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DATA ON KNOWLEDGE OF THE BLUE-GREEN ALGA ANABAENOPSIS RACIBORSKII WOLOSZ

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Abstract

The paper enlarges, on the basis of the appearance in large numbers of *Anabaenopsis raciborskii* WOLOSZ., the domain of knowledge concerning the species, giving a description of *Anabaenopsis raciborskii* var. *longicellula* SZALAI and *Anabaenopsis raciborskii* var. *seriata* (PRESCOTT) comb.nov.

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In the September of 1975, an investigation into the longitudinal section took place in the Tisza, about 400 km long, going together with the water-course. The results of investigation will be published in a separate paper (ÁDÁMOSI *et. al.* 1977). From the limnological characteristics it is worth emphasizing that the measurements took place in a period of a small water output (250 m³/sec), the water temperature

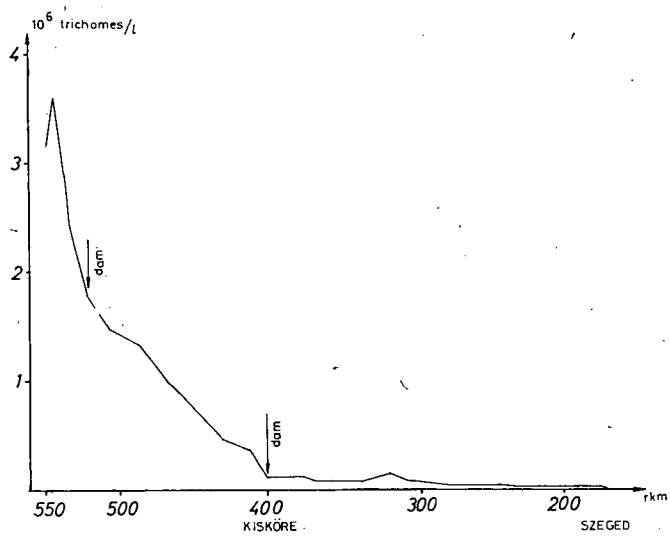

Fig. 1. Change in the individual number of *Anabaenopsis raciborskii* WOLOSZ. in the longitudinal section.

being about 22 °C. The phytoplankton stock was already rich in the Upper Tisza Region, as well (river-km 551). A considerable part of it was formed by *Anabaenopsis raciborskii* WOLOSZ. In addition, *Aphanizomenon flos-aquae* (L.) RALFS and *Microcystis aeruginosa* KÜTZ were present, as well. Some kilometres below, in the tributary Bodrog, the latter two species equally predominated — thus in the Tisza, as a result of these three species, some colouration of water developed.

At the start of the longitudinal section (Tokaj), *Anabaenopsis raciborskii* occurred in a very large individual number (max. $3{,}6\times10^6$ trichomata/l), then its individual number more and more decreased (Fig. 1), but it could still be found about 400 km farther down, as well, in the plankton. On the basis of the combination of phytoplankton, the water of the Tisza was of eutrophic state in this period.

Anabaenopsis raciborskii may have got into the Tisza from the Lónyai-channel which empties itself into the river not far from the first sampling site and is rich in

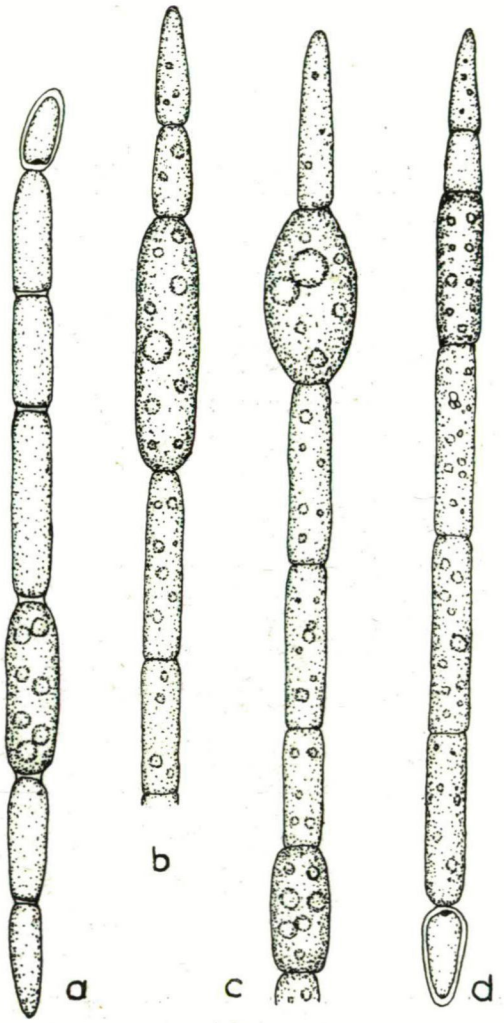

Fig. 2. a—d: *Anabaenopsis raciborskii* WOLOSZ. (Cf. in the text).

organic matter because it carries the sewage-waters of Nyíregyháza. From the gradual decrease in the individual number of species it may be inferred that this river which is of small water output, slow-flowing, and very rich in inorganic nutritive matters (HAMAR *et al.* 1976, B. TÓTH 1976), is not favourable for the presence of this species in large numbers. The decrease in the individual number was not prevented, by damming up the water, either (Fig. 1). By reason of its distribution so far, it is primarily known as a standing-water organism what does not exclude its possible multiplication in large numbers in the reservoirs.

In the course of the investigation it was possible to follow the development of the spores appearing but very rarely. It is always one of the intercalary vegetative cells that begins growing thick (Fig. 2d, 3a). The photosynthetic pigments disappear from it. It could be observed that in the lower reaches of the river the number of the trichomata having a spore or spores were much higher what is referring to the senescence of the stock. The older spores grew longer (Fig. 2b, 3h), in many cases they took an elongated oval shape (Fig. 2c, 3c—d). The young trichotomata are without heterocyst and spore. The size of spores is 7,5—12,5×3,5—4,7 μ. The spores take place beside one another or father from one another (Fig. 2c, 3j).

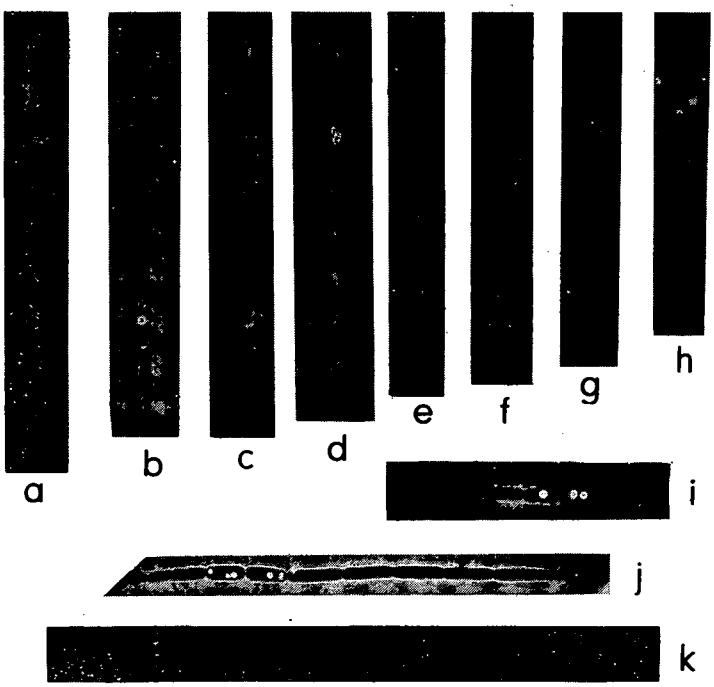

Fig. 3. *Anabaenopsis raciborskii* WOŁOSZ. (Cf. in the text).

The heterocysts are terminal, alternating but rarely. Below they are broadly rounded and near to the end narrowing. On the internal part of the surface touching the vegetative cell a nodular thickening can be found. Their size is 5—6,5×2,5—26 μ.

The light green vegetative cells are cylindrical, the cross-walls are at the young trichotomata weakly, at the older ones rather strongly constricted (Fig. 2a, 3j). The granulated cells are frequent (Fig. 3b). The size of cells is 2,3—3×7,5—12,5 μ.

The trichotomata are straight or a little curved, growing narrow at their end (Fig. 3g—i). The granules of the vegetative cells disappear after a time. The cause of their stronger granulation (Fig. 3k) is supposedly the state before their getting into the river, the origin from the sewagewater.

On the basis of the investigation, the description of the species and its morphological circle may be given in the following:

Anabaenopsis raciborskii WOLOSZ.

The trichomata are straight, curved or spiral, about 60—200 μ long. The vegetative cells are cylindrical, with a weakly — in older age stronger — constricted cross-wall. In the plasm, sometimes granules are to be found. The size of cells is 2—4 ×5—12,5 μ. The heterocysts are of terminal localization, sometimes they alternate. They are conical or have an elongated ovoid form, at their basis often with a nodular thickening. Their size is 2—2,6×5—7 μ. The spores are cylindrical or have an elongated oval shape. More of them may occur in a trichoma. Their size is 3,3—4,7×7—13 μ.

A variety of it is described by SZALAI (1942) from the Kőrös, one of the tributaries of the Tisza:

Anabaenopsis raciborskii var. *longiscellula* SZALAI.

The cells have the size of 4—5×16,2—20 μ, they are a little constricted at the cross-wall, the heterocyst is ovoid, shorter than the type, its size being 3,2—3,7 μ.

This variety is primarily distinguished from the prototype by the shape of the heterocyst. We may say the same of the species described by PRESCOTT, as well (PRESCOTT & ANDREWS 1955). On the basis of the present invetigation, *Anabaenopsis seriata* PRESC., described by PRESCOTT, also differs from the prototype but in the shape of the heterocyst.

Anabaenopsis raciborskii var. *seriata* (PRESC.) comb. nov.
Syn.: *A. seriata* PRESC.

The heterocysts are strongly elongated cone-shaped, their size being 3×4,5—8 μ.

The presence of *Anabaenopsis raciborskii* WOLOSZ. in a river water is a little unusual. It may be imagined that after a change in the environment — *e.g.*, building of the river barrages and reservoirs — this species will also get more often before the eyes of the researchers.

References

ADÁMOSI *et. al.* (1977): Limnológiai vizsgálatok a Tisza hossz-szelvényében (Limnological investigations in the longitudinal section of the Tisza). — Tiscia. (Szeged) (In press).

FELFÖLDY, L. (1972): A kékalgák (Cyanophyta) kishatározója (Small indentification-book of blue-green algae [Cyanophyta]). Vízügyi Hidrobiológia *1.*

HAMAR *et al.* (1976): Data on the hydrobiology of the Middle and Lower Tisza River Region. — Tiscia (Szeged) *11.*

HUBER—PESTALOZZI, D. (1938): Das Phytoplankton des Süßwassers. 1. Teil. — Stuttgart.

PRESCOTT, G. W. &[4]ANDREWS, T. F. (1955): A new species of Anabaenopsis in a Kansas Lake with notes on Limnology. — Hydrobiol. *7.* 60—63.

STARMACH, K. (1966): Cyanophyta-Glaucophyta. — Warszawa.

SCHWABE, G. H. (1968): Zwei bemerkenswerte Nostocaceen aus Südamerika. — Amazoniana I, *4*, 351—368.

SZALAI, I. (1942): Adatok a Kőrösök pseudophytoplanktonja ismeretéhez I (Data on knowledge of the pseudo-phytoplankton of the Kőröses I). — Doct. Thesis, University in Szeged

B. TÓTH, M. (1976): Hydrochemical conditions of the River Tisza. Seasonal dynamism of the oxygen household and nitrogen-phosphorus forms. — Tiscia (Szeged) *11* (in press).