Type Examination of Japanese Diatoms Described by Friedrich Meister (1913) from Lake Suwa

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Abstract The type slides for five taxa described by Friedrich Meister (1913) from Lake Suwa were examined. Micrographs of specimens from these type slides are presented and types are designated using individuals from each slide. One new combination is also proposed.

Key words: Asterionella subtilissima F. Meister, Aulacoseira ambiguja f. japonica (F. Meister) Tuji et D. M. Williams, comb. et stat. nov., Aulacoseira pusilla F. Meister, Gomphonema globiferum F. Meister, lectotype, Melosira japonica F. Meister, Melosira pusilla F. Meister, Synedra japonica F. Meister, Synedra delicatissima var. angustissima Grunow, Synedra delicatissima var. mesoleia Grunow, Synedra rostrata F. Meister.

Introduction

Friedrich Meister (1913, 1914) described 12 new taxa, six from Lake Suwa, Japan, one from “Filter der Wasserversorgung Yokohama”, the other five from “Teich der botanischen Gärten zu Tokyo” (thought to be the Botanical Gardens, Graduate School of Science, the University of Tokyo in Koishikawa). Though these taxa are often found in Japanese freshwater, as periphyton or plankton, their identification has been confused.

Slides prepared by Meister, agreeing with the original descriptions, are found in Hustedt’s collection in the Friedrich Hustedt Study Centre for Diatoms, the Alfred Wegener Institut für Polar- und Meeresforschung (BRM) are labelled with the species name, a locality and the name of “Meister”. As the descriptions match those given by Meister in 1913 (Meister 1913), they should be considered isotype specimens.

Results and Discussion

Aulacoseira ambiguja f. japonica (F. Meister) Tuji et D. M. Williams, comb. et stat. nov.


Lectotype (designated here): Slide BRM “A3/57”! [Fig. 4]

Isotype: Slide no. 801 of Tempère et Peragallo (2nd ed.), BM 69152! [Figs. 1, 2]

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

Although *Melosira japonica* F. Meister (1913) is a later homonym of *M. japonica* Pantoeck (1905), it has been used in many Japanese research papers (Tanaka, 2002; Tuji, 2006). *Melosira japonica sensu* F. Meister has been sometimes identified as *M. granulata* var. *tenuissima* *f. spiralis* (Wakabayasi and Ichise, 1982).

*Melosira japonica* Pant. was described from fossil material in Hokkaido and is clearly different from *M. japonica sensu* F. Meister (Tuji, pers. obs.). Since the structure of the frustule is similar to that of *Aulacoseira ambigua* (Grunow) Simon- sen, as described by Kobayasi and Nozawa (1981), Tuji and Houki (2001) made it a synonym of *A. ambigua*. Tuji and Houki (2001) used the term “Morphotype” for describing the morphological differences of colonies between *Melosira japonica* (with spiral colonies) and *A. ambigua* (straight colonies). The term “Morphotype”, which was used by Krammer and Lange-Bertalot (1991) as “Morphotyp”, is not suitable in this case, as the term, if used at all, should refer to morphological changes in a taxon.

Tanaka (2002) described *A. ambigua*, which appeared in mesotrophic environments, and *Aulacoseira japonica* nom. nud. (*M. japonica*), which appeared in eutrophic environment. The distribution of both taxa in Lake Biwa supports this ecological difference (Tuji, 1995, pers. obs.). Since we believe it is important to distinguish the morphological differences observed in the colonies (spiral and straight), and as those differences correspond to different ecological occurrences, we propose a new combination for *Melosira japonica sensu* Meister.

Four syntype slides have been identified for *Melosira japonica* F. Meister in Hustedt’s collection: BRM, “A3/28”, with the Hustedt’s label “Suwa See Japan VII 1911 St Prap Meister”; BRM “A3/29”, with the Hustedt’s label “Suwa See, Japan VII-IX, 08 St Prap Meister”; BRM “A3/57”, with the Meister’s label “Suwa Sea VII-IX 1908, Melosira japonica Meister”; and BRM “A3/58” with the Meister’s label “Suwa Sea VII-IX 1908, Melosira japonica Meister”. Last three slides include specimens in single colonies. Individuals found in all slides correspond to the given description of *M. japonica* F. Meister. Here, we propose BRM “A3/57” as the lectotype for *Melosira japonica* F. Meister.


Lectotype (designated in Tuji and Houki 2004): Slide BRM “A3/61”! [Figs. 5–10]

Isotype: Slide no. 801 in Tempère et Peragallo (2nd ed.), BM 69152! [Figs. 11–18]

Type locality: Lake Suwa, Nagano Prefecture, Japan.


Examination and lectotypification for *Melosira pusilla* Meister was undertaken by Tuji and Houki (2004) (Figs. 1–10). Tuji and Williams (2006) also examined the isotype slide in Tempère and Peragallo’s *Diatomees du monde entier* (2nd ed.) (Figs. 11–18) and discussed its morphological variation.

*Melosira pusilla* F. Meister is commonly found in eutrophic lakes, ponds and reservoirs in Japan. It has been confused with *Aulacoseira distans*.
Aulacoseira ambigua f. japonica (F. Meister) Tuji et Williams, comb. et stat. nov. Figs. 1, 2. BM 69152 (isotype). Fig. 3. Meister's original illustration in Meister (1913). 4. A3/57 (lectotype, BRM). Bar=10 μm.

*Synedra japonica* F. Meister in Arch. Hydrobiol. **8**: 312. pl. IV, f. 5–6. 1913. [Figs. 21–28]

Lectotype (designated here): BRM “K2/59”

Isotype: Slide no 801, Tempère et Peragallo (2nd ed.), BM 69152

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

In BRM there is one slide labelled “K2/59” for this taxon. It includes just two individuals: On the upper left one specimen is covered in dust and not suitable for detailed examination. The other specimen, on the lower right, as it is visible (Fig. 21), is designated as the lectotype.

Although individuals with finer striae have been observed in the isotype slide (13–14 striae per 10 µm, BM 69152, Fig. 22), it is assumed a simple morphological variation. The description given of *S. delicatissima var. angustissima* in Patrick and Reimer (1966) is the same as this this taxon.

*Synedra japonica* is common in the plankton of Japanese Lakes and Reservoirs, and previously identified as either *Synedra acus* (Yoshizawa and Nakamura, 1995) or *Synedra delicatissima var. angustissima* (Tanaka, 2002).

The valve are very narrow at the poles (1–2 µm), becoming narrow towards the central area; the poles are weakly spatulate, the sternum is very narrow. Striae are 11–14 per 10 µm (Figs. 21–23).

SEM observations on the material from Lake Biwa revealed two large rimoportulae, one at each end of the frustule (Figs. 24–26).

Examination of the type for *S. delicatissima var. delicatissima* W. Sm., using LM (Figs. 27, 28) and SEM, was undertaken by Tuji and Houki (2004). *Synedra delicatissima* has has wider and capitate valve poles when compared to *S. japonica*.

*Synedra delicatissima var. angustissima* was first described by Grunow (1882). In an annotated copy of Van Heurck (1880–1885) (GVHS, housed in W), Grunow noted the slide “2646”, the locality “Attersee” (Lake Attersee, Austria) and the density of striae (12) alongside his original line drawings. Slide “2646a” and raw material “2646” were located in Grunow’s collection and examined using LM. The individual in Figure 29, from slide W 2646a, we designate as the lectotype.

*Synedra delicatissima var. mesoleia* was also first described by Grunow (1882). In GVHS, Grunow noted the slide “1821”, the locality and density of striae (11 1/2) alongside his original line drawings. Slide “1821” was located in Grunow’s collection and examined using LM. The individual in Figure 30, from slide W 1821, we designate as the lectotype.

*Synedra delicatissima var. angustissima* and *S. delicatissima var. mesoleia* both have wide and capitate valve poles, and are considered synonyms of *S. delicatissima var. delicatissima*. These features separate it from *S. japonica* and are not synonyms.

*Synedra rostrata* F. Meister in Arch. Hydrobiol. **8**: 312. pl. IV, f. 7. 1913. [Figs. 32–37]

Lectotype (designated here): BRM “K2/57”

Isotype: Slide no. 801 Tempère et Peragallo (2nd ed.), BM 69152


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

One individual specimen of *Synedra rostrata* F. Meister on slide BRM “K2/57” was found, and designated as lectotype. Both the lectotype individual and others found on the isotype slide correspond with the description given by Meister.
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SEM micrographs were presented by Kobayasi et al. (1987) and Kobayasi et al. (2006) as *Synedra inaequalis*. The variation observed for *Synedra rostrata* F. Meister in *Arch. Hydrobiol.* 8: 312. pl. IV, f. 8–10. 1913, suggesting they are synonyms.

This taxon is common as periphyton in the oligotrophic rivers and lakes.

*Asterionella subtilissima* F. Meister in *Arch. Hydrobiol.* 8: 312. pl. IV, f. 8–10. 1913.

[Lectotype (designated here): BRM “KB/81” !

[Fig. 47]

Isotype: Slide no. 801 Tempère et Peragallo
One colony on the slide numbered “KB/81” was found to be *Asterionella subtilissima* F. Meister and is designated as lectotype. The lectotype colony was observed only in girdle view (Fig. 47). Valve and girdle views were found for specimens in the isotype slide (BM 69152, Figs. 38–46). *Asterionella subtilissima* has a short valve length and may be compared with *Asterionella gracilissa* (Hantzsch) Heib. However, there is a lack of data to clarify the taxonomic states of *A. subtilissima*. The colony formation and the valve structure of *A. subtilissima* is also similar to *Eunotia asterionelloides* Hust. However, the striae of *A. subtilissima* are parallel through to the valve ends (Fig. 40–46), those of *Gomphonema globiferum* F. Meister. BM 69152 (isotype). Figs. 50, 51. Lectotype. Fig. 52. Meister’s original illustration in Meister (1913). Figs. 48–52. Bar=10 μm.
E. asterionelloides become oblique towards the poles (Simonsen, 1987: pl. 570).

Gomphonema globiferum F. Meister in Arch. Hydrobiol. 8: 312. pl. IV, f. 13. 1913.

Lectotype (designated here): One individual from slide no. 801 Tempère et Peragallo (2nd ed.), BM 69152 ! [Figs. 50, 51]

Isotype: Specimens on slide no. 801 Tempère et Peragallo (2nd ed.), BM 69152 ! [Figs. 48–51]

No specimens of Gomphonema globiferum F. Meister were found on any BRM slides. Hence we designate an individual as the lectotype from isotype material (BM 69152). The lectotype is of the morphology for the current concept of this taxon (Tanaka, 2002).


