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Scaled Chrysophyceae From Lake Itasca Region.

II. *Synura*, *Chrysosphaerella*, *Spiniferomonas*

This paper is a second report by Wujek, Weis, and Andersen on studies of phytoplankton from lakes in the region of Lake Itasca, Minnesota. Different genera were included in that previous report (*Journal*, Volume 47-1, 1981). A third paper by Wujek and Timpano, cited as "in press" in these two earlier reports, has since been published in Kansas.

DANIEL E. WUJEK*, MICHAEL M. WEIS**, ROBERT A. ANDERSEN***

ABSTRACT — Using electron microscopy, 49 plankton samples from the Lake Itasca region were examined for the silica-scaled chrysophycean genera *Synura*, *Chrysosphaerella* and *Spiniferomonas*. Twelve taxa were observed: five are new for Minnesota, and two of these, *Synura multidentata* and *Synura petersenii* f. *asmundiae*, are new reports for the continental United States.

In a previous paper published in Volume 47, Number 1 of this *Journal*, Wujek *et al.*, reported a floristic survey of the silica-scaled chrysophycean genus *Mallomonas* was given for the Lake Itasca region. Continuing the study, this paper reports on the colonial taxa of *Synura* and *Chrysosphaerella* and the unicellular genus *Spiniferomonas*, also for the Lake Itasca region of northwestern Minnesota.

Collecting methods, locations and preparation of the plankton samples were those described in the previously cited paper. An asterisk before names in the list indicates a new record for the state, and a double asterisk represents a new record for the continental United States.

The Species Observed

Synura. The cells of this alga genus are radially united into motile colonies. As with other members of the Synuraceae, taxonomy of the species is based on the morphology of the silica scales which surround each cell.

Synura echinulata Korshikov (Figs. 1-2).

Observed only from the Beaver Pond on Hwy. 4, this species has been observed from a number of other locations within the United States, including Minnesota (Meyer and Brook, 1969), although this represents the state's first documentation using electron microscopy.

**Synura mollispina* (Petersen and Hansen) Peterfi and Moneu (Fig. 3).

Scales representing this species were collected from Hay Creek. It has been reported from a number of U.S. locations, most recently, Iowa (Wee, 1981).

***Synura multidentata* (Balanov and Kuzmin) Peterfi and Momeu (Figs. 4-5).

This is the first report of this taxon for North America. Originally described as a form of *S. echinulata*, in 1977 Peterfi and Momeu raised it to the rank of species. It has previously been reported only from Russia and Rumania. We observed it from the Darling Pond collections.

Synura petersenii Korshikov (Figs. 6-7).

The most frequently observed of the *Synura* species, we found scales belonging to this species in three samples: Hay Creek, Wild Rice River and Lake Itasca. These diverse habi-

tats are in keeping with other investigators' observations as one of the most widely distributed of the *Synura* taxa (Wee, 1981; Kristiansen, 1975).

***Synura petersenii* f. *asmundiae* Cronberg and Kristiansen (Figs. 8-9).

Our collections from the North Deming Pond and Darling Pond represent the first observation of this taxon from the continental United States. It was originally described from Lake Fiolen, Sweden (Cronberg and Kristiansen, 1980). It has also been reported from Alaska where it was called *S. petersenii* (Asmund, 1968).

**Synura petersenii* f. *kufferathii* Petersen and Hansen (Fig. 10).

This form differs from the type in that the ribs are connected by transverse folds so that a network of ribs are formed at the lower end of the scale. We observed scales fitting this description in the South Deming Pond and the Wild Rice River.

Synura spahagnicola Korshikov (Fig. 11).

Kristiansen (1969) has shown this species to occur in lakes that are acidic. Our observations confirm this for we have noted its presence in the Beaver Pond and North Deming Pond.

Synura spinosa Korshikov (Fig. 12).

Specimens of this taxon were collected from the Beaver Pond and the South Deming Pond. The scales are comparable to Petersen and Hansen's (1956) description and the findings of other investigators.

Synura uvella Ehrenberg (Fig. 13).

One of the most easily recognized taxa using light microscopy, our observation of this species was from Darling Pond.

Chrysosphaerella. This genus, with its siliceous bristles and scales, is usually easily identified with the light microscope. Differentiation of the species is, however, a difficult matter and can only be achieved with an electron microscope. Three colonial and two unicellular species are recognized. Our samples revealed the presence of two colonial taxa.

Chrysosphaerella brevispina Korshikov emend. Harris and Bradley (Figs. 14-15).

The organisms' scales and bristles we observed are consistent with the published electron micrographs of other authors (Roijackers, 1981). It was collected only once from the South Deming Pond.

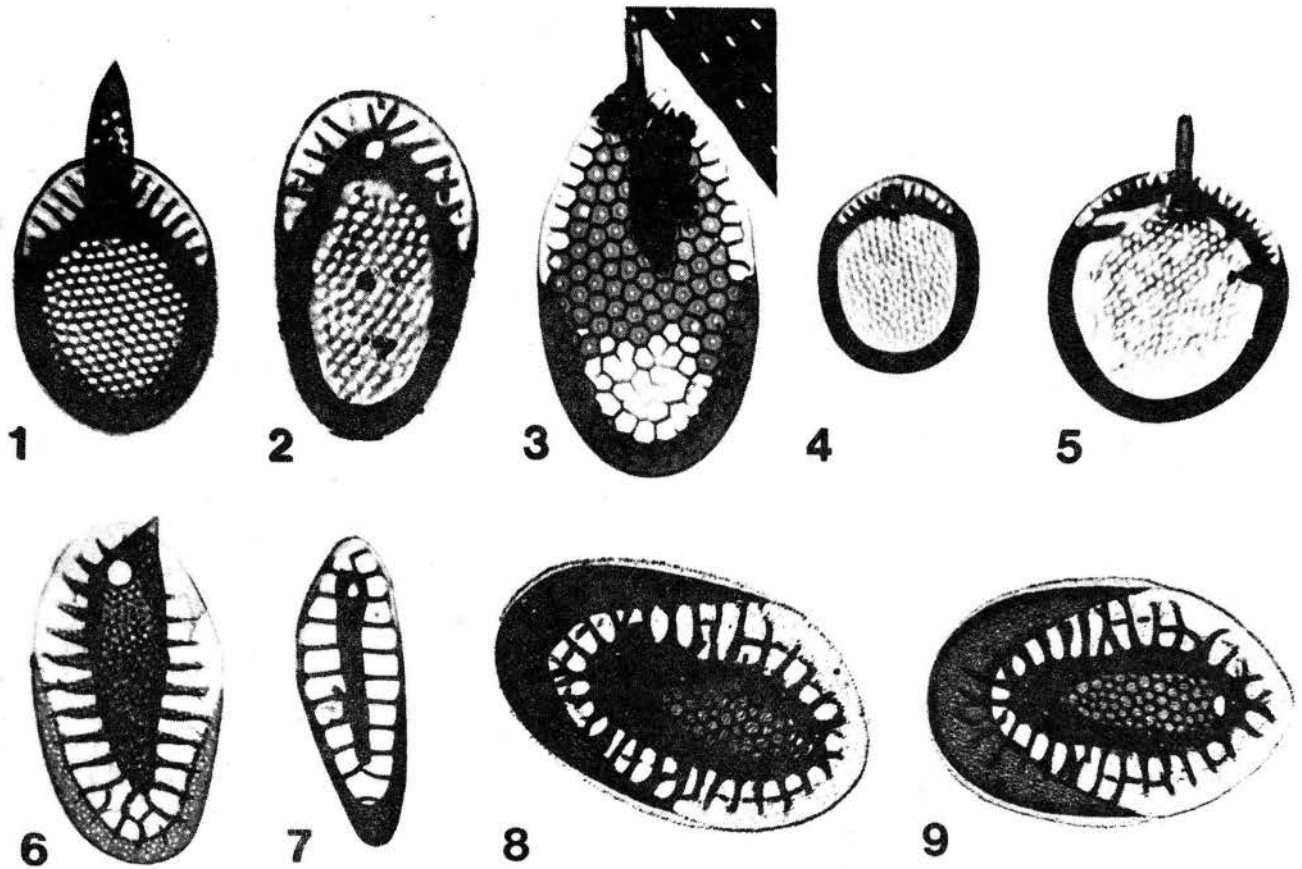
Chrysosphaerella longispina Lauterborn emend. Nicholls (Figs. 16-18).

A taxon which has been called *C. multispina* Bradley by many researchers, Nicholls (1980) in his recent reassessment

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Figures 1-13 *Synura* species.

Figs. 1-2. *S. echinulata*, X15,000.

Fig. 3. *S. mollispina*, X10,000.

Figures 1-9 *Synura* species.

Figs. 4-5. *S. multidentata*, X3,000.

Figs. 6-7. *S. petersenii*, X9,000.

Figs. 8-9. *S. petersenii* f. *asmundiae*, X10,000.

of the genus has shown that it should be considered in synonymy with *C. longispina*. Common in lakes in ponds in North America and Europe, we observed it at five locations: Dahlberg Lake, Wild Rice River, Deming Pond, North Deming Pond and East Twin Lake.

An unusual number of triangular-shaped scales were observed from the Dahlberg Lake collections (Fig. 18). Except for their large size and increased number of ribs, these scales begin to approach the morphology illustrated by Balonov (1980) with his description of a new species *C. triangulata*. The cells we observed possessed only a few of the triangular scales, but numerous of the more typical elliptical-shaped scales; the cell's of Balonov's taxon were surrounded entirely by the triangular-shaped scales.

Spiniferomonas. A unicellular genus, it was recently revised by Nicholls (1981). A very small member of the nanoplankton community, it has biflagellate cells, 3-10µm in diameter with one parietal, golden-brown plastid. The protoplasm is covered with scales and spines.

**Spiniferomonas trioralis* Takahashi (Fig. 19).

Scales and spines belonging to this species were observed from the Beaver Pond collections. It is by far the most commonly reported species in the genus.

Future Endeavors suggested for same region

The objective of these investigations was to extend our knowledge on scale-bearing Chrysophyceae from the Lake

Itasca region as studied with the electron microscope. From the previous paper in this series, this paper, and one by Wujek and Timpano (1982), it is clear that the freshwater bodies in northwestern Minnesota are rich in members of the Synuraceae.

The species composition presented in these papers may not be completely characteristic for the region. To obtain more information about the species richness of these waters, they need to be studied more frequently and during other than the summer months upon which these reports have been made.

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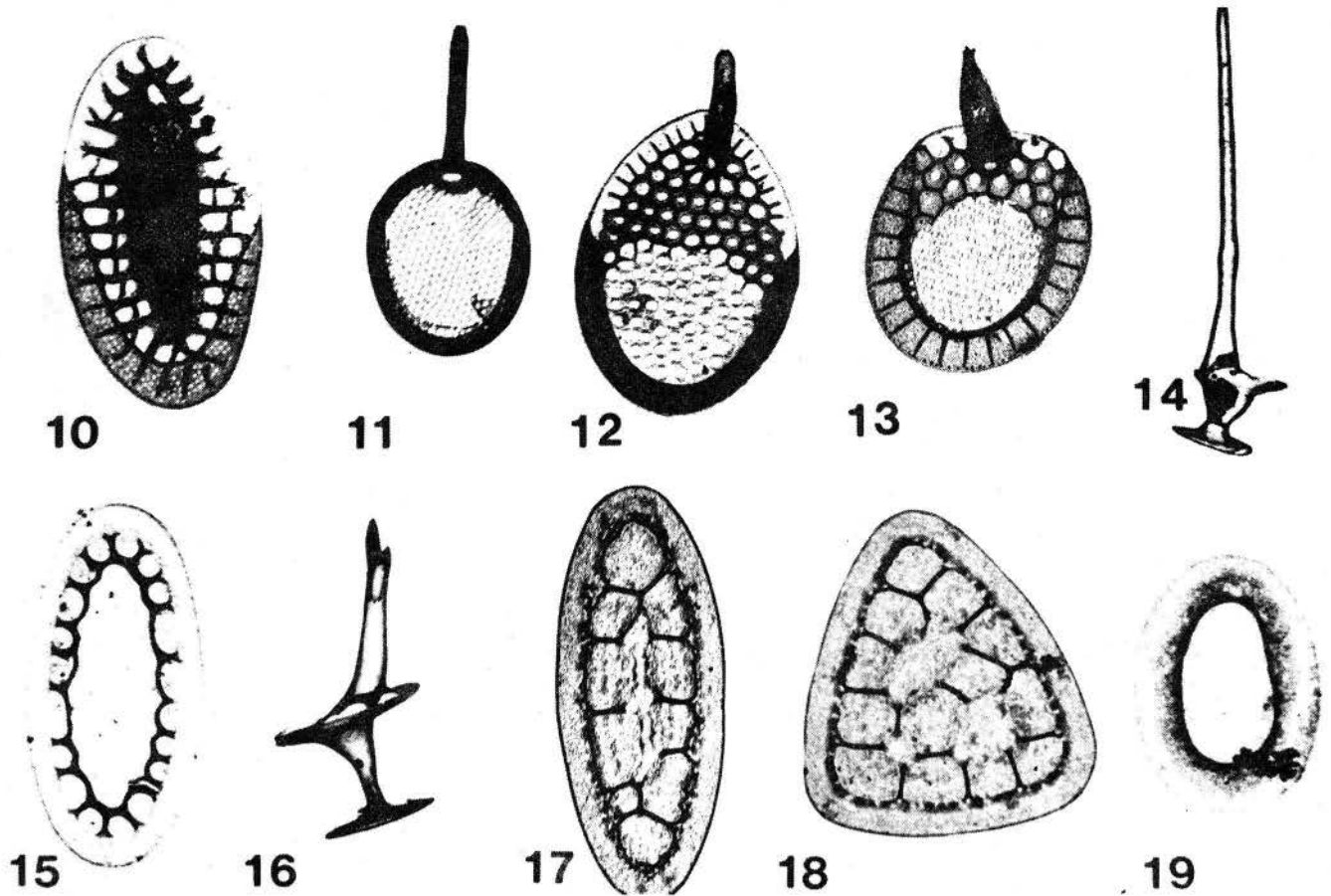


Fig. 10 *S. petersenii* f. *kufferathii*, X5,000.

Fig. 11. *S. sphagnicola*, X8,000.

Fig. 12. *S. spinosa*, x9,000.

Fig. 13. *S. uvella*, X10,000.

Figures 10 - 19.

Figures 14-18 *Chrysosphaerella* species.

Figs. 14-15 *C. brevispina*, X4,000; 13,000.

Figs. 16-18. *C. longispina*, X11,000.

Fig. 19. *Spiniferomonas trioralis*, X10,000.

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