütz. ex Born. & Flah. 1886
 Ref.: Yoneda 1938b, c, 1952a; Hirose and Hirano 1977
3. Rivulariaceae Kütz. 1843
- Calothrix** Ag. ex Born. & Flah. 1886
- C. africana** Schmidle 1901
 Ref.: Hirose and Hirano 1977
- C. braunii** Born. & Flah. 1886 ("*Braunii*")
 Ref.: Hirose 1937; Yoneda 1942c, 1952a, 1953a; Fukushima 1949; Akiyama 1965a; Horikawa et al. 1969; Nakano 1970; Hirose and Hirano 1977
- C. brevissima** G. S. West 1907
 Ref.: Yoneda 1938b, c, 1952a; Emoto and Hirose 1952a; Hirose and Hirano 1977
 Syn.: *Calothrix brevissima* var. *moniliforme* Ghose 1927
 Ref.: Emoto and Hirose 1940a
- C. confervicola** Ag. ex Born. & Flah. 1886
 Ref.: Okamura 1902, 1916; Ueda and Okada 1934; Umezaki 1961; Hagihara et al. 1970; Noda 1975
 Syn.: *Calothrix nodulosa* Setch. & Gardn. 1924
 Ref.: Umezaki 1953a, b; Noda 1974
- C. coriacea** Copel. 1936
 Ref.: Emoto and Hirose 1952a; Hirose and Hirano 1977
- C. crustacea** Thur. ex Born. & Flah. 1886
 Ref.: De Toni 1895; Okamura 1902, 1916; Matsumura 1904; Hirose 1957; Umezaki 1961; Hiramatsu 1967; Takata and Hirose 1971; M. M. Watanabe and Kurogi 1975; Noda 1974, 1987
 Syn.: *Calothrix aeruginea* Thur. ex Born. & Flah. 1886
 Ref.: Okamura 1902, 1916; Umezaki 1954, 1956b; Noda 1974, 1987
- C. fusca** (Kütz.) Born. & Flah. 1886
 Ref.: Hirose 1937; Yoneda 1941b, 1942a, b, 1952a, 1953a; Emoto and Yoneda 1941b; Akiyama 1961, 1965a; Hiramatsu 1967, 1973; M. Watanabe et al. 1985
 Syn.: *Calothrix fusca* (Kütz.) Born. & Flah. var. *crassa* C. S. Rao 1939
 Ref.: Mori 1971
 Syn.: *Calothrix longissima* Hirose 1937
 Ref.: Hirose 1937
- C. fusco-violacea** Crouan ex Born. & Flah. 1886
 Ref.: Noda 1974, 1987
- C. kuntzei** P. Richt. in Kuntze 1898 ("*Kuntzei*")
 Ref.: Yoneda 1941b, 1942b; Emoto and Hirose 1942c; Hirose and Hirano 1977
- C. marchica** Lemm. 1914
 Ref.: Higashi and Okada 1927; Hirose and Hirano 1977
 Syn.: *Calothrix marchica* Lemm. var. *crassa* C. B. Rao 1937
 Ref.: Emoto and Hirose 1942c; Mori 1971
 Syn.: *Calothrix marchica* Lemm. var. *intermedia* C. B. Rao 1937
 Ref.: Emoto and Hirose 1952a
- C. membranacea** Schmidle 1901
 Ref.: Hiramatsu 1967
- C. parasitica** (Chauv.) Thur. ex Born. & Flah. 1886
 Ref.: Yoneda 1940a; Hirose 1957, 1958; Umezaki 1961; Funahashi 1967; Noda 1974, 1987; Suzuki 1986
 Syn.: *Calothrix codicola* Setch. & Gardn. 1930
 Ref.: Umezaki 1953a, 1961; Noda 1987

- Syn.: *Calothrix nidulans* Setch. & Gardn. 1924
 Ref.: Umezaki 1956c; Noda 1987
- C. parietina** (Näg.) Thur. ex Born. & Flah. 1886
 Ref.: Yoneda 1939a, d, 1952a; 1953a; Emoto and Yoneda 1941a; Emoto and Hirose 1942a, f, 1943b; Akiyama 1965a; Mifune et al. 1959, 1966; Negoro 1973; Hirose and Hirano 1977; Mifune and Hirose 1983a; M. Watanabe et al. 1985
 Syn.: *Calothrix thermalis* (Schwabe) Hansg. ex Born. & Flah. 1886
 Ref.: Yoneda 1938b, c, 1942c, g, 1952a; Emoto and Hirose 1943a
 Syn.: *Calothrix parietina* var. *thermalis* G. S. West 1902
 Ref.: Negoro 1973
- C. rhizosoleniae** Lemm. 1899 ("*Rhizosoleniae*")
 Ref.: Akatsuka 1951; Marumo 1966
- C. scopulorum** (Web. & Mohr.) Ag. ex Born. & Flah. 1886
 Ref.: Okamura 1902, 1916; Matsumura 1904; Hirose 1957; Umezaki 1961; Hiramatsu 1967; Noda 1974, 1987; M. M. Watanabe and Kurogi 1975
- C. stagnalis** Gom. 1895
 Ref.: Negoro 1973
- C. turfosa** Geitl. 1933
 Ref.: Emoto and Hirose 1942d; Yoneda 1952a; Hirose and Hirano 1977
- Dichothrix** Zanard. ex Born. & Flah. 1886
- D. gypsophila** (Kütz.) Born. & Flah. 1886
 Ref.: Higashi and Okada 1927; Yoneda 1953a; Hirano 1962; Horikawa et al. 1969; Negoro 1973; Hirose and Hirano 1977
- D. meneghiniana** (Kütz.) Forti 1907 ("*Meneghiniana*")
 Ref.: Hirano 1960
- Gardnerula** J. De Toni 1936
 Syn.: *Polythrix* Zanard. ex Born. & Flah. 1886, non *Polythrix* Nees 1847
- G. corymbosa** (Harv.) J. De Toni 1936
 Basion.: *Polythrix corymbosa* (Harv.) Grun. ex Born. & Flah. 1886
 Ref.: Higashi and Okada 1927; Umezaki 1956a, b, 1961; Umezaki and Kamura 1977
- Gloeotrichia** J. Ag. ex Born. & Flah. 1886
- G. echinulata** (Smith & Sowerby) P. Richt. 1894
 Ref.: Yoneda 1938a; Akatsuka 1951; Hirano 1956b; Ochiai 1962b; Mizuno 1964; Negoro 1973; Hirose and Hirano 1977; Imazu 1981
 Syn.: *Rivularia echinata* Smith & Sowerby ex Agardh 1824
 Ref.: Akatsuka 1951
- G. pisum** (Ag.) Thur. ex Born. & Flah. 1886 ("*Pisum*")
 Ref.: Okamura 1902; Akiyama 1965a; Hirose and Hirano 1977
 Syn.: *Rivularia Lens* Menegh. 1843
 Ref.: Martens 1866; Okamura 1902
 Syn.: *Rivularia Pisum* Ag. 1824
 Ref.: Matsumura 1904
- G. longiarticulata** G. S. West 1907
 Ref.: Imazu 1979
- G. natans** (Hedw.) Rabenh. ex Born. & Flah. 1886
 Ref.: Higashi and Okada 1927; Yoneda 1937, 1938c, 1952a; Okada 1939b; Akatsuka 1951; Hirano 1963; Mori 1966; Negoro 1973; Hirose and Hirano 1977; Imazu 1979; Yamagishi 1985
 Syn.: *Rivularia natans* Welwitsch ex Born. & Flah. 1886
 Ref.: Akatsuka 1951
- Isactis** Thur. ex Born. & Flah. 1886
- I. nipponica** Hirose 1937
 Syn.: *Rivularia nipponica* (Hirose) Bourr. 1970
 Ref.: Hirose 1937
- I. plana** (Harv.) Thur. ex Born. & Flah. 1886
 Ref.: Higashi and Okada 1927; Hirose 1957; Umezaki 1961; Noda 1974, 1987; Hiramatsu 1967; Kajimura 1975
- Rivularia** (Roth) Ag. ex Born. & Flah. 1886
- R. aquatica** De Wild. 1897
 Syn.: *Rivularia globiceps* G. S. West 1907
 Ref.: Hirose 1937; Akiyama 1965a; Hirose and Hirano 1977

- Syn.: *Rivularia globiceps* var. *longissima*
Hirose 1937
Ref.: Hirose 1937; Hirose and Hirano
1977
- R. atra** Roth ex Born. & Flah. 1886
- R. atra** var. *atra*
Ref.: De Toni 1895; Okamura 1902, 1916;
Matsumura 1904; Akatsuka 1951; Tana-
ka 1956; Hirose 1957 and 1958 (as
Rivularia beccariana); Umezaki 1961;
Hiramatsu 1967; Noda 1974, 1987
Syn.: *Rivularia opaca* Harv. 1859
Ref.: Harvey 1859; Dawson 1959 (Har-
vey's manuscript)
- R. atra** var. *confluens* Born. 1892
Ref.: Umezaki 1961
- R. atra** var. *hemisphaerica* (Kütz.) Born. &
Flah. 1886
Ref.: Yamada and Tanaka 1934; Umezaki
1961
- R. beccariana** (De Not.) Born. & Flah. 1886
("Beccariana")
Ref.: Hirose 1937; Yoneda 1940a;
Hiramatsu 1967, 1973; Negoro 1973;
Hirose and Hirano 1977
- R. biasolettiana** Menegh. ex Born. & Flah.
1886 ("Biasolettiana")
Ref.: Yoneda 1952a
- R. borealis** Richt. 1899
Ref.: Negoro 1973
- R. dura** Roth ex Born. & Flah. 1886
Ref.: Negoro 1973
- R. haematites** (Lam. & De Candl.) Ag. ex
Born. & Flah. 1886
Ref.: Akiyama 1965a; Negoro 1973; Bando
and Nakano 1983
- R. nitida** Ag. ex Born. & Flah. 1886
Ref.: Kawashima 1957; Umezaki 1961;
Funahashi 1967; Hagihara et al. 1970;
Noda 1974, 1987
- R. planctonica** Elenk. 1921
Ref.: Kokubo and Kawamura 1949
- R. polyotis** (J. Ag.) Born. & Flah. 1886
Ref.: Umezaki 1961; Hiramatsu 1967;
Umezaki and Kamura 1977
- R. sphaerica** Hirose 1937
Ref.: Hirose 1937; Hirose and Hirano
1977
4. Scytonemataceae Kütz. 1843
- Kyrtuthrix* Erceg. 1929
- K. maculans** (Gom.) Umezaki 1958
Basion.: *Brachytrichia maculans* Gom. 1901
Ref.: Okamura 1916
Syn.: *Kyrtuthrix maculans* Erceg. 1929
Ref.: Umezaki 1958, 1961; Hirose 1957,
1958; Hiramatsu 1967
- Scytonema* Ag. ex Born. & Flah. 1886
- S. arcangelii** Born. & Flah. 1886 ("Arcangelii")
Ref.: Hiramatsu 1967
- S. burmanicum** Skuja 1949
Ref.: Hiramatsu 1973
- S. cincinnatum** (Kütz.) Thur. ex Born. &
Flah. 1886
Syn.: *Scytonema crispum* (Ag.) Born. 1889
Ref.: Hirose 1938; Emoto and Hirose
1940, 1943b, 1952b; Yoneda 1941a,
1952a; Kobayasi 1958; Kobayasi et al.
1962; Hiramatsu 1973; Hirose and Hira-
no 1977; Bando and Nakano 1983; M.
Watanabe and Niiyama 1990
- S. coactile** Mont. ex Born. & Flah. 1886
- S. coactile** var. *coactile*
Ref.: Hiramatsu 1967
- S. coactile** var. *minus* Wille 1913 ("minor")
Ref.: Emoto and Hirose 1943b (as *minor*);
Yoneda 1952a (as *minor*); Hirose and
Hirano 1977 (as *minor*)
- S. coactile** var. *thermale* Geitl. 1933
Ref.: Emoto and Hirose 1942b, c, d; Yone-
da 1952a; Hirose and Hirano 1977
- S. hofmannii** Ag. ex Born. & Flah. 1887
("Hofmannii")
- S. hofmannii** var. *hofmannii*
Ref.: Emoto and Hirose 1943a; Yoneda
1951; Akiyama 1961, 1965a; Hiramatsu
1967; Mori 1971; Hirose and Hirano
1977; Bando and Nakano 1983
- S. hofmannii** var. *crassum* Bharadw. 1934
("crassa")
Ref.: Emoto and Hirose 1942d, 1943a;
Yoneda 1952a; Hirose and Hirano 1977
- S. hofmannii** var. *symplocoides* (Reinsch)
Born. & Flah. 1886 ("Symplocoides")
Ref.: Hirose and Hirano 1977
- S. javanicum** (Kütz.) Born. ex Born. & Flah.

- 1887
Ref.: Yoneda 1951; Hiramatsu 1973
- S. millei** Born. ex Born. & Flah. 1886
("Millei")
Ref.: Nakano 1970; Hirose and Hirano 1977
- S. mirabile** (Dillw.) Born. 1889
Ref.: Higashi and Okada 1927; Yoneda 1937, 1953a; Hirose 1938; Fukushima 1952, 1954; Akiyama 1961, 1965a; Kobayasi 1958; Kobayasi et al. 1962; Hirano 1962; Nakano 1970, 1971; Yamagishi 1967, 1972; Hiramatsu 1967, 1973; Negoro 1973; Hirose and Hirano 1977; Imazu 1979
Syn.: *Scytonema figuratum* Ag. ex Born. & Flah. 1886
Ref.: Okamura 1902
- S. myochrous** (Dillw.) Ag. ex Born. & Flah. 1886 ("Myochrous")
Ref.: Yoneda 1939a; Yamaguti 1956; Hiramatsu 1967; Mori 1971; Hirose and Hirano 1977
- S. ocellatum** Lyngb. ex Born. & Flah. 1886
Ref.: Okamura 1902; Emoto and Hirose 1940b; Emoto and Yoneda 1941a, b; Yoneda 1950, 1951; Mizuno 1964; Akiyama 1965a; Hirose and Hirano 1977; Yamagishi 1972, 1985
- S. pascheri** Bharadw. 1934 ("Pascheri")
Ref.: Hiramatsu 1973
- S. polycystum** Born. & Flah. 1886
Ref.: De Toni 1895; Okamura 1902, 1916; Matsumura 1904; Umezaki 1961
Syn.: *Lyngbya effusa* Harv. 1859
Ref.: Harvey 1859; Okamura 1902
- S. saleyerense** Weber-van Bosse 1913 ("saleyerensis")
Ref.: Hiramatsu 1973
- S. stuposum** (Kütz.) Born. ex Born. & Flah. 1886
Ref.: Yoneda 1941a, 1951, 1952a; Emoto and Yoneda 1941a, b; Hirose and Hirano 1977
Syn.: *Scytonema caldarium* Setch., 1899
Ref.: Emoto and Hirose 1942a, c, e; Yoneda 1952a; Hirose and Hirano 1977
- S. tolypothrichoides** Kütz. ex Born. & Flah. 1886 ("tolypotrichoides")
Ref.: Ochiai 1962b; Hiramatsu 1973
- S. varium** Kütz. ex Born. & Flah. 1886
Ref.: Yoneda 1938b, c, 1952a; Hirose and Hirano 1977
- Scytonematopsis* E. Kissel. 1930**
- Syn.: *Tildenia* Kossinsk. 1926, *Setchelliella* J. De Toni 1936
- S. ambigua** Emoto & Hirose 1952b
Ref.: Emoto and Hirose 1952b
- S. pilosa** (Harv.) comb. nov.
Basion.: *Calothrix pilosa* Harv. ex Born. & Flah., Ann. Sci. Nat. VII. Bot. 3: 363, 1886
Syn.: *Tildenia pilosa* (Harv.) Poljansky, Izv. Glavn. Bot. Sada URSS 27(3): 327, 1928, *Setchelliella pilosa* (Harv.) J. De Toni, Noterelle di nomenclatura algologica, VIII, p. 6, 1936
Ref.: Umezaki 1961; Hiramatsu 1967; Noda 1974, 1987
- The following species without Latin diagnosis and other descriptions are listed in Yoneda's paper (Yoneda, Y.: A general consideration of the thermal Cyanophyceae of Japan. Mem. Coll. Agr., Kyoto Univ. 62: 1-20, 1952). Rivulariaceae: *Calothrix itibionensis* Yoneda nom. nud., *Dichothrix caldaria* Yoneda nom. nud. Scytonemataceae: *Scytonematopsis variabilis* Yoneda nom. nud.
- IV. Stigonematales Geitl. 1925
1. Borzinemataceae Geitl. 1942
- Borzinema* J. De Toni 1936**
- B. rupicola** (Borzi) J. De Toni 1936
Basion.: *Diplonema rupicola* Borzi 1916
Ref.: Mori 1971
- Spelaeopogon* Borzi 1905**
- Syn.: *Pseudospelaeopogon* Elenk. 1949
- S. koidzumianum** Yoneda 1942f ("Koidzumianum")
Ref.: Yoneda 1942f

2. Capsosiraceae (Borzi) Geitl. 1925

Capsosira Kütz. ex Born. & Flah. 1886

C. brebissonii Kütz. ex Born. & Flah. 1887
("Brebissonii")

Ref.: Higashi and Okada 1927; Hirose 1937; Yoneda 1953a; Hirose and Hirano 1977

3. Fischerellaceae Anagn. & Kom. 1990

Fischerella (Born. & Flah.) Gom. 1895

Syn.: *Fischera* S. H. Schwabe 1837, *Sommierella* Borzi 1907

F. ambigua (Näg.) Gom. 1895

Basion.: *Scytonema ambiguum* Näg. ex Born. & Flah. 1886

Ref.: Emoto and Hirose 1940b; Yoneda 1952a; Hirano 1962; Yamagishi 1967; Hirose and Hirano 1977

F. major Gom. 1902

Ref.: Yoneda 1938a; Hirose and Hirano 1977

F. muscicola (Thur.) Gom. var. *minor* Peters. 1928

Ref.: Higashi and Okada 1927

F. thermalis (Schwabe) Born. & Flah. 1887

Ref.: Yoneda 1938b, c, 1952a

Westiellopsis M. Janet 1941

W. prolifica M. Janet 1941

Ref.: Akiyama 1965b; Akiyama and Nishigami 1967; Hirose and Hirano 1977

4. Mastigocladaceae Geitl. 1925

(1) Mastigocladoideae Anagn. & Kom. 1990

Hapalosiphon Näg. in Kütz. ex Born. & Flah. 1887

H. arboreus W. & G. S. West 1895

Ref.: Yoneda 1937; Hirose and Hirano 1977

H. fontinalis (Ag.) Born. 1889

Ref.: Yoneda 1938b, c, 1952a, 1953a; Emoto and Yoneda 1941a, b; Hirano 1962; Negoro 1973; Hirose and Hirano 1977

Syn.: *Hapalosiphon pumilus* Kirchn. ex

Born. & Flah. 1886

Ref.: Okamura 1902

H. hibernicus W. & G. S. West 1896

Ref.: Higashi and Okada 1927; Yoneda 1937, 1941b, 1952a, 1953a, 1954b; Hirose 1937; Negoro 1937b, 1973; Emoto and Hirose 1940b; Hirano 1959b, 1962; Ochiai 1962b; Mizuno 1964; Imada 1970; Yamagishi 1972; Hirose and Hirano 1977; Imazu 1977, 1986

H. intricatus W. & G. S. West 1895

Ref.: Hirano 1962; Akiyama 1965a; Hiramatsu 1967; Yamagishi 1967; Nakano 1971; Hirose and Hirano 1977

H. luteolus W. & G. S. West 1897

Ref.: Hiramatsu 1967

H. stuhlmannii Hieron. 1895 ("Stuhlmannii")

Ref.: Akiyama 1965a; Hiramatsu 1967; Hirose and Hirano 1977

H. welwitschii W. & G. S. West 1897 ("Welwitschii")

Ref.: Akiyama 1965b; Hiramatsu 1967, 1973; Hirose and Hirano 1977

Mastigocladus Cohn 1862

M. laminosus Cohn 1862

Ref.: Molisch 1926; Yoneda 1938b, c, 1939b, c, 1940b, c, 1941b, 1942, 1952a; Emoto and Hirose 1940a, b, c, 1941, 1942a, b, d, e, f, 1943a, b, 1949, 1952a, b, c; Fukushima 1950; Ikoma and Doi 1955; Akiyama 1965a; Hirose 1966; Negoro 1973; Hirose and Hirano 1977; Mifune and Hirose 1982, 1983a, b

Syn.: *Mastigocladus laminosus* var. *anabaenoides* (B. Peters.) Copel. 1936

Ref.: Yoneda 1952a

Syn.: *Mastigocladus laminosus* var. *phormidioides* (B. Peters.) Copel. 1936

Ref.: Emoto and Yoneda 1942; Yoneda 1952a

Thalpopbila Borzi 1906

T. caldaria Emoto & Yoneda 1941b

Ref.: Emoto and Yoneda 1941b; Yoneda 1952a

Umezakia M. Watanabe 1987

U. natans M. Watanabe 1987

- Ref.: M. Watanabe 1987
- (2) Brachytrichoideae (Born. & Flah.) Fritsch 1945
- Syn.: Sub-trib. Rivulariaceae Kütz. ex Born. & Flah. 1886, sectio Brachytricieae Born. & Flah. 1886, Scytonemataceae Rabenh. 1865 subfam. Brachytrichieae Fritsch 1945, Brachytrichiaceae Watenberg 1872, Brachytrichiaceae Hirose 1965, nom. nud.
- Brachytrichia* Zanard. ex Born. & Flah. 1886
- B. quojii* (Ag.) Born. & Flah. ("Quoyi")
Basion.: *Nostoc Quojii* Ag. 1924 ("Quoji")
Syn.: *Brachytrichia Balanii* Born. & Flah. 1886, *Brachytrichia rivularioides* Zanard. 1872, *Brachytrichia affinis* Setch. & Gardn. in Gardn. 1918, *Brachytrichia Codii* Setch. 1926, *Brachytrichia Balanii* f. *purpurea* Frémy 1932
Ref.: Okamura 1915, 1936; Higashi and Okada 1927; Higashi 1933a; Umezaki 1952a, 1955b, 1956b, c, 1958, 1961; Hirose 1957 (as *Brachytrichia quoyi* f. *quoyi* Umezaki), 1958; Kida 1964; Umezaki and Kamura 1977; Hiramatsu 1967; Noda 1974, 1987
5. Nostochopsaceae Geitl. 1925
- Syn.: Mastigocladopsaceae Iyeng. & Desik. 1946 (false Mastigocladopsidaceae)
- Mastigocoleus* Lagerh. ex Born. & Flah. 1886
- M. testarum* Lagerh. ex Born. & Flah. 1886
Ref.: Okamura 1922; Higashi and Okada 1927; Umezaki 1961; Akimoto et al. 1972
- Nostochopsis* Wood ex Born. & Flah. 1886
- N. lobatus* Wood ex Born. & Flah. 1886
Ref.: Higashi and Okada 1927; Hada 1937; Yoneda 1952a; Akiyama 1965a; Hiramatsu 1967; Negoro 1973
Syn.: *Nostochopsis Wichmannii* Weber van Bosse 1913
Ref.: Yoneda 1938c, 1939a; Hirose and
- Hirano 1977
6. Stigonemataceae (Hass.) Kirchn. 1898
- Stigonema* Ag. ex Born. & Flah. 1886
- Syn.: *Sirosiphon* Kütz. 1843
- S. aerugineum* Tild. 1910
Ref.: Hiramatsu 1967, 1973
- S. hormoides* (Kütz.) Born. & Flah. 1886
Ref.: Akiyama 1961, 1965a; Horikawa et al. 1969; Nakano 1971; Hiramatsu 1973; Hirose and Hirano 1977; Bando and Nakano 1983
- S. informe* Kütz. ex Born. & Flah. 1886
Ref.: Higashi and Okada 1927
- S. mamillosum* (Lyngb.) Ag. ex Born. & Flah. 1886
Ref.: Yoneda 1937; Hirano 1962; Nakano 1971; Negoro 1973; Hirose and Hirano 1977; Bando and Nakano 1983
- S. mesentericum* Geitl. 1925
Ref.: Hiramatsu 1967
- S. minutum* (Ag.) Hass. ex Born. & Flah. 1886
Ref.: Hirose 1937; Yoneda 1939a, 1949, 1950; Fukushima 1952, 1954; Akiyama 1961, 1965a; Horikawa et al. 1969; Negoro 1973; Hirose and Hirano 1977
- S. ocellatum* (Dillw.) Thur. ex Born. & Flah. 1886
- S. ocellatum* f. *ocellatum*
Ref.: Yoneda 1937, 1951, 1953a, 1954b; Fukushima 1952, 1954; Hirano 1959a, 1962; Ochiai 1962b; Mizuno 1964; Akiyama 1961, 1965a, b; Hiramatsu 1967; Yamagishi 1967, 1972; Nakano 1971; Negoro 1973; Hirose and Hirano 1977
- Syn.: *Sirosiphon vermicularis* Suring. 1870, *Stigonema vermicularis* (Suring.) Forti 1907
Ref.: Suringer 1870; Okamura 1902; Matsumura 1904
- S. ocellatum* f. *tomentosum* (Kütz.) Elenk. 1938
Basion.: *Stigonema tomentosum* (Kütz.) Hieron. 1895
Ref.: Emoto and Hirose 1942c; Yoneda 1952a; Hirose and Hirano 1977
- S. panniforme* (Ag.) Born. & Flah. 1886

Ref.: Hiramatsu 1967

S. turfaceum Cooke ex Born. & Flah. 1886
Ref.: Yoneda 1937; Akiyama 1965a;
Hiramatsu 1967; Hirose and Hirano
1977

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梅崎 勇*・渡辺眞之**：日本産藍藻類目録 2. ネンジュモ目及びスチゴネマ目

本報告は日本から報告された藍藻類のネンジュモ目とスチゴネマ目の種をリストしたものである。ネンジュモ目は4科28属161種あった。その内訳は、ミクロケト科は6属19種、ネンジュモ科は13属86種、ヒゲモ科は6属37種、スキトネマ科は3属19種であった。ネンジュモ科とスキトネマ科にそれぞれ1新組合せ種がつけられた。ネンジュモ科：*Hydrocoryne enteromorphoides* (Grun. ex Born. & Flah.) comb. nov. (= *Hormothamnium enteromorphoides* Grun. ex Born. & Flah. 1886), スキトネマ科：*Scytonematopsis pilosa* (Harv. ex Born. & Flah.) comb. nov. (= *Calothrix pilosa* Harv. ex Born. & Flah. 1886)。スチゴネマ目は6科13属30種がリストされた。その内訳は、ボルジネマ科は2属2種、カブソシラ科は1属1種、フィッシュセラ科は2属5種、イデュアイミドリ科は5属11種、ノストコプシス科は2属2種、スチゴネマ科は1属9種であった (*917 小浜市学園町1-1 福井県立大学生物資源学部海洋生物資源学科, **305 つくば市天久保4-1-1 国立科学博物館 植物研究部)

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