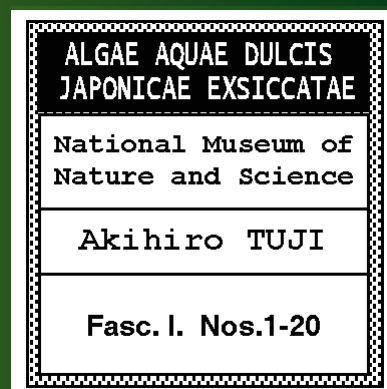


ALGAE AQUAE DULCIS JAPONICAE EXSICCATAE

Published by
National Museum of Nature and Science
Tsukuba, JAPAN

Edited by
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Microalgal Herbarium
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18 May 2007

PREFACE

Taxonomic studies on diatoms from Japanese Islands have a short history, beginning with several European diatomists (Ehrenberg 1854, Brun and Tempère 1889, Pantocsek 1892 and Meister 1913-4). Japanese diatomists became active in the taxonomy of diatoms after World War II. Recently, many Japanese diatomists have been working in taxonomical, ecological and environmental fields. Two Japanese monographs were recently published (Watanabe et al. 2005 and Kobayasi et al. 2006).

Many endemic taxa have been describing from Japan, and more study is required to understand the causes of this endemism.

This exsiccata set, made from Japanese freshwater microalgal specimens, is issued by the National Museum of Nature and Science. The first fascicle comprises 20 slides. Future fascicles will be issued at irregular intervals, in series of 20.

I am grateful to Dr. Toshiharu Watanabe for allowing use of his collection in TNS for this exsiccata.

If there are any problems experienced using this exsiccata, please contact me. I will send another slide. I am always pleased to receive comments and suggestions.

CITATION

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ALGAE AQUAE DULCIS JAPONICAE EXSICCATAE

Published by
National Museum of Nature and Science
Tsukuba, Japan

Edited by
Akihiro Tuji

Fasc. I (nos. 1-20)

18 May 2007

Slides in this exsiccata set are prepared from original material housed in the Department of Botany, National Museum of Nature and Sciences (TNS). Most of the raw material, collected by T. Watanabe, had been treated by K. Asai using hot sulfuric acid and added potassium dichromate. Other samples have been treated by A. Tuji, using nitric acid. Permanent slides are mounted in Zrax (Microlife Services, Somerset).

Micrographs are taken using differential interference contrast (DIC) microscope (Axiophoto, Zeiss, Jena, Germany) and Charge Couple Device (CCD) camera (LU135M, Lumenera corp., Ottawa), and magnified 2000 times.

The taxa in this catalogue have been chosen from the most common on the slides. Others do exist on the slides.

All taxa in this catalogue have been identified by A. Tuji.

Ecological information relevant to Japan is referred from Watanabe et al. (2005). The terms, saproxenous, indifferent and saprophilous, are defined by Asai (1995) using a statistic classification for their index (DAIpo: Diatom Assemblage Index to organic water pollution).

.....
Watanabe, T., Ohtsuka, T., Tuji, A. & Houki, A. 2005. Picture book and ecology of the freshwater diatoms. Uchida-rokakuho, Tokyo, 666pp

Asai, K. 1995. Statistic classification of epilithic diatom species into three ecological groups relating to organic water pollution (1). Method with coexistence index. *Diatom* **10**: 13-34.

Nos. 001

R. Arakawa, Saitama Pref., Japan.

[35°56'48.9" N, 138°56'00.0" E]

Electric conductivity (EC: $\mu\text{s}/\text{cm}$): 77, pH: 7.9, Water temperature (WT: $^{\circ}\text{C}$): 9.5.

Date: 25/xi/2004.

Coll. A. Tuji (duplicate of TNS-AL-54241m in TNS).

Isotype specimen of *Gomphoneis okunoi* Tuji.

Gomphoneis okunoi Tuji, Bull. Natn. Sci. Mus. Tokyo ser. B. **31**: 92-95. *pl. 12. f. 1-10. pl. 13. f. 1-4. pl. 14. f. 1-5.* 2005.

(Figs 1-3)

Synonym: *Gomphonema tetrastigmatum* sensu Okuno, Diat. Elektr. Mikr. **9**: 36-37. 1974.

Gomphoneis tetrastigmata sensu T.Ohtsuka, Diat. **18**: 32. *f. 77-80.* 2002.

Holotype: A slide numbered TNS-AL-54241sc in TNS.

Type material: TNS-AL-54241m in TNS collected from R. Arakawa by A. Tuji on 25th November, 2004.

Isotype: BM101269 in BM, CAS221093 in CAS.

Ecology: Commonly found in less polluted rivers and lakes (xenosaprobic to oligosaprobic in saprobic level) and regarded as saproxenous taxon and prefers low temperatures (Tuji 2005). pH-circumneutral.

Nitzschia dissipata (Kütz.) Rabenh. Alg. sachs. 948. 1860.

(Figs 4-5)

Ecology: saproxenous, alkaliphilous, cosmopolitan.

Nitzschia inconspicua Grunow, Verh. K. Zool.-Bot. Ges. Wien **12**: 579. *pl. 12. f. 25.* 1862.

(Fig. 6)

Ecology: indifferent, alkaliphilous.

Reimeria sinuata (W.Greg.) Kociolek et Stoermer, Syst. Bot. **12**: 457. 1987.

(Fig. 7)

Ecology: saproxenous, pH-circumneutral.

Nitzshia fonticola (Grunow) Grunow in Van Heurck, Syn. Diat. Belg. *pl. lxxix, f. 15-20.* 1881.

(Figs 8-9)

Ecology: indifferent, alkaliphilous.

Gomphonema parvulum (Kütz.) Kütz., Sp. alg. 65. 1849.

(Fig. 10)

Ecology: indifferent, alkaliphilous, cosmopolitan.

Hannaea arcus var. ***recta*** (Cleve) M.Idei in H.Kobayasi et al., H.Kobayasi's Atlas Jap. Diat. Electr. Microsc. **1**: 12. 2006.

≡ *Fragilaria arcus* var. *recta* Cleve, Bih. Kongl. Svenska Vet.-Akad. Handl. **24**: 9. 1898.

(Fig. 11)

Fragilaria gracilis Østrup, Danske Diat. 190. pl. V. f. 117. 1910.

(Fig. 12)

Lectotype: slide 1342 in C, designated by Lange-Bertalot in Krammer and Lange-Bertalot,

Süßw.-flora Mitteleur. **2/2**: taf. 110. f. 9-11. 1991.

Isotype (raw material): 352.1 in the Østrup collection housed in C.

Type locality: A basin in the Botanical garden, Kopenhagen.

Type examination using LM & SEM: Tuji, Bull. Natl. Mus. Nat. Sci. Tokyo ser. B. **33**: 9-12. f. 1-8. 2007.

Ecology: saproxenous, alkaliphilous.

Achnantheidium japonicum (H.Kobayasi) H.Kobayasi, Nova Hedw. **65**: 156. 1997.

≡ *Achnanthes japonica* H.Kobayasi in H.Kobayasi et al. Diat. **2**: 85-86. f. 19-21, 27-36, 44-50, 55-58. 1986.

(Figs 13-16)

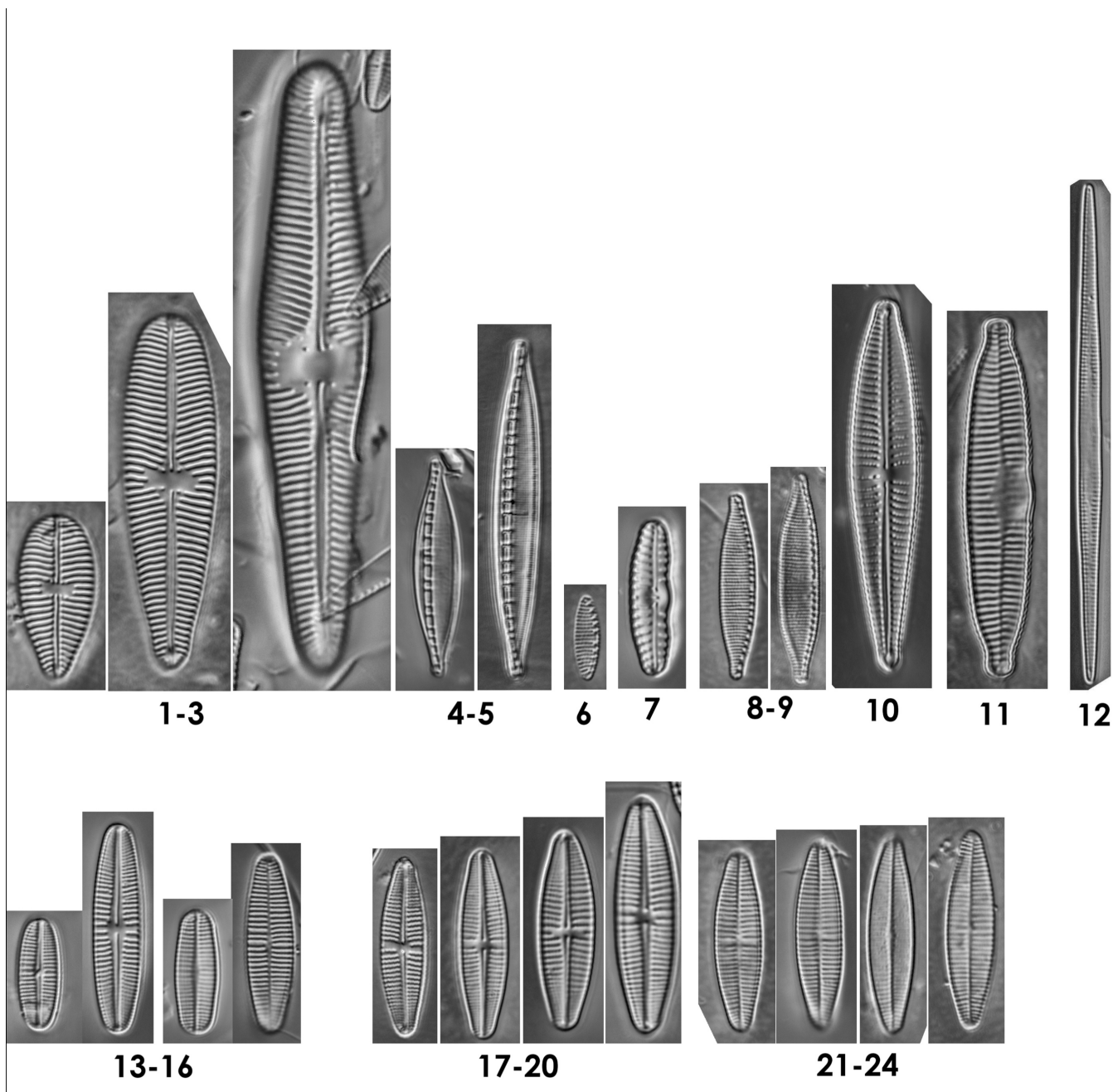
Ecology: saproxenous, pH-circumneutral.

Achnantheidium pyrenaicum (Hust.) H.Kobayasi, Nova Hedw. **65**: 148. 1997.

≡ *Achnanthes pyrenaica* Hust., Ber. Deutsch. Bot. Ges. **56**: 554. f. 5-10. 1939.

Holotype: 397/18. Gave d'Ossau. Pyrenäen. 2, examined by Simonsen, Atlas Cat. Diat. Typ. Fr. Hust. **2**: pl. 371. f. 9-17. 1987.

(Figs 17-24)



Nos. 002

R. Tamagawa (R. Obonai), Akita Pref., Japan. [39°41' N, 140°43' E from a map]

EC: 195, pH: 8.2, WT: 10.5.

Date: 13/xi/1994.

Coll. Toshiharu Watanabe (duplicate of TNS-AL-TW-12581 in TNS).

Synedra rostrata F.Meister, Arch. Hydrobiol. **8**: 312. *pl. IV, f. 7*. 1913.

(Figs 1-3)

Synonym: *Synedra inaequalis* H.Kobayasi in H.Kobayasi et al., Diat. **3**: 9-10. *f. 2-13*. 1987. ≡

Ulnaria inaequalis (H.Kobayasi) M.Idei in H.Kobayasi et al., H.Kobayasi's Atlas Jap. Diat.

Electr. Microsc. **1**: 86. 2006.

Type locality: Lake Suwa, Nagano Pref., Japan.

Lectotype: BRM "K2/57", designated by Tuji & D.M.Williams, Bull. Natl. Mus. Nat. Sci. Tokyo ser.

B. **33**: 74. *f. 32-37*. 2007.

Isotype: Slide no. 801 Tempère et Peragallo (2nd edition), BM69152.

Ecology: saproxenous, alkaliphilous.

Diatoma vulgaris Bory, Dict. Class. hist. Nat. **5**: 461. *pl. Arthrod.-20 f. 1a, b*. 1824.

(Fig. 4)

Ecology: saproxenous, alkaliphilous.

Hannaea arcus var. *recta* (Cleve) M.Idei in H.Kobayasi et al., H.Kobayasi's Atlas Jap. Diat. Electr.

Microsc. **1**: 12. 2006.

(Fig. 5)

Nitzschia dissipata (Kütz.) Rabenh. Alg. sachs. 948. 1860.

(Fig. 6)

Nitzschia inconspia (Grunow) Grunow in Van Heurck, Syn. Diat. Belg. *pl. lxix, f. 15-20*. 1881.

(Fig. 7)

Nitzschia frustulum var. *bulnheimiana* (Rabenh.) Grunow in Van Heurck, Syn. Diat. Belg. *pl. lxxviii.*

f. 30. 1881.

≡ *Homoeocladia bulnheimiana*, Rabenh. Alg. Eur. 1301. 1864.

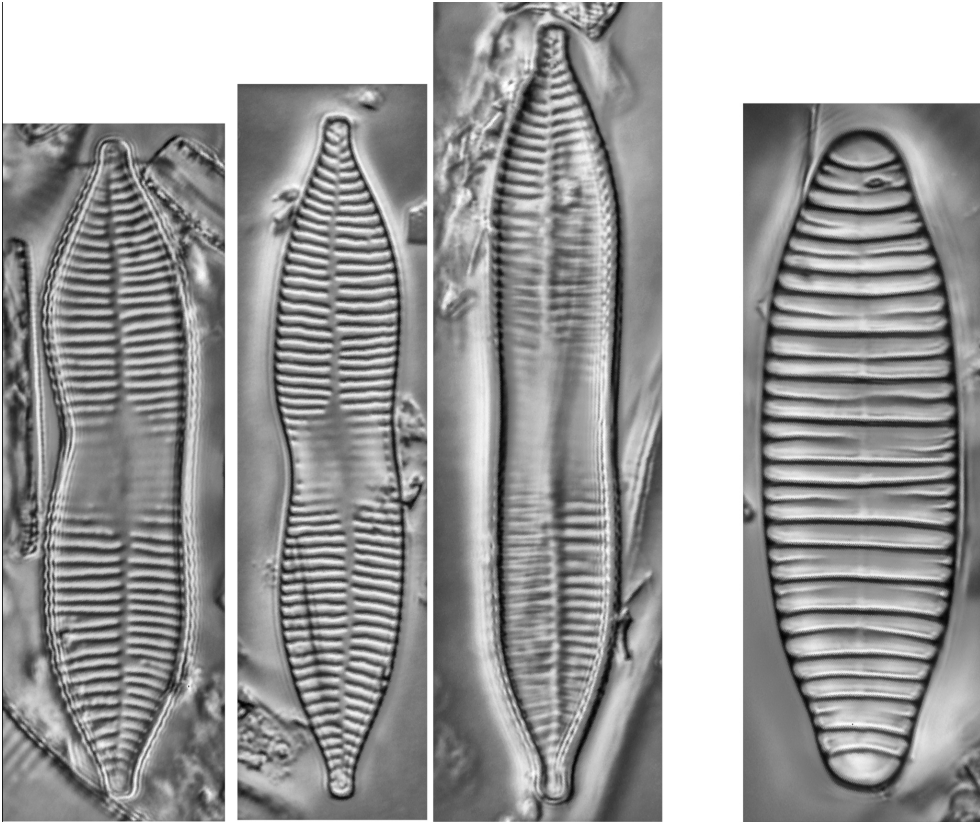
(Figs 8-9)

Type examination using LM: Krammer & Lange-Bertalot, Süßw.-flora Mitteleur. **2/2**: *taf. 68. f.*

11-12. 1988.

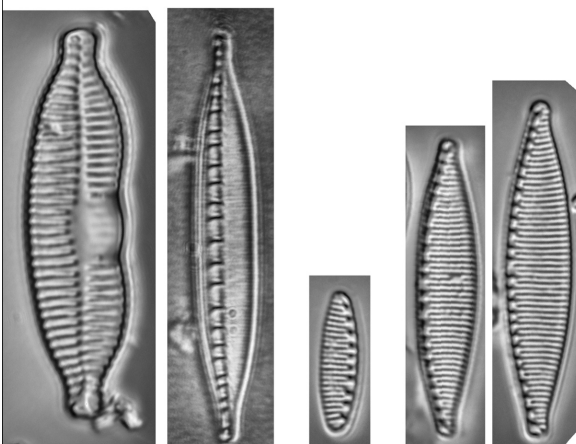
Ecology: indifferent, alkaliphilous.

Nos. 002



1-3

4



5

6

7

8-9

Nos. 003

Gorogorosui-spring, R. Doro, Nara Pref., Japan.

[34°16' N, 135°54' E from a map]

EC: 175, WT: 10.3 (pH: 7.9 from a reference).

Date: 19/viii/1991.

Coll. T. Watanabe (duplicate of TNS-AL-TW-12279 in TNS).

Diatoma mesodon (Ehrenb.) Kütz., Bacill. 47. pl. 17. f. xiii. 1844.

≡ *Fragilaria mesodon* Ehrenb. Abh. Preuss. Akad. Wiss. Berlin 1838: 57. pl. 1.2. f. 9. 1839.

(Figs 1-4)

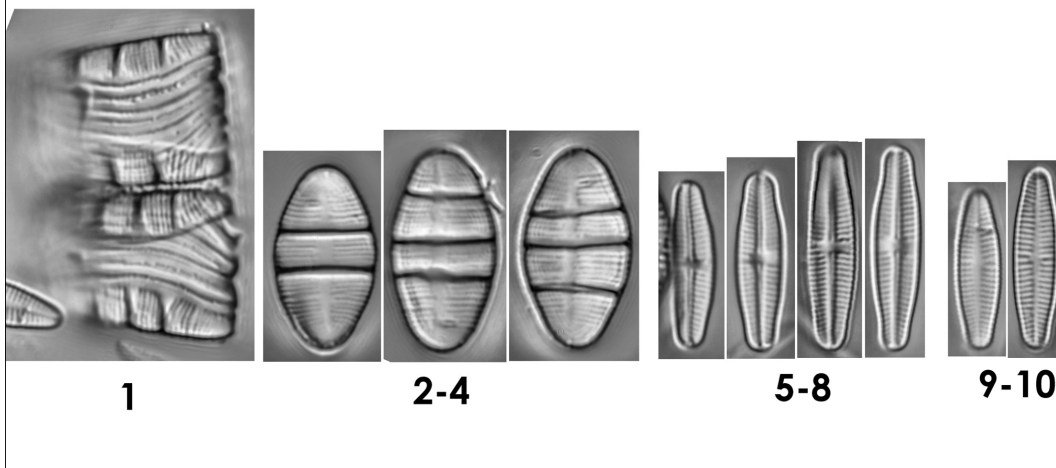
SEM examination: Williams, Bibl. Diat. 8: 147-155. pl. 4. f. 38-41. pl. 19. 1985.

Ecology: saproxenous, alkalibiontic.

Achnantheidium minutissimum (Kütz.) Czarn., Proc. Int. Diat. Symp. 11: 157. 1994.

(Figs 5-10)

Ecology: indifferent, pH-circumneutral.



Nos. 004

Genta-shimizu spring, Hachimantai, Iwate Pref., Japan. [39°57' N, 140°51' E from a map]

EC: 24, pH: 5.6, WT: 4.0.

Date: 29/viii/1995.

Coll. T. Watanabe (duplicate of TNS-AL-TW-12018 in TNS).

Diatoma maxima (Grunow) Fricke in A.W.F.Schmidt, Atlas Diat. pl. 267. f. 7-11. 1906.

≡ *Odontidium anomalum* var. *maximum* Grunow, Verh. Zool.-bot. ges. Wein 12: pl. 4. f. 4. 1862.

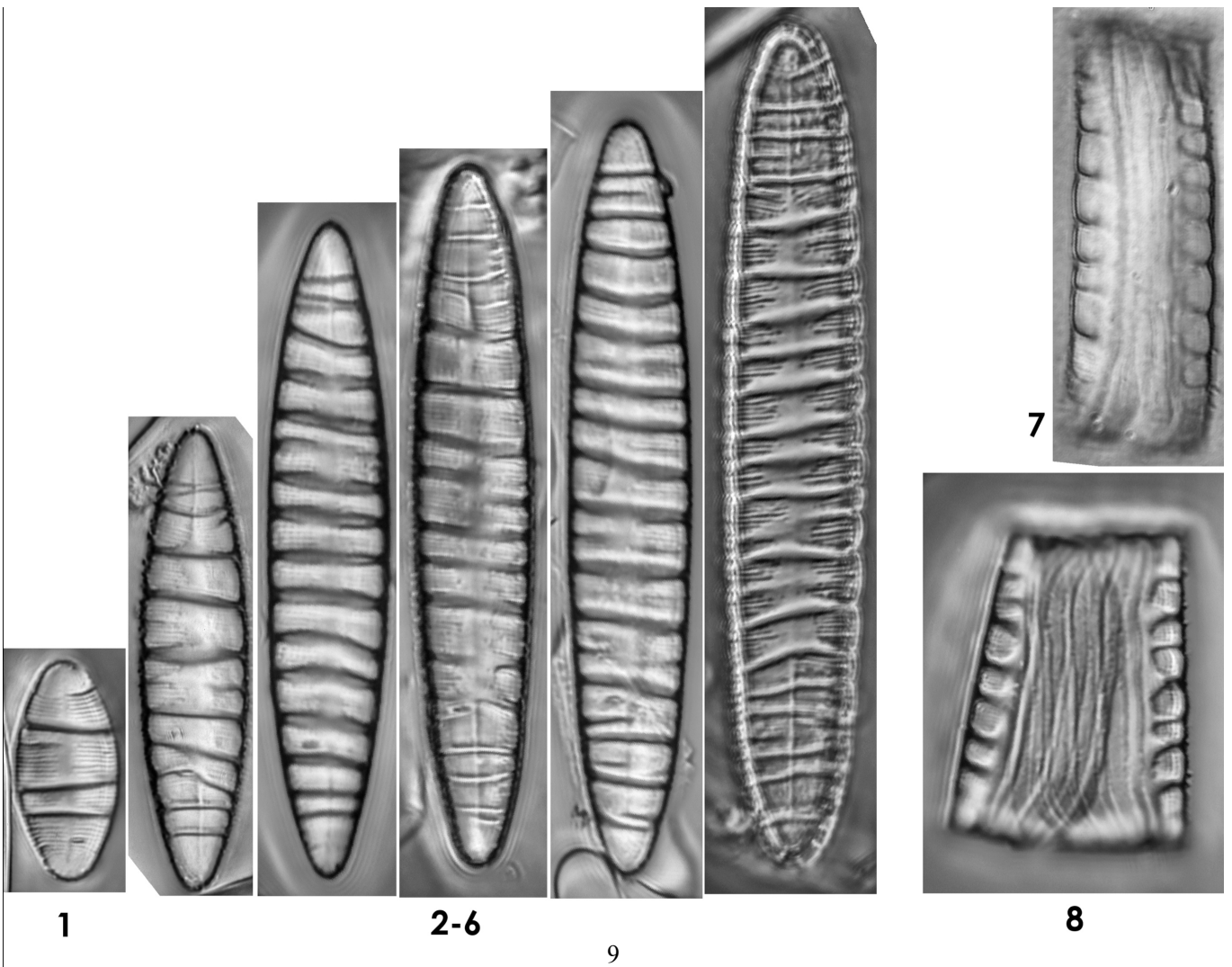
(Figs 2-8)

SEM examination: D.M.Williams, Bibl. Diat. 8: 139-146. pl. 4. f. 35-37. pl. 17-18. 1985.

Ecology: oligosaprobic, rare.

Diatoma mesodon (Ehrenb.) Kütz., Bacill. 47. pl. 17. f. xiii. 1844.

(Fig. 1)



Nos. 005

Tsukahara hot spa, Oita Pref., Japan.

[33°19' N, 131°25' E from a map]

EC: 9890, pH: 1.8, WT: 34.4.

Date: 17/x/1992.

Coll. T. Watanabe (duplicate of TNS-AL-TW-10208 in TNS).

Pinnularia osoresanensis (Negoro) Fukush., Yoshit. et Ts.Kobay. Diat. **18**: 8. 2002

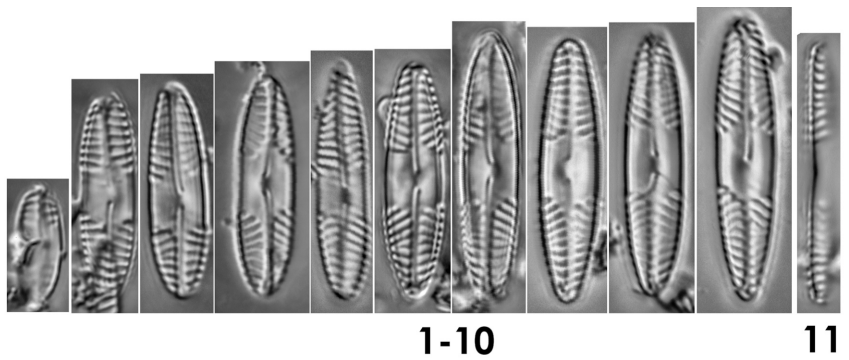
≡ *Pinnularia acoricola* var. *osoresanensis* Negoro, Sci. Rep. Tokyo Bunrika Daigaku. sect. B. **101**: 316. f. 3c. 1944.

(Figs 1-11)

Synonym: *Pinnularia acoricola* var. *acoricola* sensu Negoro, Sci. Rep. Tokyo Bunrika Daigaku. sect. B. **101**: 314. 1944.

Type locality: Zigokudani, Osoresan, Aomori Pref., Japan.

Ecology: acidobiontic, common in Japanese acid (pH: 1-3.5) hot spa.



Nos. 006

Zao hot spa, Miyagi Pref., Japan.

[38°10' N, 140°24' E from a map]

Date: 02/vi/2006.

(pH: 1.5 from a reference).

Coll. A. Tuji (duplicate of TNS-AL-55953m in TNS).

Pinnularia acidojaponica M.Idei et H.Kobayasi in M.Idei & Mayama, Lange-B. –Festschr. 266. *f.* 1-29. 2001.

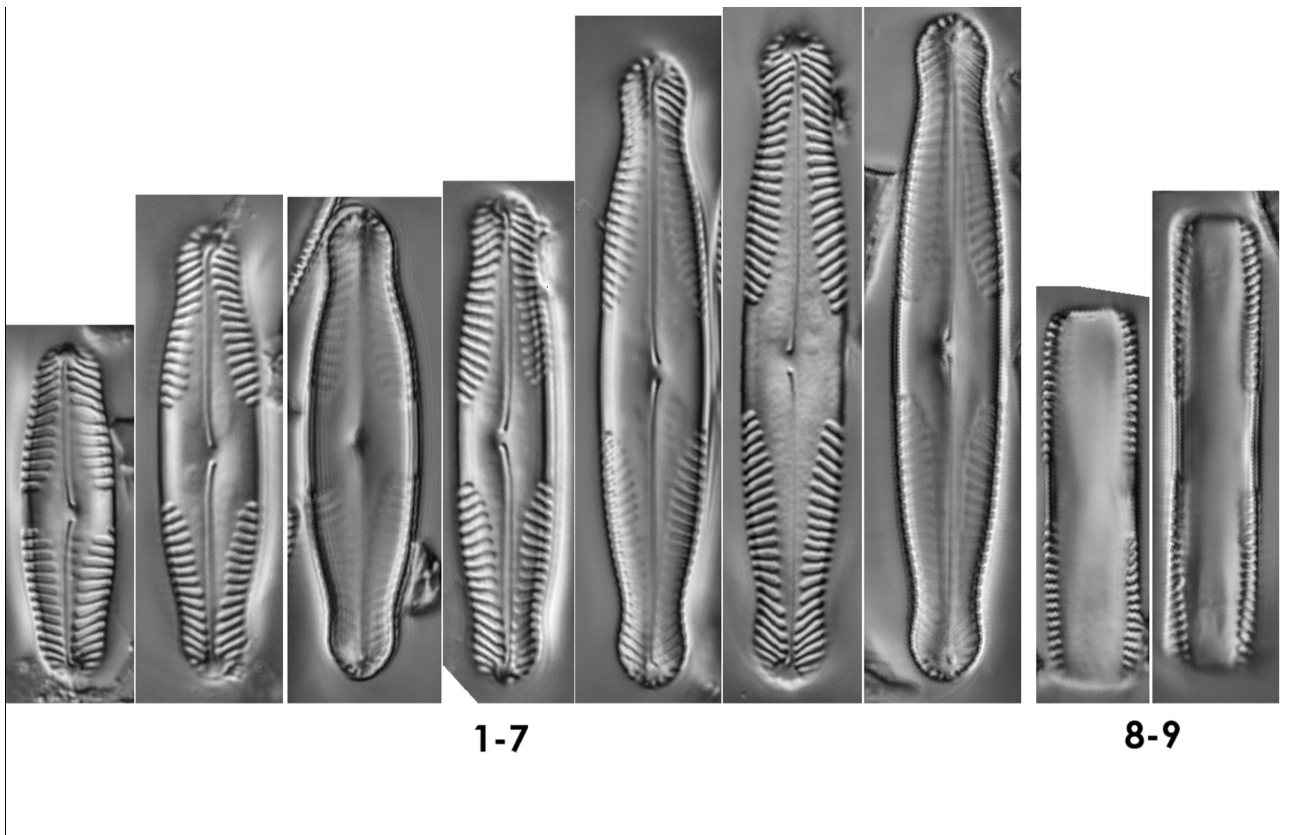
(Figs 1-9)

Synonym: *Pinnularia braunii* var. *amphicephala* sensu Negoro, Sci. Rep. Tokyo Bunrika Daigaku, sect. B. **101**: 311. 1944.

Holotype: TNS-AL-48980 in TNS.

Type locality: Owakudani, Hakone, Kanagawa Pref., Japan.

Ecology: acidobiontic, common in Japanese acid hot spa.



Nos. 007

Fudo pond, Kirishima, Miyazaki Pref., Japan.

[31°56'57.7" N, 130°50'57.4" E]

EC: 36, pH: 4.0, WT: 9.1.

Date: 12/xii/2003.

Coll. A. Tuji (duplicate of TNS-AL-55402m in TNS).

Isotype specimen of *Pinnularia kirisimaensis* Tuji & Tosh. Watan.

Pinnularia kirisimaensis Tuji & Tosh. Watan., Diat. **19**: 50. f. 13-19. 2003.

(Figs 1-4)

Holotype: TNS-AL-55402sa in TNS (figs 16, 17).

Type Material: TNS-AL-55402m in TNS.

Type Locality: Fudo Pond, Kirishima, Miyazaki Pref. Japan.

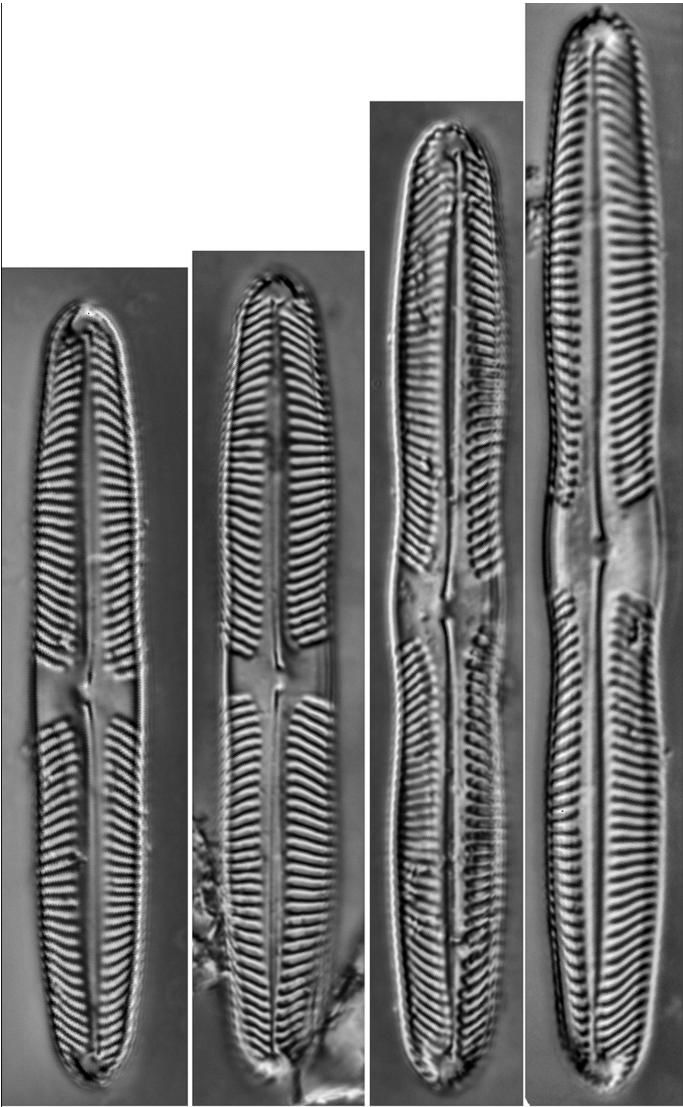
Ecology: known from only type locality, may be an endemic taxon.

Eunotia minor (Kütz.) Grunow in Van Heurck, Syn. Diat. Belg. *pl. xxxiii. f. 20-21*. 1881.

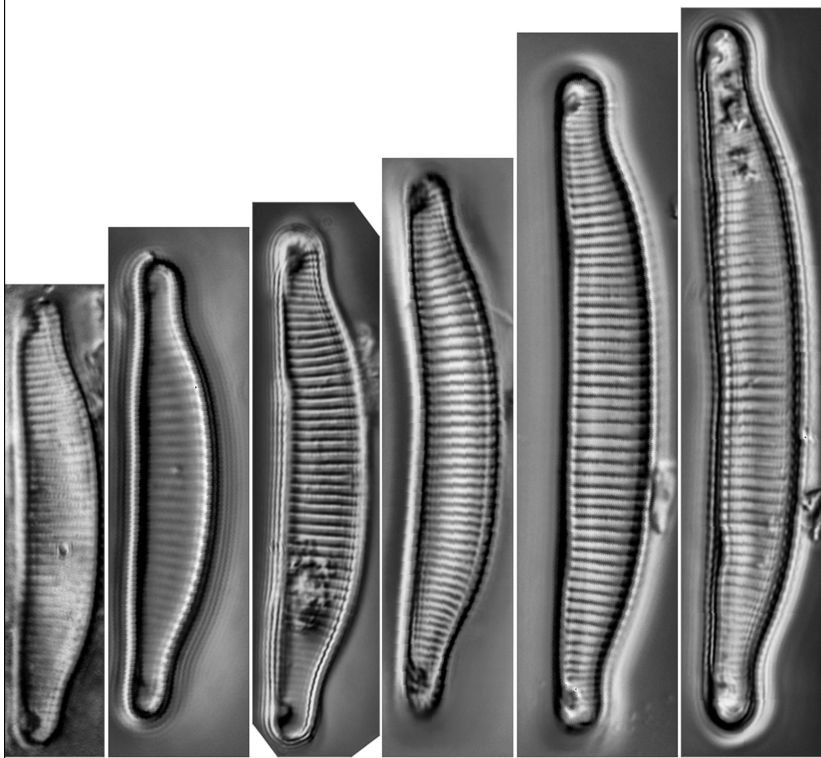
(Figs 5-11)

Ecology: saproxenous, pH-circumneutral.

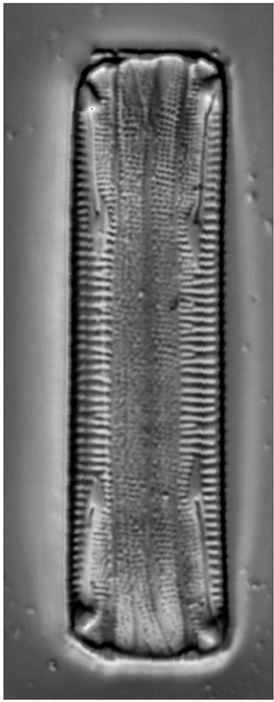
Nos. 007



1-4



5-10



11

Nos. 008

Hana-no-ego moor, Yaku-shima Isl., Kagoshima Pref., Japan.

[30°18'40.5" N, 130°30'46.2" E]

EC: 22, pH: 5.1, WT: 8.3.

Date: 8/xii/2003.

Coll. A. Tuji (duplicate of TNS-AL-55458m in TNS).

Aulacoseira pfaffiana (Reinsch) Krammer, Nova Hedw. **52**: 94. 1991.

≡ *Melosira pfaffiana* Reinsch in Rabenh., Alg. Eur. 1912. 1866.

(Figs 1-8)

Synonym: *Melosira pfaffiana* Reinsch, Abh. Senckenberg. Naturf. Ges. **6**: 137, pl. xx. c. iii. Algenfl.

Frank. 11. pl. I. f. II. 1867 (1866).

Type locality: Franconia: near Erlangen, Germany.

Syntype (exsiccata): Die Algen Europa's exsiccatae. no. 1912, examined by Tuji & Williams, Bull.

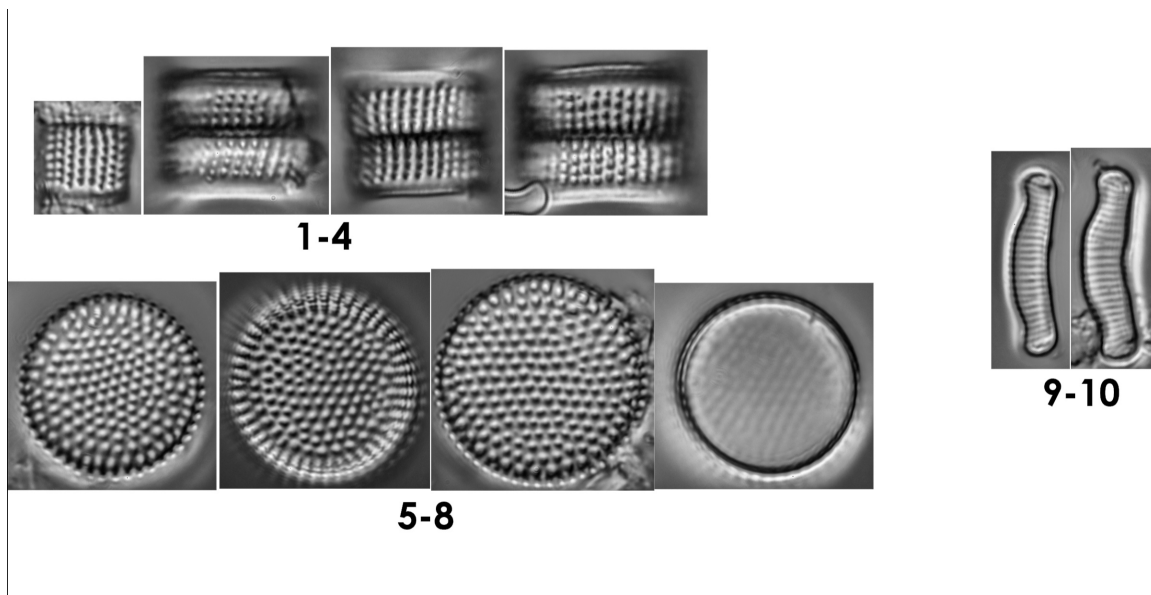
Natn. Sci. Mus., Tokyo ser. B. **32**: 117-121. f. 1-14, 24-28. 2006.

Ecology: The identification of this taxon has been confusing in Japan.

Eunotia microcephala Krasske, Hedw. **72**: 102. f. 7. 1932.

(Figs 9-10)

Ecology: acidophilous.



Nos. 009

Tashirodaira-moor, Hakkouda, Aomori Pref., Japan.

[40°41'40.2" N, 140°55'05.8" E]

Date: 1/vi/2006.

(pH: 2.2-3.8 measured another day).

Coll. A. Tuji (duplicate of TNS-AL-55942m in TNS).

Frustulia saxonica Rabenh., Alg. Sach. 42. 1851.

(Fig. 1)

Lectotype: Single specimen in slide 42 from Exs.ii. Algen Sachsens no. 42, designated by

Lange-Bertalot & Jahn, Syst. Geogr. Pl. **70**: 256. f. 2-3. 2000.

Ecology: acidobiontic.

Eunotia arculus Lange-Bert. et M.Nörpel in Lange-Bertalot, Biblioth. Diatomol. **27**: 26.

Holotype: V.H. Type de Synopsis 274 in W.

(Figs 2-3)

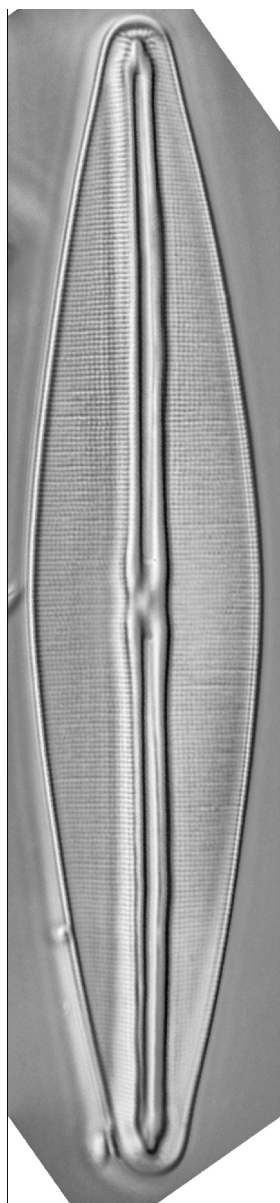
Ecology: acidobiontic.

Brebisira arentii (Kolbe) Krammer, Lange-B.-Festschr. 19. 2001.

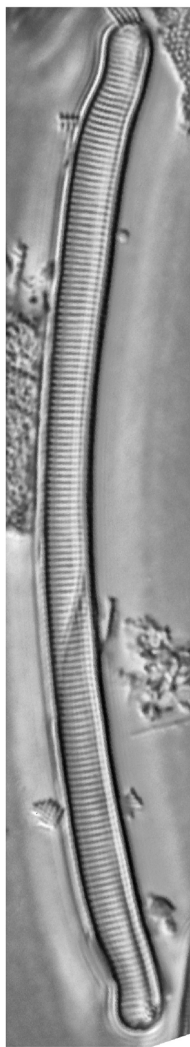
≡ *Cyclotella arentii* Kolbe, Sven. Bot. Tidsk. **42**: 464. f. 9. 1948.

(Figs 4-5)

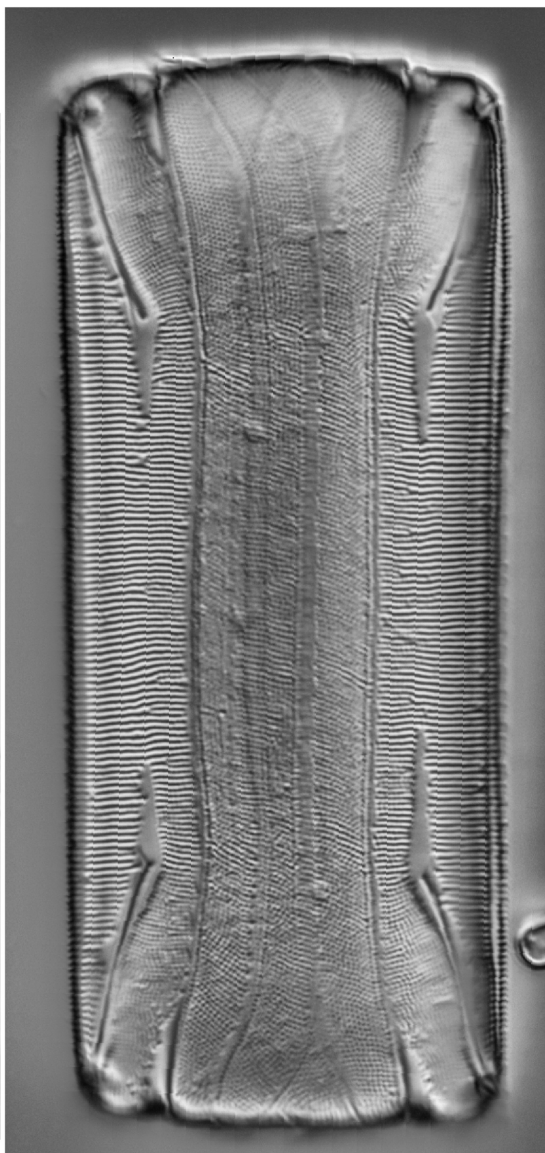
Nos. 009



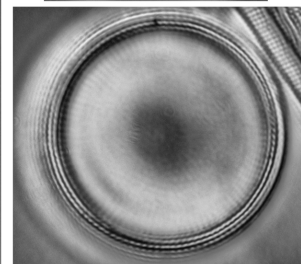
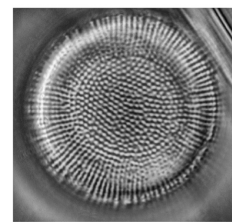
1



2



3



4-5

Nos. 010

Katata-naiko pond near Lake Biwa, Shiga Pref., Japan. [35°06.809' N, 135°55.430' E]

Date: 3/iii/2000.

Coll. A. Tuji (duplicate of TNS-AL-56303m in TNS).

Aulacoseira pusilla (F.Meister) Tuji et Houki, Bull. Natn. Sci. Mus. Tokyo ser. B. **30**: 38. 2004.

≡ *Melosira pusilla* F.Meister, Arch. Hydrobiol. **8**: 306. *pl. IV. f. 2.* 1913.

(Figs 1-7)

Synonym: *Aulacoseira subborealis* (Nygaard) Denys, Muylaert & Krammer, Nova Hedw. **77**: 410. ≡

Melosira italica var. *subborealis* Nygaard, Folia Limnol. Scand. **8**: 74. *pl. 1. f. 8. pl. 2. f. 13-19. pl. 6. f. 24-25.* 1956.

Type locality: Lake Suwa, Nagano Pref., Japan.

Lectotype: A slide numbered "A3/61" with Meister's label in BRM, designated by Tuji et Houki, Bull. Natn. Sci. Mus. Tokyo ser. B **30**: 38. *f. 55-60.* 2004.

Isotype: A slide in Collection Tempère et Peragallo (2nd edition) no. 801. BM69152 in BM, examined by Tuji & Williams, Diat. **22**: 70-73. *f. 3-14.* 2006.

SEM examination: Tuji & Houki, Lake Biwa Study Monogr. **7**: 33. *pl. 11. f. 1. pl. 12. f. 1-2.* 2001.

Ecology: Common in eutrophic pond, dam and small lakes as a plankton (Tuji pers. obs.). Since the identification of this taxon had been confusing, the reliable ecological information is not exist for this taxon.

Discostella woltereckii (Hust.) Houk et Klee, Diat. Res. **19**: 223. 2004.

≡ *Cyclotella woltereckii* Hust. Arch. Hydrobiol. **42**: 16. *f. 11-13.* 1942.

(Fig. 8)

Holotype: A slide Ac/68 in BRM, examined by Simonsen, Atlas Cat. Diat. Typ. Fr. Hust. *pl. 400. f. 7-14.* 1987.

Lectotype: An individual at position 467.1 on the holotype slide BRM Ac/68, designated in Tuji & Williams, Bull. Natn. Sci. Mus. Tokyo ser. B. **32**: *f. 1 a-d.* 2006; micrograph presented by Simonsen, Atlas Cat. Diat. Typ. Fr. Hust. *pl. 400. f. 9.* 1987.

Discostella pseudostelligera (Hust.) Houk et Klee, Diat. Res. **19**: 223. 2004.

≡ *Cyclotella pseudostelligera* Hust., Abh. Naturw. Ver. Bremen **31**: 591. *f. 1-2.* 1942.

(Fig. 9)

Lectotype: BRM 51/1. Ems, bei Papenburg. 197, designated by by Simonsen, Atlas Cat. Diat. Typ. Fr. Hust. *pl. 371. f. 29-29.* 1987.

SEM examination: Tuji & Houki, Lake Biwa Study Monogr. **7**: 32. *pl. 11. f. 1-3.* 2001.

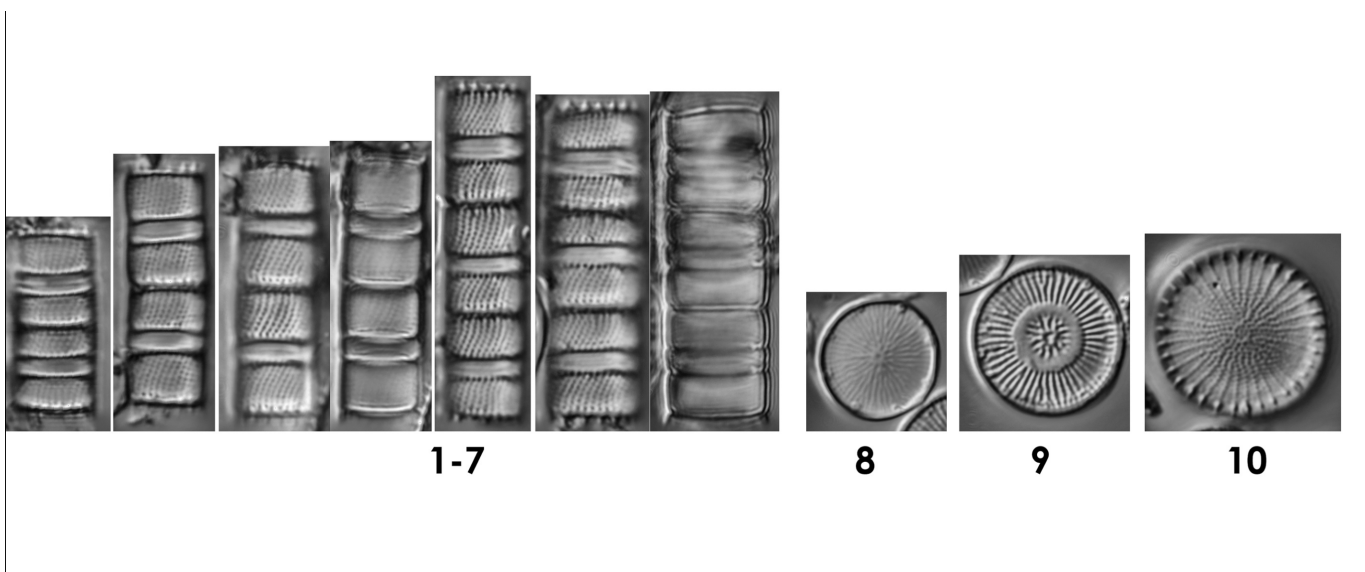
Ecology: The ecology of *Discostella* species complex seems to be different each other. However, the taxonomy of this complex has been confusing in Japan, and we need the new ecological study for this complex.

Stephanodiscus hantzschii f. *tenuis* (Hust.) Håk. et Stoermer, Nova Hedw. **39**: 486. 1984.

(Figs 2-3)

SEM examination: Tuji & Houki, Lake Biwa Study Monogr. **7**: 46. *pl. 18. f. 1-6*. 2001.

Ecology: indifferent, alkaliphilous.



Nos. 011

Chuo-koen pond, Tsukuba, Ibaraki Pref., Japan.

[36°05' N, 140°07' E from a map]

Date: 11/vii/2004.

Coll. Masayuki Watanabe (duplicate of TNS-AL-55500m in TNS).

Staurosirella berolinensis (Lemmerm.) Bukhtiy., *Algologia* **5**: 417-424. 1995.

≡ *Synedra berolinensis* Lemmerm., 1900. *Abh. Naturw. Ver. Bremen* **31**: 591. *f. 1-2*. 1942.

≡ *Belonastrum berolinensis* (Lemmerm.) Round et Maidana, *Diat.* **17**: 22.

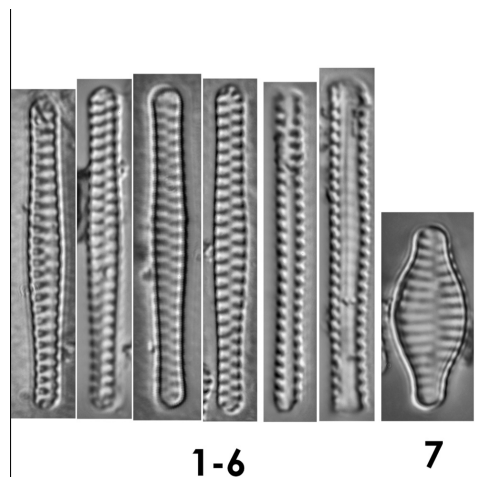
(Figs 1-6)

SEM examination: Morales, *Cryptog.* **24**: 277-288. *f. 44-49, 50, 52*. 2003.

Staurosira venter (Ehrenb.) Grunow, *Beitr. Paläont. Österr.-Ung.* **2**: 139. 1882.

(Fig. 7)

Ecology: saprophilous, alkaliphilous.



Nos. 012

Noda-numa pond near Lake Biwa, Shiga Pref., Japan. [36°26.898' N, 136°12.042' E]

EC: 155, pH: 7.4.

Date: 18/iv/2000.

Coll. A. Tuji (duplicate of TNS-AL-56304m in TNS).

Cyclostephanos tholiformis Stoermer, Håk. et E.C.Ther., Br. Phycoll. J. **22**: 352. f. 7-17. 1987.

(figs 1-3)

Type locality: planktonic in Lazy Lagoon, Lake West Okoboji, Iowa, USA.

Holotype: Slide No. ANSP A-GC. 63787.

Ecology: indifferent. This ecological information might be confused with other similar taxa.

Aulacoseira ambigua f. *japonica* (F.Meister) Tuji et D.M.Williams, Bull. Natl. Mus. Nat. Sci. Tokyo ser. B. **33**: 69-70. 2007.

≡ *Melosira japonica* F.Meister, Archiv f. Hydrobiol. **8**: 311. f. 1. 1913. later homonym.

non: *Melosira japonica* Pant. Beitr. Kenntn. Foss. Bacill. Ungarns **3**: 62. 1905. pl. 4. f. 63. pl. 8. f. 137. 1892.

(Figs 4-5)

Lectotype: Slide BRM "A3/57", designated by Tuji et D.M.Williams, Bull. Natl. Mus. Nat. Sci. Tokyo ser. B. **33**: 70. f. 4. 2007.

Isotype: Slide no. 801 of Tempère et Peragallo (2nd edition), BM69152.

Type locality: Lake Suwa, Nagano Pref., Japan.

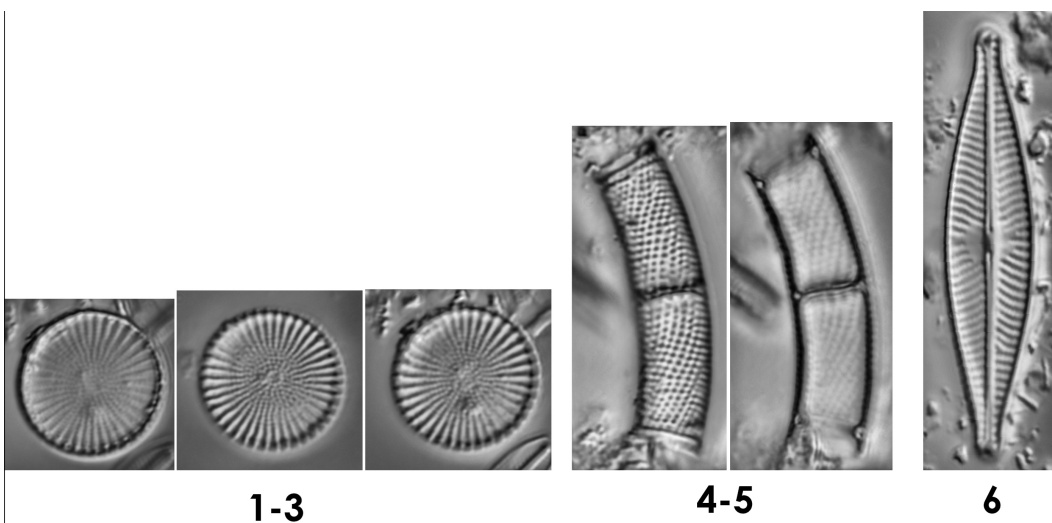
Ecology: The nominate forma is indifferent taxon. This forma seems to appear in more polluted water than nominate forma (Tuji pers. obs.).

Navicula cryptocephala Kutz., Bacill. 95. pl. 3. f. xx, xxvi. 1844.

(Fig. 6)

Lectotype: Kützing packet 459; BM 18785, designated by R.M.Patrick in Patrick & Reimer, Diat. United States 503; micrographs in Cox, Diat. Res. **10**: 108-109. f. 23. 1995.

Ecology: indifferent, pH-circumneutral.



Nos. 013

A spring in Matsuodera temple, Nara Pref., Japan. [34°38' N, 135°44' E from a map]

EC: 99, pH: 6.6, WT: 17.0.

Date: 24/ix/1991.

Coll. T. Watanabe (duplicate of TNS-AL-TW-12289 in TNS).

Achnanathidium subhudsonis (Hust.) H.Kobayasi in H.Kobayasi et al., H.Kobayasi's Atlas Jap.
Diat. Electr. Microsc. **1**: 13. 2006.

≡ *Achnanthes subhudsonis* Hust., Hedw. **63**: 144. f. 9-12. 1921.

(Figs 1-15)

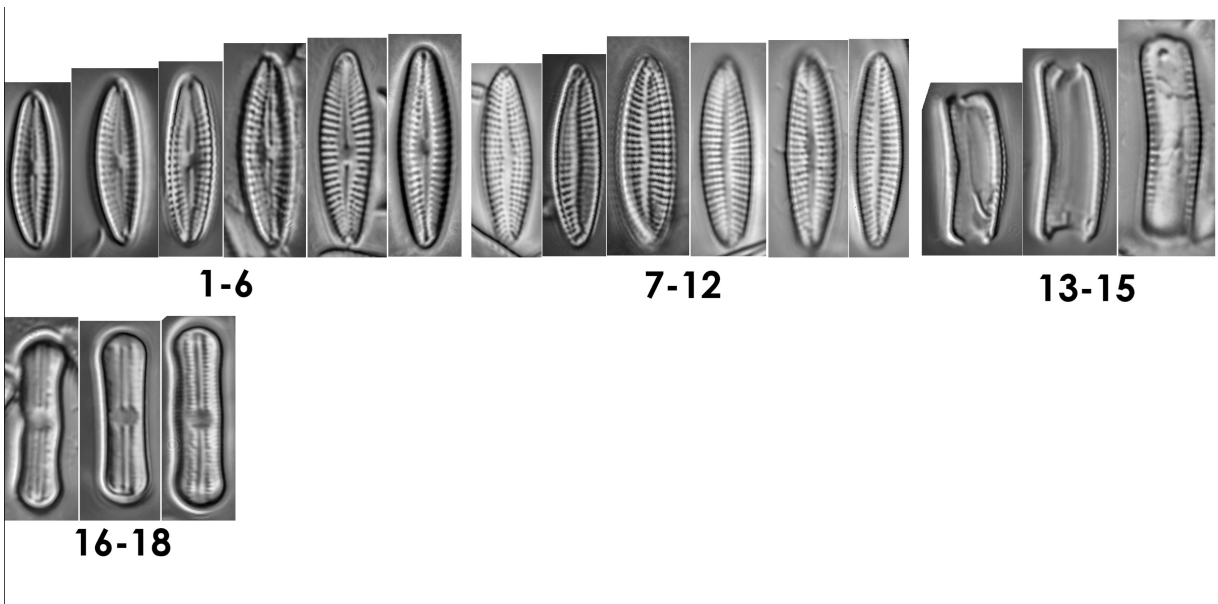
Lectotype: BRM 219/19. Amani, Urwald. 25.8.10. Schr. 7., designated by by Simonsen, Atlas Cat.

Diat. Typ. Fr. Hust. *pl.* 68. f. 1-9. 1987.

Ecology: saproxenous, pH-circumneutral.

Diadesmis paracontenta Lange-Bert. & Werum in Lange-Bertalot & Genkal, Iconogr. Diatomol. **6**:
41. *pl.* 21. f. 2-5. 1999.

(Figs 16-18)



Nos. 014

Shimoyu spring, Totsugawa hot spa, Nara Pref., Japan.

[33°56' N, 135°45' E from a map]

pH: 8.6, WT: 26.

Date: 1/iii/1994.

Coll. T. Watanabe (duplicate of TNS-AL-TW-10870 in TNS).

Achnanthydium saprophilum (H.Kobayasi et Mayama) Round et Bukhtiyarova, Diat. Res. **11**: 349. 1996.

≡ *Achnanthes minutissima* var. *saprophila* H.Kobayasi et Mayama, Jap. J. Phycol. **30**: 195. f. 2a-h. 1982.

(Figs 1-15)

Ecology: saprophilous, alkaliphilous.

Nitzschia amphibia Grunow, Verh. K. Zool.-Bot. Ges. Wien **12**: 574. pl. 12. f. 23. 1862.

(Figs 16-18)

Ecology: saprophilous, alkaliphilous.

Nitzschia microcephala Grunow, K. Svenska Vet.-Akad. Handl., ser. 4. **17**: 96. 1880.

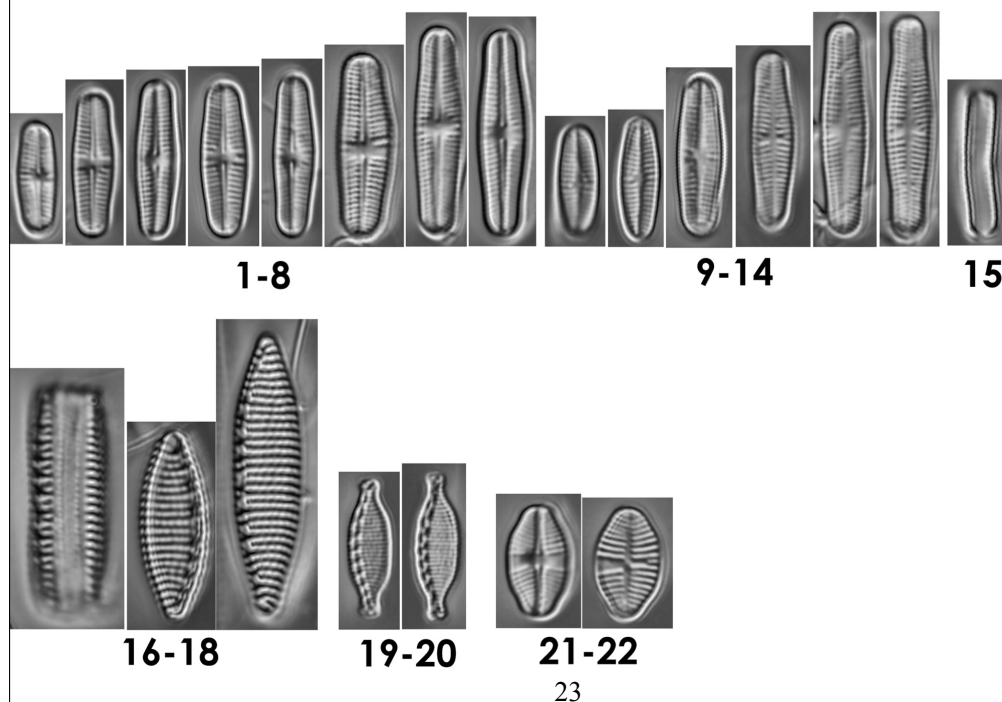
(Figs 19-20)

Ecology: saproxenous, alkaliphilous.

Psammothidium subatomoides (Hust.) Bukhtiy. et Round, Diat. Res. **11**: 13. 1996.

(Figs 21-22)

Ecology: saproxenous.



Nos. 015

Taishi-ido, Takatori, Nara Pref., Japan.

[34°27' N, 135°47' E from a map]

pH: 6.8.

Date: 13/ix/1991.

Coll. T. Watanabe (duplicate of TNS-AL-TW-12292 in TNS).

Achnantheidium catenatum (Bílý et Marvan) Lange-Bert., Iconogr. Diatomol. **6**: 277. 1999.

≡ *Achnanthes catenata* Bílý et Marvan, Preslia **31**: 34. pl. 8, f. 1-4. 1959.

Type examination using LM: Lange-Bertalot & Krammer, Bibl. Diat. **18**: 37. pl 55. f. 30-32. 1989.

(Figs 1-11)

Luticola goeppertiana (Bleisch in Rabenh.) D.G.Mann in Round, R.M.Crawford & D.G.Mann,
Diatoms 670. 1990.

≡ *Stauroneis goeppertiana* Bleisch in Rabenh., Alg. Europ. 1183. 1861.

(Figs 12-13)

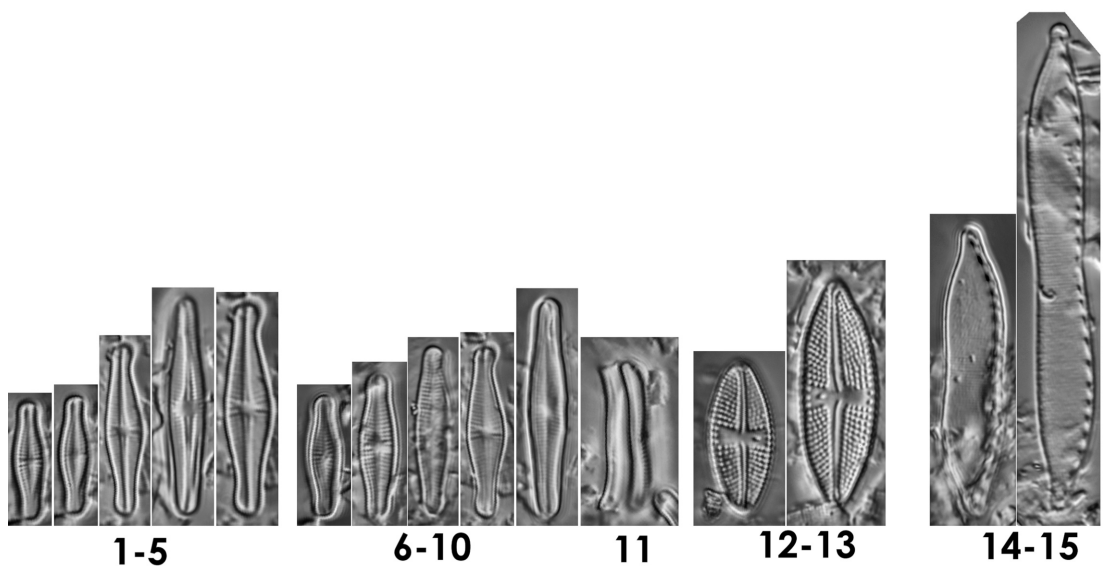
Taxonomy: Though Mann (1990) cited “*Navicula mutica* var. *goeppertiana* M.Bleisch 1861” not
Stauroneis goeppertiana Bleisch 1861, this combination is valid under ICBN.

Ecology: saprophilous, alkaliphilous.

Nitzschia brevissima Grunow in Van Heurck, Syn. Diat. Belg. pl. lxxvii. f. 4. 1881.

(Figs 14-15)

Ecology: indifferent, pH-circumneutral.



Nos. 016

Kagami-ike pond, Nara Pref., Japan.

[34°41' N, 135°50' E from a map]

Date: 2/vii/1976.

Coll. T. Watanabe (duplicate of TNS-AL-TW-10350 in TNS).

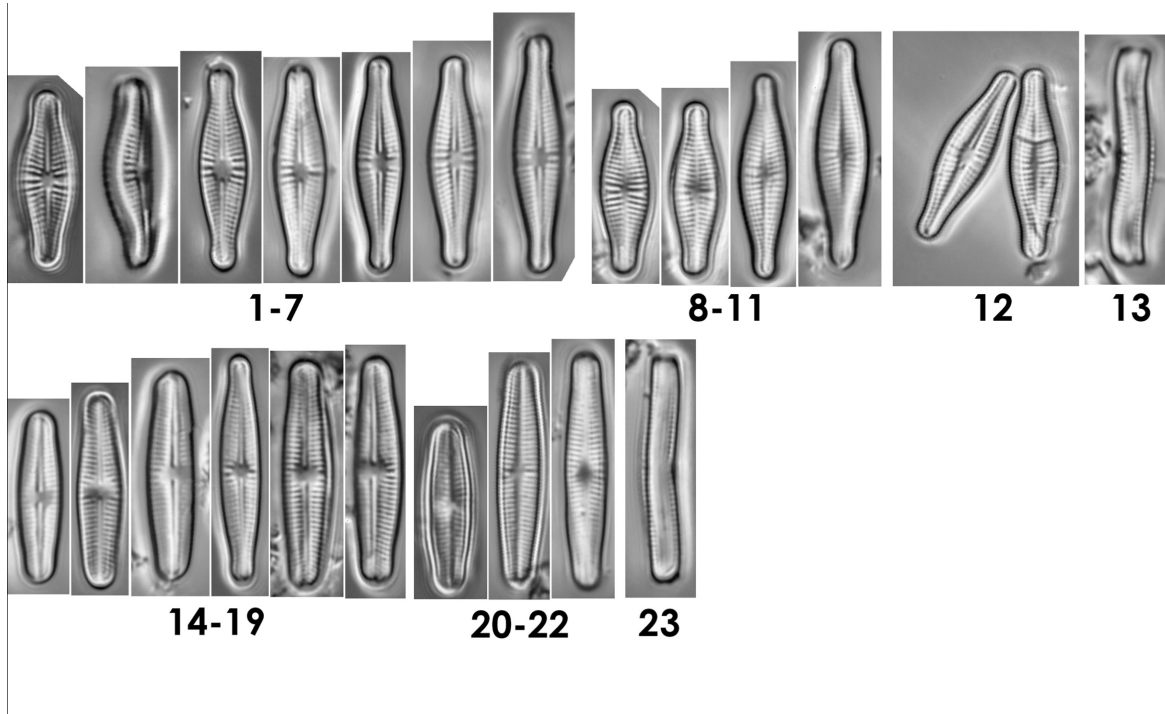
Achnanthydium microcephalum Kütz, Bacill. 75. pl. 3. f. XIII, XIX. 1844.

(Figs 1-13)

Achnanthydium minutissimum (Kütz.) Czarn., Proc. Int. Diat. Symp. 11: 157. 1994.

(Figs 14-23)

Ecology: Since the taxonomy of *A. minutissimum* species complex has been confusing, the ecology of each taxon is not clear. However, the ecology of each taxon seems to be different, and it should be very important to study the ecological difference of each taxon.



Nos. 017

A spring in Tsubokawake house, Maruoka, Fukui Pref., Japan

[36°09' N, 136°20' E from a map]

pH: 6.4, WT: 7.2.

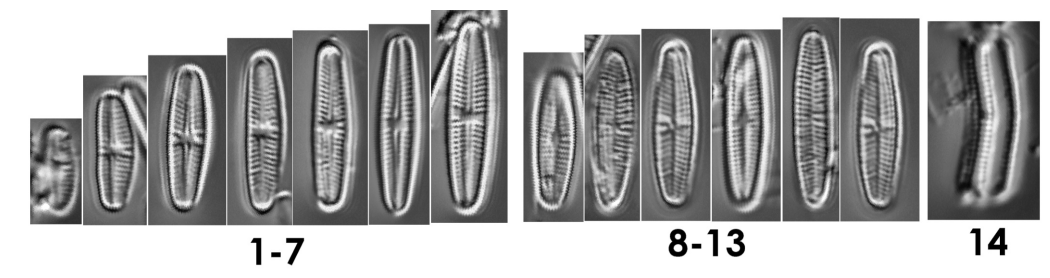
Date: 4/iv/1994.

Coll. T. Watanabe (duplicate of TNS-AL-TW-10878 in TNS).

Achnanthydium lineare W.Sm., Ann. & Mag. Nat. Hist. ser. 2. **15**: 8. *pl. I. f. 9.* 1855.

Lectotype: Coll. W.Smith, im BM 445 aus Lasswade, deisginated by Lange-Bertalot in Krammer and Lange-Bertalot, Süßw.-flora Mitteleur. **2/4**: *taf. 32. f. 10-17.* 1991; micrographs also in Lange-Bertalot & Ruppel, Alg. Stud. *f. 103-112.* 1980.

(Figs 1-14)



Nos. 018

Ryujin hot spa, Totsugawa, Nara Pref., Japan.

[33°58' N, 135°34' E from a map]

pH: 8.5, EC: 1600, WT: 40.

Date: 26/iii/1996.

Coll. T. Watanabe (duplicate of TNS-AL-TW-12435 in TNS).

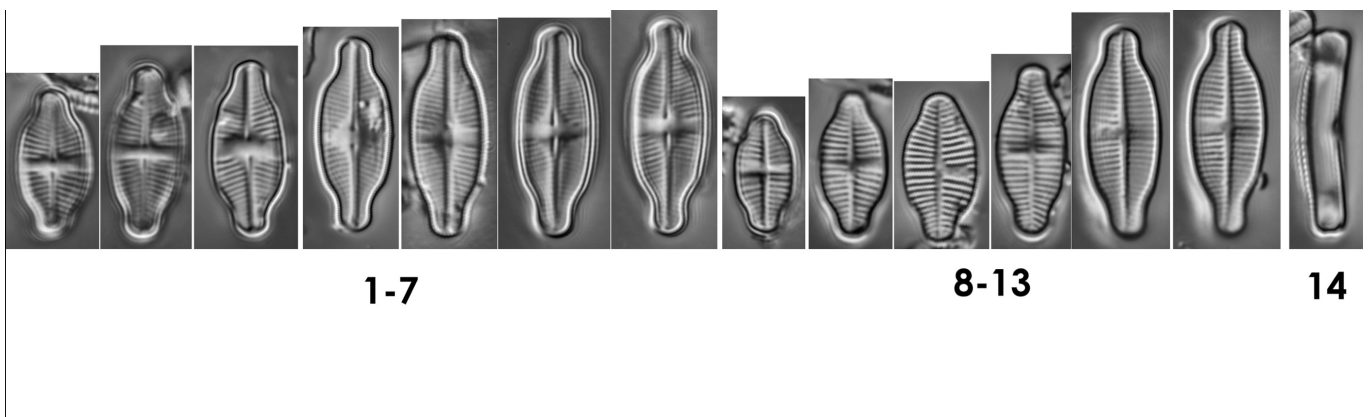
Achnantheidium exile (Kütz.) Heib., Consp. Diat. Dan. 119. 1863.

≡ *Stauroneis exilis* Kütz., Bacill. 105. pl. 30, f. 21. 1844.

≡ *Achnantheidium exiguum* (Grunow) Czarn., Proc. Int. Diat. Symp. 11: 157. 1994.

(Figs 1-14)

Ecology: saproxenous, rare.



Nos. 019

R. Hyogo, Fukui Pref., Japan.

pH: 6.6, WT: 9.0.

Date: 27/xi/1994.

Coll. T. Watanabe (duplicate of TNS-AL-TW-12596 in TNS).

Navicula gregaria Donk., Quart. J. Microsc. Sci. new ser. 10. *pl. I. f. 10.* 1861.

(Figs 1-6)

Type locality: Chibburn Mouth, Druridge Bay, Lyne Mouth, Blyth Harbour, Tynemouth.

Lectotype: BM11987 (Chibburn Mouth), designated by R.M.Patrick in Patrick & Reimer, *Diat.*

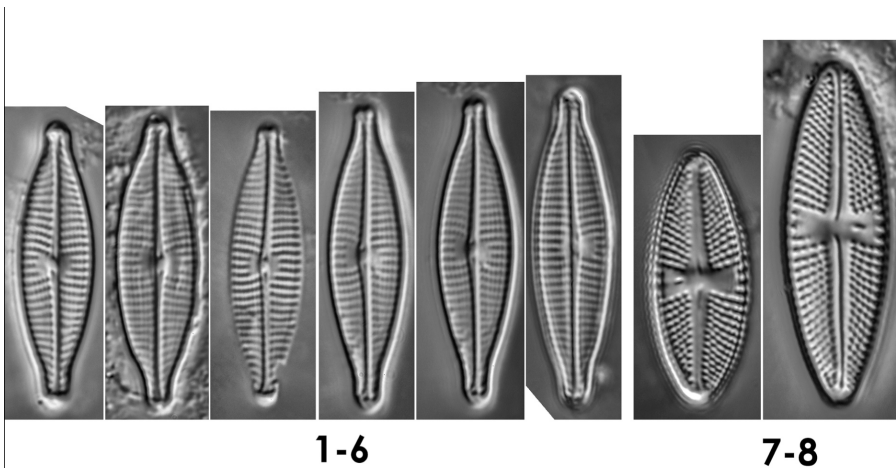
United States 467-468; micrographs in Cox, *Diat. Res.* **10**: 109. *f. 39.* 1995.

Ecology: indifferent, alkaliphilous.

Luticola goeppertiana (Bleisch in Rabenh.) D.G.Mann in Round, R.M.Crawford & D.G.Mann,

Diatoms 670. 1990.

(Figs 7-8)



Nos. 020

Nagasawa-ryuro, outflow of hot spa, Izu-oshima Isl., Tokyo Pref., Japan.

[34°45'15.6" N, 139°21'08.2" E]

EC: over 2000, pH: 9.5.

Date: 30/i/2005.

Coll. A. Tuji (duplicate of TNS-AL-55526m in TNS).

Nitzschia perspicua Cholnoky, Hydrobiol. **16**: 262. f. 36. 1960.

(Figs 1-6)

Type: Coll. Cholnoky, Swarkops 14A, no. 201/4009, Sudafricka, examined by Krammer & Lange-Bertalot, Süßw.-flora Mitteleur. **2/2**: taf. 80. f. 1-2. 1988.

Entomoneis paludosa (W.Sm.) Reimer in Patrick & Reimer, Monogr. Acad. Nat. Sci. Philadelphia **13**: 4. 1975.

(Fig. 7)

