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SCALED CHRYSOPHYCEAN ALGAE FROM PENNSYLVANIA I. LAKE LACAWAC[1]

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ABSTRACT

The flora of Lake Lacawac was dominated by Chrysophycean algae (Siver and Chock, 1985). Six species belonging to the Mallomonadaceae were positively identified with SEM. We believe that these represent the first siliceous chrysophytes identified using EM in Pennsylvania.

INTRODUCTION

Lake Lacawac is a small ice-scour lake located in the town of Lake Aerial, situated in the Pocono Mountains of northeastern Pennsylvania. It is a small dimictic lake, low in nutrients and conductivity, acidic and slightly dystrophic in nature (Siver and Chock 1985). Based on a detailed seasonal and distributional analysis, carried out between November, 1980 through November, 1982, the phytoplankton flora of the lake was found to be dominated by the Chrysophyceae (Siver and Chock 1985). Over 75% of all phytoplankton cells belonged to the Chrysophyceae or golden algae. Golden algae that possess siliceous scales, the Mallomonadaceae, were an important component of the flora. Species identification in the Mallomonadaceae is based on scale and bristle ornamentation. Most identifications are not considered valid unless scale detail was observed with electron microscopy (Wee 1981).

The purpose of this paper was to use EM to document the presence of siliceous scale bearing Mallomonadaceae taxa in Lake Lacawac. To our knowledge these represent the first Chrysophyceae identified with EM in Pennsylvania.

METHODS

All samples were collected with a van Dorn bottle from one meter at the center of the lake, returned to the laboratory and immediately observed. From samples where scaled chrysophytes were present a subsample was air dried onto a piece of aluminum foil, gently rinsed with distilled water, mounted on an aluminum stub and coated with gold using a Polaron sputter coater. All samples were observed with a Coates and Welter scanning electron microscope.

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RESULTS

The following species of scaled chrysophytes were found in Lake Lacawac during the study:

Mallomonas acaroides Perty emend. Ivanov

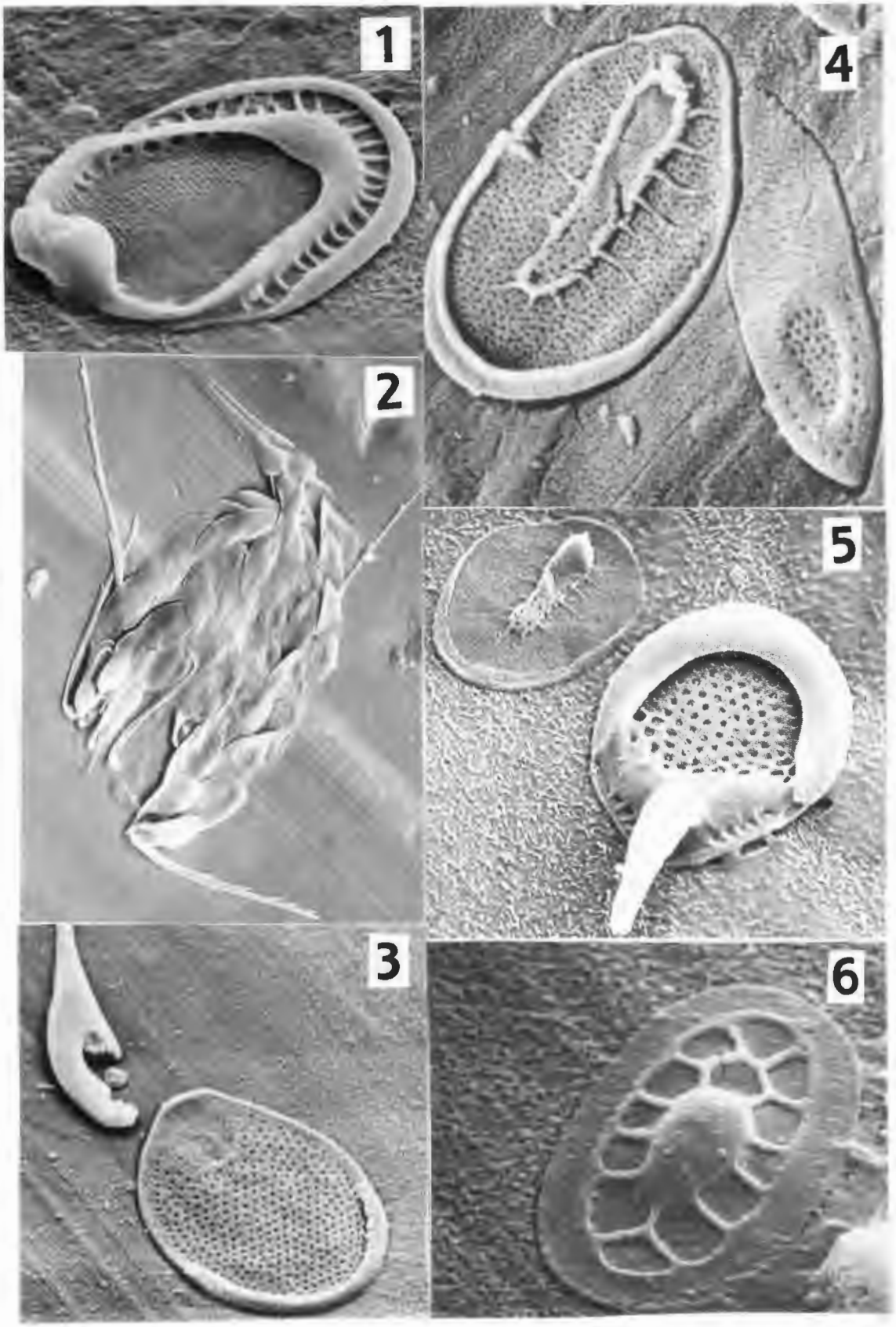
Scales from this taxon possessed a well defined V-rib, rim and dome (Figure 1). Struts ran perpendicular from the V-rib to the rim, however, no thickened ribs were found to extend from the V-rib onto the shield. The shield consisted mainly of pores and only hooded type bristles were found (Asmund 1959). *Mallomonas acaroides* was an important component of the phytoplankton flora during the spring and fall months between 12 and 17°C.

Mallomonas akrokomas Ruttner *in* Pascher

Cells of this species were spindle-shaped with a rounded anterior portion and an elongated pointed posterior tail. Cells, 15-40 uM x 5-8 uM, were on the lower end of size ranges observed by previous workers (Harris 1958 and Wee 1982). All cells possessed a group of small anteriorly attached serrated bristles. The scales consisted of three types: anterior domed scales with bristles, body scales and elongated caudal scales. Scale ultrastructure (Figure 2) was similar to that reported by previous workers (Asmund 1956, Harris 1958, Takahashi 1978 and Wee 1982). Serrations on the proximal portions of scales were present on many Lake Lacawac specimens. This taxon was found under the ice during both the 1980/81 and 1981/82 winters and was the most abundant species during the 1981/82 winter.

Mallomonas hamata Asmund

Specimens of *M. hamata* (Figure 3) were identical to those originally described by Asmund (1959). Cells were present from late winter through spring overturn when cyst formation was observed.



Figures 1-6.—Fig. 1. *Mallomonas acaroides* (10,700 x). Fig. 2. *Mallomonas akrokomos* (5,400 x). Fig. 3. *Mallomonas hamata* (18,800 x). Fig. 4. *Synura petersenii* v. *glabra* (left) and *Mallomonas akrokomos* (right) (22,000 x). Fig. 5. *Synura spinosa* (right) and *Synura petersenii* v. *glabra* (upper left) (14,200 x). Fig. 6. *Chrysosphaerella longispina* (19,700 x).

Synura petersenii Korshikov

All cells were found to possess scales characteristic of *S. pertersenii v. glabra* (Figure 4) where the struts did not reach the scale perimenter (Petersen and Hansen 1956, Balonov 1976 and Takahashi 1978). This taxon was the most abundant (in terms of cell concentration) organism in the lake during the study. *S. petersenii v. glabra* appeared in November, persisted under the ice, greatly increased in concentration with ice-out and disappeared by April.

Synura spinosa Korshikov

Scales of this species were as described by Petersen and Hansen (1956) and Asmund (1968) (Figure 5—spined scale). All cells had spineless posterior scales with upturned rims that completely encircled the scale. This organism was found during late winter through early spring in 1982.

Chrysosphaerella longispina Lanterborn emend Nicholls

Small numbers of *C. longispina* were found during mid to late fall and was never a dominant species in the lake (Figure 6). Scales and bristles were as described by Nicholls (1980) who showed that *C. multispina* was synonymous with *C. longispina.* Triangular shaped scales like those found by Wujek et al (1981) were not observed in these samples.

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