

鈴木 繁*・真山茂樹** : 日本において *Pinnularia braunii* var. *amphicephala* (Mayer) Hustedt と同定されてきた種類の増大胞子と大きさの範囲

Shigeru Suzuki* & Shigeki Mayama** : Auxospore of *Pinnularia* sp. which has long been identified as *Pinnularia braunii* var. *amphicephala* (Mayer) Hustedt in Japan and the size reduction of the vegetative valve

Key index words : Auxospore, cell size reduction, hot spring, initial cells, inorganic acid river, perizonium, *Pinnularia braunii* var. *amphicephala*.

There are many inorganic acid rivers and ponds in Japan caused by volcanic activity. The diatoms identified as *Pinnularia braunii* var. *amphicephala* (Mayer) Hustedt have sometimes been reported from such waters (e. g. Negoro 1985, Suzuki 1994). However, judging from the photomicrographs of the holotype specimens, the present specimens cannot be considered to be conspecific with *Pinnularia mayerii* Krammer, which is an avowed substitute for *Pinnularia amphicephala* Mayer, because the holotype specimens have prominent large capitate valve ends (Krammer 1992 taf. 42. figs 2-4).

We collected a sample of *Pinnularia* sp. (= *P. braunii* var. *amphicephala* sensu auct. nonnull.) from a small stream (pH 3.2, water temp. 18.2 °C) originating from the outflow water of Doroyu hot spring in Yuzawa-shi, Akita, Japan on 15 May 1995. One of the present authors, Suzuki (1995) already reported the gametes of this taxon from the same basin without observation of the auxospore, however, many auxospores (111 cells) were observed in this study.

They were cylindrical with rounded ends (Fig. 1). Almost all of the elongated auxospores were 70–90 μm in length (min. 60 μm, max. 123 μm) and two or three times longer than those of the gametangial mother cells. The gametangial mother cells (56 cells) were 30–40 μm in length, though the longest one was 45.5 μm.

Two auxospores were formed from each pair of gametangial mother cells. The auxospores and the mother cells were arranged in parallel along their longitudinal axes though partly broken in Fig. 1. This arrangement is the same

as seen in *Pinnularia viridis* (Nitzsch) Ehrenberg (Hashizume 1978 a, 1978 b) and *Pinnularia major* (Kützing) Cleve (Hashizume 1985).

Scanning electron microscopy showed the auxospore wrapped by a perizonium. The perizonium remaining on the initial frustule is composed of many string-like elements (Fig. 2).

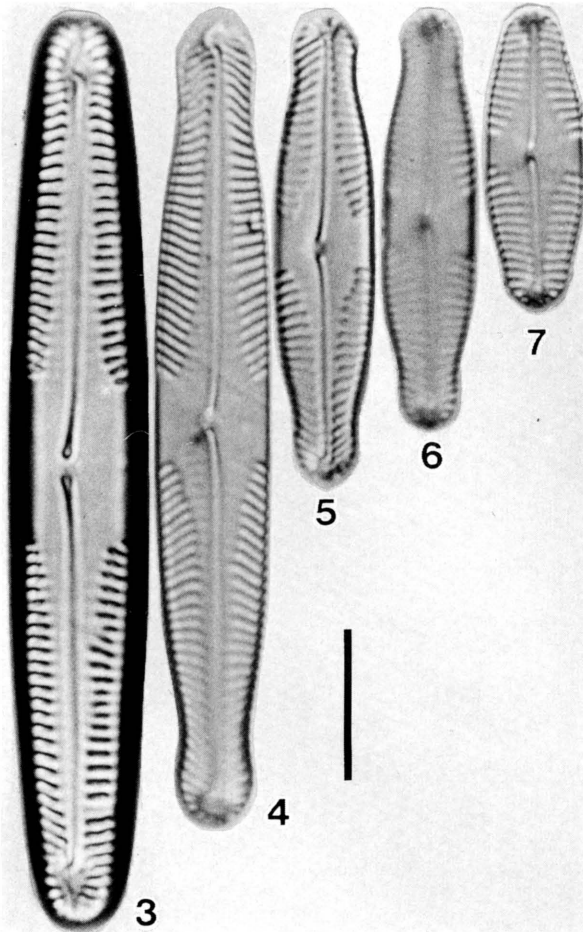
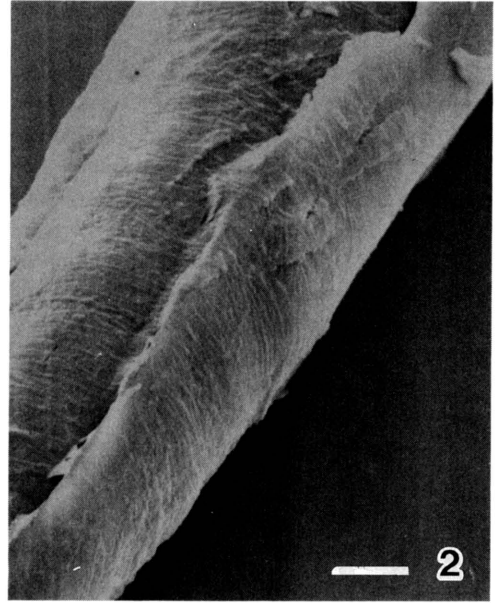
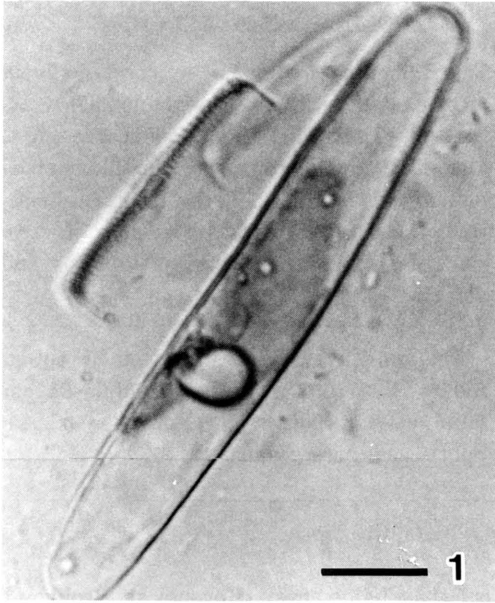
The length of the initial valves was 60–123 μm and the width was 9.5–11 μm (Fig. 3). The other vegetative valves observed in the same population were 20–70 μm long and 6.5–9.5 μm wide (Figs 4–7). The initial valves were lanceolate with rounded ends. The ends became weakly capitate to rostrate when accompanied by the cell size reduction during vegetative multiplication. The valves longer than about 30 μm showed almost parallel valve sides at the center, though this feature was not seen in smaller valves. However, the striae density, 11–13 in 10 μm, was a stable characteristic throughout the life cycle. Detailed observations using electron microscopy will be necessary for the taxonomy of this taxon.

Acknowledgment

We would like to express our thanks to Emer. Prof. M. Yamamoto of Akita University for his valuable advice. We also thank Mr. T. Goto of Yuzawakita High School for his cordial kindness.

摘 要

秋田県湯沢市泥湯温泉から湧出する小流中(馬ノ湯)から、増大胞子を多数含む *Pinnularia* 種の個体群を採集した。この珪藻はかつて *Pinnularia braunii* var. *amphicephala* (Mayer) Hustedt としてわが国では知られていた種類である。しかし、近年 Krammer (1992) が写真で示した *Pinnularia mayerii* Kram-



mer (*P. amphicephala* Mayer の公認代置名) のタイプ標本は、より大きな頭状形の殻端部をもち、本試料の個体とは明らかに異なっていた。

本種では、増大胞子が配偶子母細胞囊殻の長軸と平行して2個形成された。観察された増大胞子の多くは、長さ70–90 μm であり、母細胞囊殻の2–3倍であった。増大胞子を覆うペリゾニウムは、多数の細い糸状の環より構成されていることが走査型電子顕微鏡観察によりわかった。また、初生殻は殻長60–123 μm 、殻幅9.5–11 μm であり、通常の栄養細胞では殻長20–70 μm 、殻幅6.5–9.5 μm であった。条線数は10 μm 中11–13本であり、生活史を通じて安定していた。

References

- Hashizume, M. 1978a: The formation and germination of the auxospore of *Pinnularia*. The Heredity (Iden) 32 (4): front pls. 3, 4. (in Japanese)
- Hashizume, M. 1978b: On the sexual reproduction of the pennate diatoms. The Heredity (Iden) 32 (6): 74–77. (in Japanese)
- Hashizume, M. 1985: Desmids and auxospores of diatoms in Komegane. Hashizume, Komegane. (in Japanese)
- Krammer, K. 1992: *Pinnularia*, eine Monographie der europäischen Taxa. Biblioth. Diatomol. 26: 1–353.
- Negoro, K. 1985: Diatom flora of the miner-

alogenous acidotrophic inland waters of Japan.
Diatom 1 : 1-8.

Suzuki, S. 1994 : Benthic flora and fauna in Kawarageyujiri-zawa (an inorganic acid river with high water temperature) in 1993. Seasonal succession and distribution of *Synechocystis* and *Pinnularia*. *Seibutsu Akita* **1995** (36) : 11-17. (in Japanese)

Suzuki, S. 1995 : On the sexual reproduction of the pennate diatoms. Gametogamy of *Pinnularia braunii* var. *amphicephala* (Preliminary report) . *Seibutsu Akita* **1995** (37) : 19-22. (in Japanese)

Explanations of Figures

Figs 1-7. *Pinnularia* sp. (= *Pinnularia braunii* var. *amphicephala* sensu auct. nonnull.). Scale bars = 10 μ m (Figs 1, 3-7) or 20 μ m (Fig. 2).
Fig. 1. Elongated auxospore and gametangial mother valves. Fig. 2. Perizonium remaining on the initial frustule. Figs 3-7. Valves of various sizes. Fig. 3. Initial valve. Figs 4-7. Post-initial valves.

This work was partly supported by Grant in Aid no. 07917003 from the Scientific Research Fund of the Ministry of Education, Science, Sports and Culture, Japan.

* Shigeru Suzuki : Omote-machi 1-3-13, Yuzawa-shi, Akita, 012 Japan.

鈴木 繁 : 秋田県湯沢市表町 1-3-13 〒 012

** Shigeki Mayama : Department of Biology, Tokyo Gakugei University, Koganei-shi, Tokyo, 184 Japan. 真山茂樹 : 東京都小金井市貫井北町 4-1-1 東京学芸大学生物学教室 〒 184