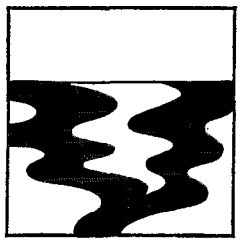

# *Study of the Euglenophyta from Camaleão Lake (Manaus - Brazil)*

## *II.* Strombomonas *Defl.*

Visitación Conforti (1)

Abstract

*A total of 43 taxa belonging to the genus* Strombomonas *Defl. (Euglenophyta) from Camaleão lake (Marchantaria Island, near Manaus, Brazil) have been studied. On the basis of these observations we propose one new species :* S. brasiliensis, *and two new varieties :* S. fluviatilis *var.* major *and* S. gibberosa *var.* major. *Thirteen taxa have been examined by means of scanning electron microscopy.*

Keywords : Morphology — Taxonomy — Ultrastructure — *Strombomonas* — Euglenophyta — Brazil.

Résumé

Les euglénophytes du lac Camaleão (Manaus - Brésil). II. *Strombomonas* Defl.

*Dans le présent travail, 43 taxons appartenant au genre* Strombomonas *Defl. (Euglenophyta) provenant du lac Camaleão (île Marchantaria, près de Manaus au Brésil) sont étudiés. Nous proposons une nouvelle espèce :* S. brasiliensis *et deux nouvelles variétés :* S. fluviatilis *var.* major *et* S. gibberosa *var.* major. *Treize des taxons cités ont été examinés au microscope électronique à balayage.*

Mots clés : Morphologie — Taxonomie — Ultrastructure — *Strombomonas* — Euglénophytes — Brésil.

Resumen

Estudio de las euglenofitas del Lago Camaleão (Manaus - Brasil). II. *Strombomonas* Defl.

*En este trabajo hemos estudiado un total de 43 taxones pertenecientes al género* Strombomonas *Defl. (Euglenophyta) provenientes del lago Camaleão (Isla Marchantaria, próximo a Manaus, Brasil). Como resultado de nuestras observaciones decidimos describir una especie* S. brasiliensis *y dos variedades* S. fluviatis *var.* major *y* S. gibberosa *var.* major *como nuevos taxones. Con la utilización del microscopio-electrónico de barrido hemos examinado la ultraestructura de 13 taxones.*

Palabras claves : Morfología — Taxonomía — Ultraestructura — *Strombomonas* — Euglenophyta — Brasil.

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## INTRODUCTION

Due to the high diversity of the euglenophyta found in the Camaleão Lake (Manaus, Brazil), we divided the publication of our results into three parts. The first one was dedicated to the genus *Trachelomonas* Ehr. (CONFORTI, 1993). In this second paper we only deal with the genus *Strombomonas* Defl. It is a conflicting genus, some authors even discuss its validity (BALECH, 1944; DUNLAP *et al.*, 1986). In nature, its frequency is very low and it has been possible to grow only one species *S. conspersa* in laboratory. Respect to its ultrastructure, the observations of its loricas by means of scanning electron microscope are limited (TELL and CONFORTI, 1984, 1985, 1988). For these reasons, we consider very important each new report which contributes to increase our knowledge of *Strombomonas*. We have recorded 43 taxa, of which *S. brasiliensis*, *S. fluviatilis* var. *major* and *S. gibberosa* var. *major* are proposed as new taxa. In addition, data on the ultrastructure of the lorica of 13 taxa of *Strombomonas* are included.

## MATERIAL AND METHODS

The study area, the material and methods have been described in the first paper of this series (CONFORTI, 1993). The new taxa and those whose ultrastructure was observed are totally described in the text. For other taxa, only dimensions, additional comments on relevant morphological or distribution characteristics are provided.

## TAXONOMICAL DESCRIPTIONS
## FAMILY EUGLENACEAE

### *Strombomonas* Defl.

**_S. acuminata_ var. _amphora_ Playf.** (pl. I, figs. 12 a, b)

The organisms recorded from Camaleão Lake were larger than those described by DEFLANDRE (1930), 51-53 µm long, 29-33 µm broad. Australia. It is the first record for America.

Samples : 22, 24, 31.

**_S. argentiniensis_ Garcia de Emiliani** (pl. III, figs. 6 a, b; pl. V, figs. 1-6)

= **_S. bourrellyi_ Tell and Zaloc.**, *in* TELL AND CONFORTI, 1985

Lorica 41-51 µm long, 13-15 µm broad, elongate fusiform. Sides rounded gradually tapering to the posterior end into a subspherical cauda, and converging to the front into a cylindrical collar, expanded and irregular at the free end (4-5 × 5-8 µm). Wall yellowish to light brown, irregularly and sparsely punctated (86-90/100 µm²), ornamented sometimes with very small granulations or warts (pl. V, fig. 4), and sometimes with robust cylindrical spines (0.5-2.5 × 0.4-0.6 µm) (pl. V, figs. 1-2). Besides, some organisms showed the lorica surface partially or totally covered by agglutinated exogenous particles, like those described by TELL and CONFORTI (1985).

Some specimens presented a lorica more elongate and ornamented than the type (pl. II, fig. 6 a ; pl. V, fig. 1-2). However, we do not consider these characters sufficient to propose a new forma. We observed a gradient of morphological changes comprising on one hand organisms which correspond to the type, and on the other specimens with very distinct characters. Argentina, Bolivia.

Samples : 19, 31, 45.

**_S. asymmetrica_ (Roll) Popova** (pl. I, figs. 16 a-c)

Lorica 26-27 µm long, 14-15 µm broad. Wall coarse, yellowish. Europe. This is the first record of the species for America.

Samples : 19, 22, 31.

**_S. balvayi_ Bourr. and Couté** (pl. III, figs. 4 a-c)

Lorica 40-47 µm long, 21-22 µm broad. Wall yellowish to light brown, coarse. Our specimens present identical characteristics as those described by BOURRELLY and COUTÉ (1978). Europe. This is the first record of this species for America.

Samples : 19, 58.

**_S. borystheniensis_ (Roll) Popova** (pl. I, figs. 11 a-c; pl. VII, figs. 1-2)

Lorica 23-28 µm long, 17-22 µm diam., broadly ellipsoidal posterior end rounded or slightly acuminate. Pore surrounded by a depressed wide collar, undulated and oblique at the distal end. Wall yellowish, totally coated by numerous exogenous particles adhering on its surface, including pieces of diatom frustules (arrow in pl. VII, fig. 2). Widespread.

Samples : 19, 22, 24, 58, 70.

**_S. brasiliensis_ n. sp.** (pl. III, figs. 7 a, b)

*Lorica 33-36 µm long, 16-18 µm lat., ellipsoidea, extremo-posteriore rotundato, extremo anteriore praelongate recto collo cylindrico, paries castaneus, punctatus, spinis obtusis, irregulariter distributis exornatu.*

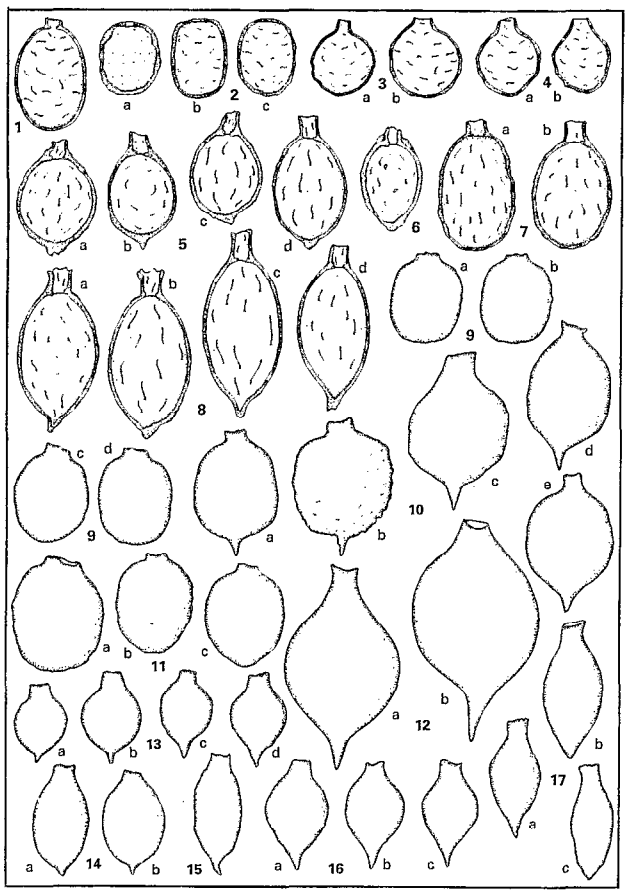

PLATE I

FIG. 1. — *S. scabra*; 2 a-c. *S. cylindrica* var. *minor*; 3 a, b. *S. scabra* var. *coberensis*; 4 a-b. *S. scabra* var. *cordata*; 5 a-d. *S. scabra* var. *ovata* fo. *caudata*; 6. *S. scabra* var. *ovata* fo. *minor*; 7 a, b. *S. scabra* var. *longicollis*; 8 a-d. *S. scabra* var. *intermedia*; 9 a-d. *S. massartii*; 10 a-e. *S. verrucosa* var. *genuina*; 11 a-c. *S. borystheniensis*; 12 a, b. *S. acuminata* var. *amphora*; 13 a-d. *S. globulosa*; 14 a, b. *S. brevicaudata*; 15. *S. elegans*; 16 a-c. *S. asymmetrica*; 17 a-c. *S. lanceolata*.

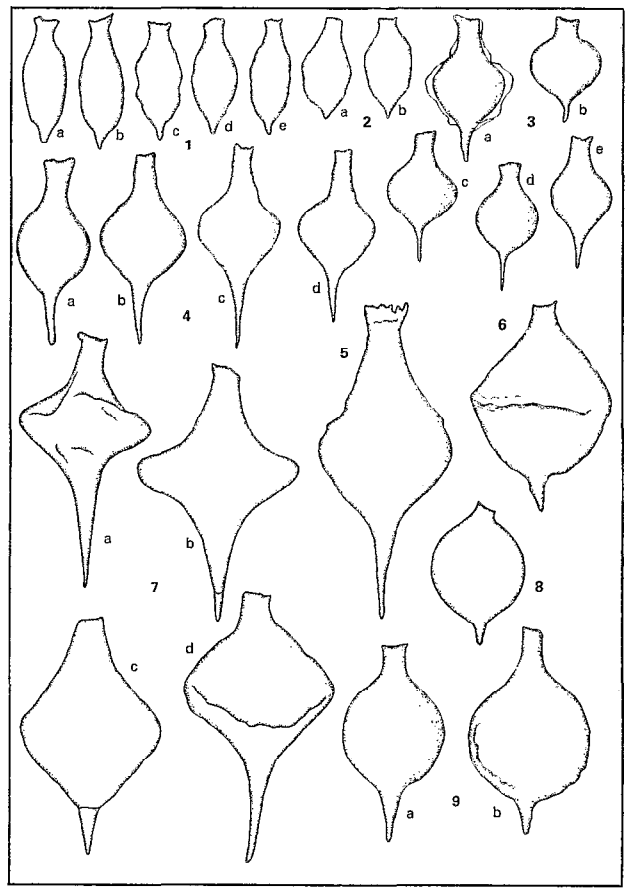

PLATE II

FIG. 1 a-e. — *S. vaseformis*; 2 a, b. *S. minuta*; 3 a-e. *S. schauinslandii*; 4 a-d. *S. gibberosa* var. *longicollis*; 5. *S. gibberosa* var. *major*; 6. *S. tellii*; 7 a-d. *S. gibberosa*; 8. *S. ovalis*; 9 a, b. *S. praeliaris*.

*In Camaleão lacu, Manaus, Brasil. XII/87 — III/88. Holotypus tabl. III, figs. 7 a, b.*

Lorica 33-36 µm long, 16-18 µm broad, fusiform, sometimes with a slight constriction at the last third. Sides rounded, converging to the anterior end into a cylindrical collar (5-6 × 4-5 µm) straight, irregular at the distal end. Posterior end rounded. Wall light brown, sparsely punctated, ornamented by robust, randomly distributed, rod shaped spines (0.5-2.5 × 0.4-0.6 µm). This newly established species resembles *S. argentiniensis* Garcia de Emiliani, but it differs mainly in the shape of its lorica.

Sample : 27.

### *S. brevicaudata* Conf. and Joo (pl. I, figs. 14 a, b)

Lorica 21-22 µm long, 12-14 µm broad, ovate, symmetrical. Wall hyaline to yellowish. This species

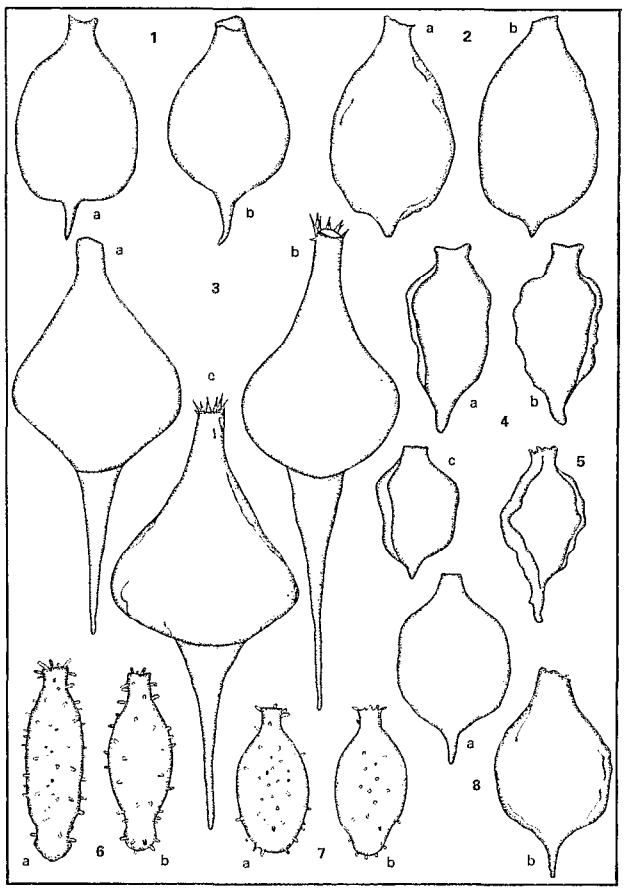

PLATE III

FIG. 1 a, b. — *S. planctonica*;
2 a, b. *S. planctonica* fo. *bucharica*; 3 a-c. *S. ensifera*;
4 a-c. *S. balvayi*; 5. *S. tetraptera*; 6 a, b. *S. argentiniensis*;
7 a, b. *S. brasiliensis*; 8 a, b. *S. urceolata*.

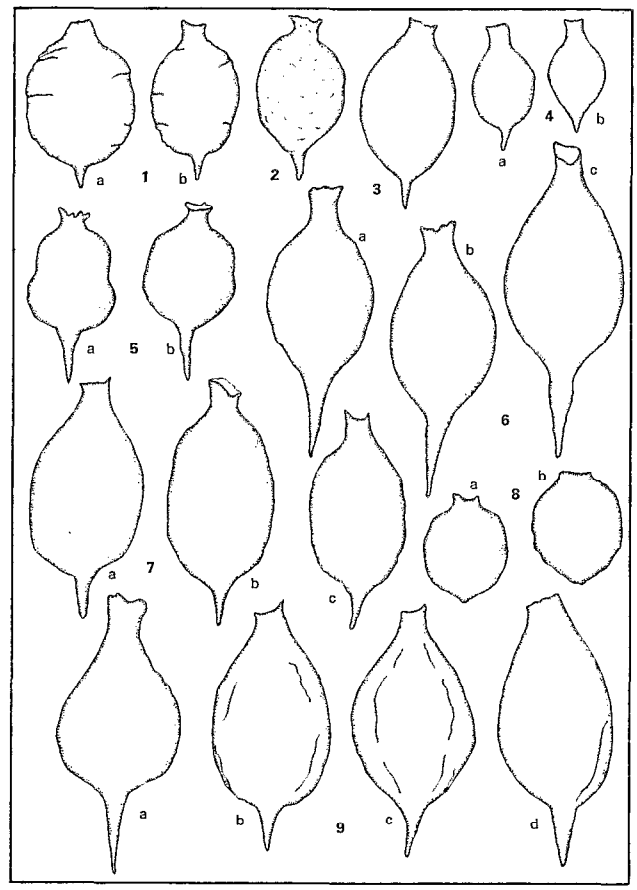

PLATE IV

FIG. 1 a, b. — *S. tambowika*; 2. *S. deflandrei*;
3. *S. fluviatilis* var. *elegans*; 4 a, b. *S. fluviatilis*;
5 a, b. *S. girardiana*; 6 a-c. *S. fluviatilis* var *major*;
7 a-c. *S. verrucosa* var. *zmiewika*; 8 a, b. *S. eurystoma*;
9 a-d. *S. costata*.

was only found in materials from U.S.A. (CONFORTI and Joo, in press).

Sample : 22.

***S. costata* Defl.** (pl. IV, figs. 9 a-d)

Lorica 55-67 µm long, 28-32 µm broad. Our specimens were totally coincident with those described by DEFLANDRE (1930). Argentina, Europe.

Samples : 19, 22, 27, 31.

***S. cylindrica* var. *minor* Conf. and Joo** (pl. I, figs. 2 a-c)

Lorica 16.5-20 µm long, 13-15 µm broad. Wall thick, coarse, yellowish to light brown. This species was only found in U.S.A. (CONFORTI and Joo, in press).

Samples : 27, 31, 70.

***S. deflandrei* (Roll) Defl.** (pl. IV, fig. 2; pl. VI, fig. 3)

Lorica 36-40 µm long, 21-24 µm diam., broadly ovoid. Pore surrounded by a depressed collar (1.5-2 × 7-8 µm), with an irregular margin. Posterior end abruptly tapering to a conical cauda (8.5-9.5 × 4.5-5.5 µm), longer than those described by TELL and CONFORTI (1984). Wall yellowish, totally covered with exogenous agglutinated particles. Widespread.

Samples : 27, 31.

***S. elegans* Conf. and Joo** (pl. I, fig. 15)

Lorica 30-31 µm long, 10-12 µm broad. Wall thick, coarse, yellowish. This species was only found in materials from U.S.A., (CONFORTI and Joo, in press).

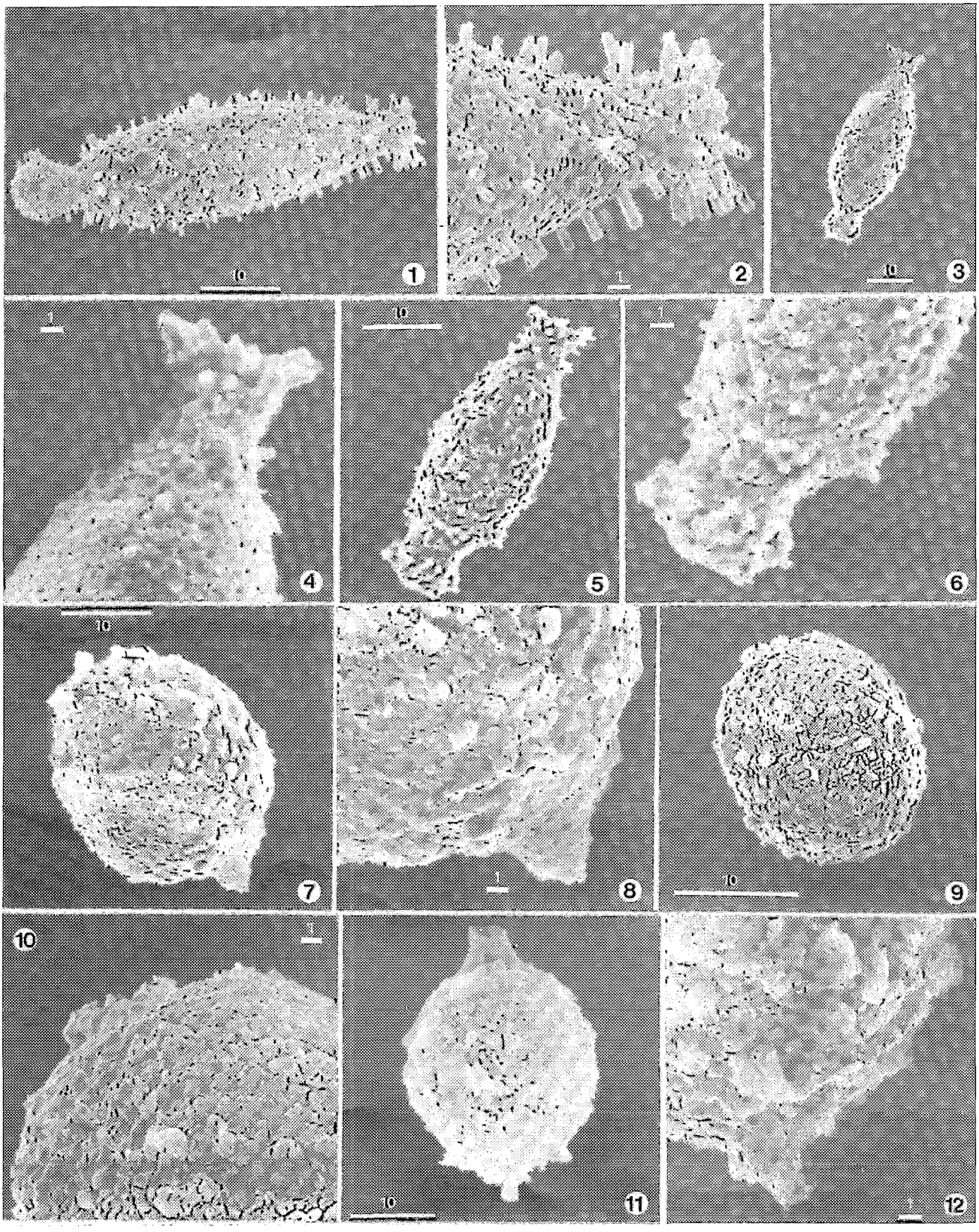

PLATE V

FIGS. 1, 6. — *S. argentiniensis*, 1, 3, 5. general view, 2, 4. detail of the collar, 6. detail of the posterior end ; 7, 8. *S. ovalis*, 7. general view, 8. detail of the tail ; 9, 10 *S. scabra*, 9. general view, 10. detail of the pore and lorica surface ; 11, 12. *S. scabra* var. *ovata* fo. *caudata*, 11. general view, 12. detail of the tail.

S. argentiniensis, *1, 3, 5. vue générale, 2, 4. détail du col, 6. détail de l'extrémité postérieure ; 7, 8.* S. ovalis, *7. vue générale, 8. détail de la queue ; 9, 10.* S. scabra, *9. vue générale, 10. détail du col et de la thèque ; 11, 12.* S. scabra *var.* ovata *fo.* caudata, *11. vue générale, 12. détail de la queue.*

***S. ensifera* (Daday) Defl.** (pl. III, figs. 3 a-c)

The studied lorica were shorter than the specimens described by DEFLANDRE (1930), 98-115 μm long, 39-46 μm broad. We could observe some organisms with the distal end of the neck ornamented by conical spines irregularly distributed (pl. III, figs. 3 b, c). Wall hyaline, smooth. Widespread.

Samples : 31-45.

***S. eurystoma* (Stein) Popova** (pl. IV, figs. 8 a-b)

Lorica 27-28 μm long, 21-22 μm broad. Our specimens were morphologically coincident with those described by POPOVA (1966). Africa, Europa, U.S.A. This is the first record for South America.

Samples : 31, 70.

***S. fluviatilis* (Lemm.) Defl.** (pl. IV, figs. 4 a, b ; pl. VI, figs 1-2)

Lorica 24-42 μm long, 12-18 μm broad, elongate fusiform. Sides rounded gradually converging to the front in a cylindrical neck (4-6.5 × 4-6 μm) straight or oblique at the distal end and to the posterior end in a conical cauda (5-6 × 4-6 μm). Wall yellowish to light brown, totally covered with exogenous particles of different sizes. In the pl. VI, fig. 2, the biggest of them measures 10 μm long, 1.3 μm broad. Widespread.

Samples : 31, 45, 67, 70.

**var. *elegans* Drez.** (pl. IV, fig. 3)

The observed specimens were shorter than those described by DEFLANDRE (1930), lorica 47-48 μm long, 22-23 μm broad. Poland. This is the first record of this species for America.

Sample : 31.

**var. *major* n. var.** (pl. IV, figs. 6 a-c)

*A typo maioribus dimensionibus differt. Lorica 70-72 μm long., 26-28 μm lat. In Camaleão lacu, Manaus, Brasil, I-III/88. Holotypus tabl. IV, figs. 6 a-c.*

This new variety presented the same characteristics as the type, the only difference being the bigger dimensions of the lorica 70-72 μm long, 26-28 μm broad; collar 5-6 × 7-9 μm; cauda 15.5-23 × 5.5-8 μm.

Samples : 27, 31.

***S. gibberosa* (Playf.) Defl.** (pl. II, figs. 7 a-d ; pl. VII, figs. 5-6)

Lorica 50-68 μm long, 22-42 μm diam., broadly rhomboidal with the median region somewhat angular. Sides straight or convex, tapering rapidly to the front in a collar and to the posterior end in a conical cauda. Collar (5-13 × 4.5-11 μm), sometimes widened towards the pore, with irregular, oblique distal end. Cauda straight or slightly bent, pointed (9-12 × 3-7,5 μm); normally with a thin transverse membrane at its base. Wall yellowish to slight brown, totally covered by agglutinated exogenous particles. Widespread.

Samples : 19, 22, 24, 27, 31.

**var. *longicollis* (Playf.) Defl.** (pl. II, figs. 4 a-d)

The organisms recorded from Camalcão Lake were smaller than those described by DEFLANDRE (1930); 42-49 μm long, 11-12 μm broad. Australia. This is the first record of this variety for America.

Samples : 27, 70.

**var. *major* n. var.** (pl. II, fig. 5)

*A typo maioribus dimensionibus differt. Lorica 75-77 μm long., 31-33 μm lat. In Camaleão lacu, Manaus, Brasil, I-III/88. Holotypus tabl. II, fig. 5.*

This new variety presents the same characteristics as the type, the only difference being the bigger dimensions of the lorica 75-77 μm long, 31-33 μm broad.

Sample : 31.

***S. girardiana* (Playf) Defl.** (pl. IV, figs. 5 a, b)

Lorica 42-50 μm long, 22-25 μm broad. Wall rough, yellowish to light brown. Australia, Egypt. In America : Argentina, Venezuela.

Sample : 70.

***S. globulosa* Conf. and Joo** (pl. I, figs. 13 a-d)

The organisms occurring in the samples from Camaleão Lake were larger than the specimens described by CONFORTI and JOO (in press); 22-24 μm long, 12-15 μm broad. U.S.A. This is the first record of this species for South America.

Sample : 22, 67.

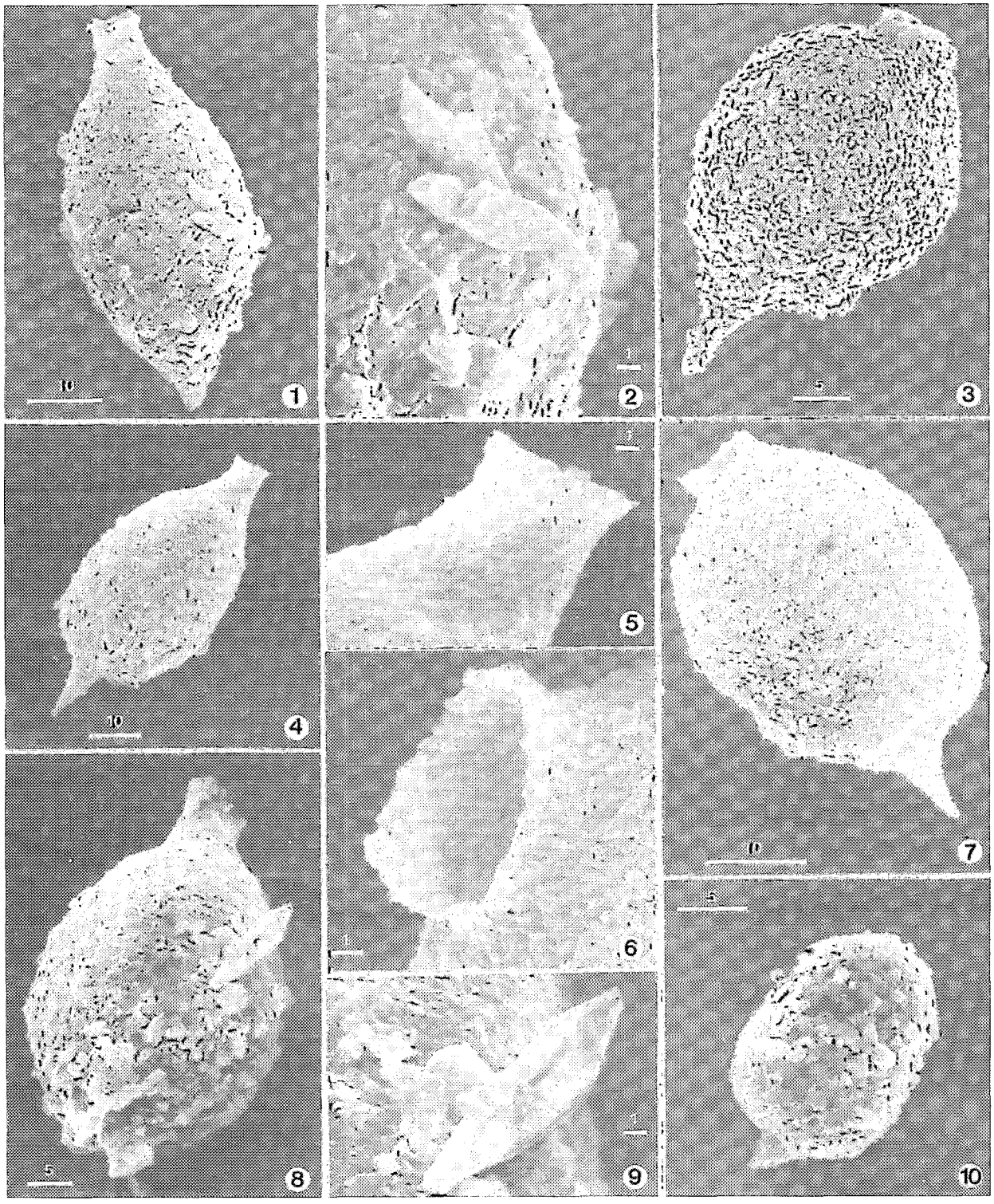

PLATE VI

FIGS. 1, 2. — *S. fluviatilis*, 1. general view, 2. detail of the lorica surface; 3. *S. deflandrei*, general view; 4, 5. *S. verrucosa* var. *zmiewika*, 4. general view, 5. detail of the anterior end; 6, 7. *S. tambowika*, 6. detail of the pore and lorica surface, 7. general view; 8, 9. *S. planctonica* fo. *bucharica*, 8. general view, 9. detail of the diatom frustule agglutinated on the lorica surface; 10. *S. verrucosa* var. *genuina*, general view.

S. fluviatilis, *1. vue générale, 2. détail de la thèque; 3.* S. deflandrei, *vue générale; 4, 5.* S. verrucosa *var.* zmiewika, *4. vue générale, 5. détail de l'extrémité antérieure; 6, 7.* S. tambowika, *6. détail du col et de la thèque, 7. vue générale; 8, 9.* S. planctonica *fo.* bucharica, *8. vue générale, 9. détail des frustules de diatomées collées sur la thèque; 10.* S. verrucosa *var.* genuina, *vue générale.*

***S. lanceolata* (Playf.) Defl.** (pl. I, figs. 17 a-c)

Lorica 29-35 μm long, 10,5-14 μm broad. Wall yellowish, rough. Widespread.
Samples : 22, 31, 70.

***S. massartii* Hub.-Pest.** (pl. I, figs. 9 a-d)

The lorica of the observed specimens were broader than those described by HUBER-PESTALOZZI (1955); 22-25 μm long, 17-20 μm broad. Java, Poland. In America : Argentina, U.S.A.
Samples : 22, 31, 58.

***S. minuta* Conf. and Joo** (pl. II, figs. 2 a-b)

The studied organisms were broader than those described by CONFORTI and Joo (in press); 24-25 μm long, 13-15 μm broad. This species was only found in U.S.A. (CONFORTI and Joo, *loc. cit.*).
Sample : 24.

***S. ovalis* (Playf.) Defl.** (pl. II, fig. 8; pl. V, figs. 7-8)

Lorica 34-39 μm long, 23-26 μm diam.; regularly ovoid. Anterior end prolonged into a short collar, with straight or oblique distal end (1-2.5 × 4.5-5 μm). Posterior end abruptly tapering to a short conical cauda (3-3.5 × 4.5-5 μm). Several authors (DEFLANDRE, 1930; TELL and CONFORTI, 1986; PHILIPOSE, 1988; etc.) described the wall of *S. ovalis* as smooth, however, by means of scanning electron microscope, the lorica shows, as others *Strombomonas*, exogenous agglutinated particles. It is possible to distinguish (pl. V, fig. 7-8) different sizes of particles, some bigger than the others (3-4.5 × 2-3 μm). Argentina, Australia, Poland.
Sample : 22.

***S. planctonica* (Wolz.) Popova** (pl. III, figs. 1 a, b)

The organisms recorded from Camaleão Lake were larger than the type described by POPOVA (1955); 56-58 μm long, 30-32 μm broad. Asia, Europe. This is the first record of the species for America.
Sample : 22.

**fo. *bucharica* (Kiss.) Popova** (pl. III, figs. 2 a, b; pl. VI, figs. 8-9)

The lorica of the observed specimens were longer than those described by POPOVA (1966), 55-56 μm long, 30-34 μm diam.; broadly ovate. Sides rounded converging abruptly to the anterior end in a cylindrical neck, with widened or not, oblique and irregular margin and to the posterior end in a short, pointed or rounded, conical cauda. Wall hyaline to yellowish, with exogenous particles coating its surface, including a diatom frustule (pl. VII, fig. 8-9). Europe. Recorded in America for the first time.
Sample : 22.

***S. praeliaris* (Palmer) Defl.** (pl. II, figs. 9 a, b; pl. VII, figs. 3-4)

Lorica 34-49.5 μm long, 20-30 μm diam.; nearly spherical. Anterior end with a cylindrical collar (4-8 × 4-7 μm), sometimes widened toward the free end, with oblique and irregular margin. Posterior end rapidly tapering to a conical pointed or rounded cauda (7-13 × 5-7 μm). Wall hyaline to yellowish, totally covered by adhering exogenous particles; among these, it is possible to distinguish pieces of diatom frustules (arrow in pl. VII, fig. 3). Widespread. Recorded in South America for the first time.
Some organisms recorded from Camaleão Lake were longer than those described by DEFLANDRE, 1930 (22-42 × 18-32 μm). Therefore, we do not consider these as *S. praeliaris* fo. *major* THÉRÉZIEN, 1989, because this taxon presents a very long cauda (18 μm) and shows a lorica shape very different from our specimens.
Sample : 22, 24, 70.

***S. scabra* (Playf.) Tell and Conf.** (pl. I, fig. 1; pl. V, figs. 9-10)

Lorica 18-30 μm long, 14-20 μm diam.; cylindrical ellipsoidal, ends broadly rounded. Pore surrounded by a depressed collar or by agglutinated particles (pl. V, fig. 10). Wall yellowish to dark brown, thick, coarse, with numerous adhering exogenous particles on its surface. Widespread.
Samples : 22, 27, 31, 45, 58, 70, 89.

**var. *coberensis* (Defl.) Tell and Conf.** (pl. I, figs. 3 a, b)

The specimens from the Camaleão Lake were morphologically coincident with those described by TELL and CONFORTI (1986). Widespread.
Samples : 22, 27, 31, 45, 58, 70, 89.

**var. *cordata* (Playf.) Tell and Conf.** (pl. I, figs. 4 a, b)

Lorica heart-shaped, with dimensions smaller than those reported by TELL and CONFORTI (1986), 18-18,5 μm long, 14-16 μm broad. Australia. In America : Argentina, U.S.A.
Sample : 22.

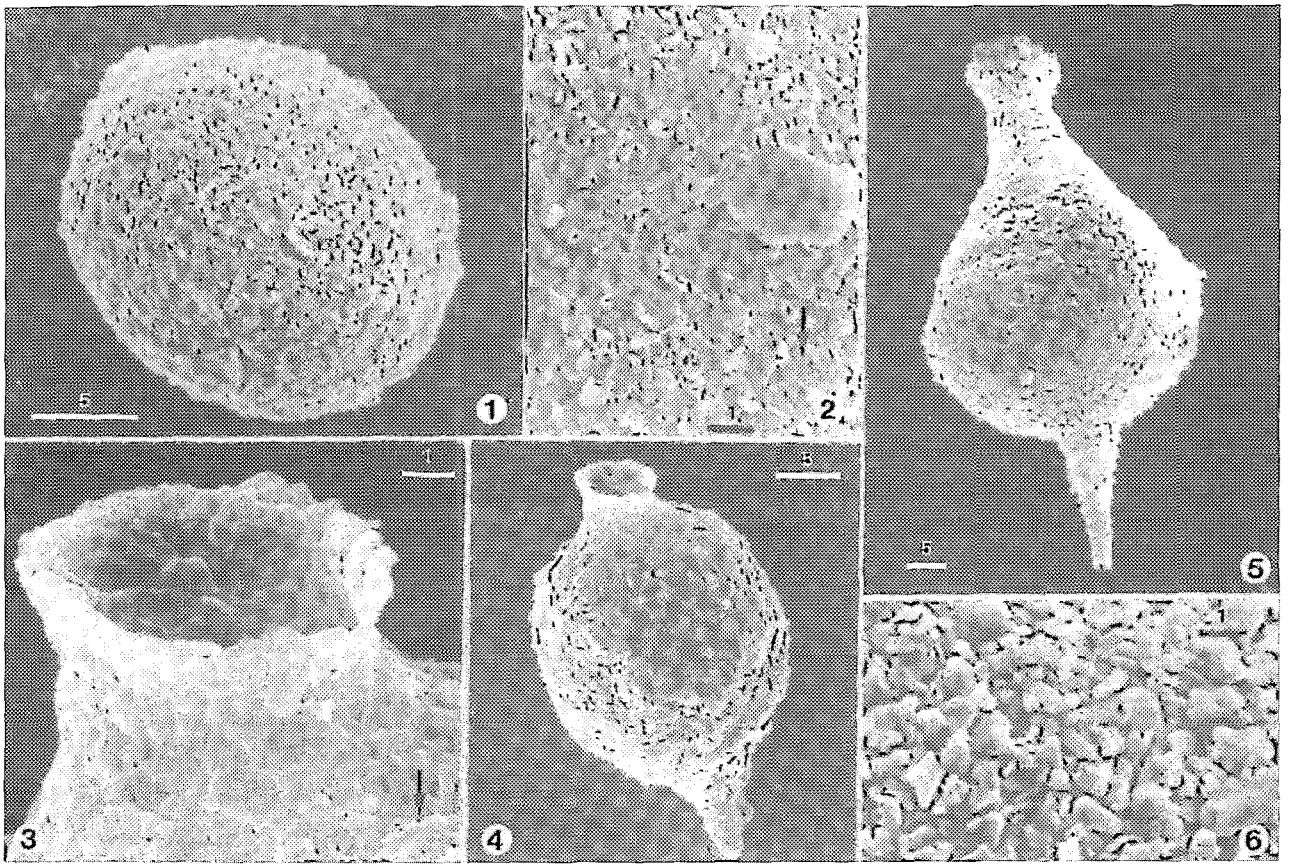

PLATE VII

FIGS. 1-2. — *S. borystheniensis*, 1. general view, 2. detail of the lorica surface (arrow indicates diatom fragment); 3, 4. *S. praeliaris*, 3. general view, 4. detail of the neck and lorica surface; 5, 6. *S. gibberosa*, 5. general view, 6. detail of the lorica surface.
S. borystheniensis, *1. vue générale, 2. détail de la thèque (la flèche indique un fragment de diatomée); 3, 4.* S. praeliaris, *3. vue générale, 4. détail du col et de la surface de la thèque; 5, 6.* S. gibberosa, *5. vue générale, 6. détail de la thèque.*

**var. *intermedia* (Yacub.) Tell and Conf.**
(pl. I, figs. 8 a-d)

Lorica 39-46 µm long, 17-20 µm broad. The specimens observed presented the same characteristics as those described by TELL and CONFORTI (1988). This variety was only recorded for tropical and subtropical regions from South America : Argentina, Venezuela.

Samples : 31, 45, 70, 89.

**var. *longicollis* (Playf.) Tell and Conf.** (pl. I, figs. 7 a, b)

Lorica 31-34 µm long, 19-20 µm broad. The organisms observed were morphologically coincident with those described by TELL and CONFORTI (1986). Widespread.

Samples : 27, 31, 70, 89.

**var. *ovata* fo. *caudata* (Tell and Zaloc.) Tell and Conf.**
(pl. I, figs. 5 a-d ; pl. V, figs. 11-12)

Lorica 28-32 µm long, 16-22 µm diam.; ellipsoidal elongate. Anterior end prolonged into a cylindrical collar, sometimes narrowed to the distal end, straight or oblique. Hind end tapered to a short conical cauda. Wall yellowish to dark brown, thick, coarse, covered by exogenous, agglutinated particles of very different sizes. This forma was only found in subtropical region of Argentina (TELL and ZALOCAR, 1985).

Samples : 27, 31, 70.

**fo. *minor* (Defl.) Tell and Conf.** (pl. I, fig. 6)

Lorica 24-26 µm long, 15-16 µm broad, these organisms were coincident with those described by TELL

and CONFORTI (1986). This forma was recorded only for America ; Argentina, U.S.A. and Venezuela.
Samples : 31, 58, 70.

***S. schauinslandii* (Lemm.) Defl.** (pl. II, figs. 3 a-e)

Lorica 26-39 µm long, 17-21 µm broad. The specimens observed were morphologically coincident with those described by TELL and CONFORTI (1986). Widespread.
Samples : 19, 22, 27, 31, 45, 58, 67, 70.

***S. tambowika* (Swir.) Defl.** (pl. IV, figs. 1 a, b ; pl. VI, figs. 6-7)

Lorica 39-59 µm long, 22-27 µm broad ; ellipsoidal or ovoid. Anterior end prolonged into a short (3-4 × 7.5-8 µm) cylindrical collar, with irregular and sometimes widened margin. Posterior end rounded, abruptly tapered to a conical pointed cauda (7-8 × 4-4.5 µm). Wall yellowish to brown, showing randomly arranged constrictions or wrinkles and numerous agglutinated particles coating its surface. Widespread.
Samples : 22, 24, 27, 67.

***S. tellii* Zalocar de Domitrovic** (pl. II, fig. 6)

The organisms occurring in our samples were larger than the specimens described by ZALOCAR DE DOMITROVIC (1991), 51-53 µm long, 34-35 µm broad. This species was only reported in materials from Argentina subtropical region.
Sample : 22.

***S. tetraptera* Balech and Dast.** (pl. III, fig. 5)

Our material differs from the type in the longer dimensions of the cauda (9-10 µm), it resembles the specimens observed by ZALOCAR DE DOMITROVIC (1991).This species was only recorded in materials from Argentina.
Sample : 31.

***S. urceolata* (Stokes) Defl.** (pl. III, figs. 8 a, b)

Lorica 35-47,5 µm long, 15-28 µm broad. The specimens from the Camaleão Lake were morphologically coincident with those described by TELL and CONFORTI (1986). Widespread.
Samples : 22, 70.

***S. vaseformis* Philip.** (pl. II, figs. 1 a-e)

Lorica 28-31 µm long, 9-11 µm broad. This species was originally described by PHILIPOSE (1988), our specimens showed identical characteristics. India, U.S.A. It is the first record for South America.
Sample : 27, 70.

***S. verrucosa* var. *genuina* Defl.** (pl. I, figs. 10 a-e ; pl. VI, fig. 10)

Lorica 23-57 µm long, 16-30 µm broad, trapezoidal. Anterior end prolonged into a depressed short cylindrical neck (1-6 × 4-6 µm), with oblique, sometimes expanded, irregular free end. Posterior end abruptly tapering into a conical pointed straight or slightly bent cauda (3-7 × 2-4 µm). Membrane hyaline to yellowish, coarse, shows randomly arranged adhering particles covering its surface. Widespread.
Samples : 22, 24, 31, 58.

**var. *zmiewika* (Swir.) Defl.** (pl. IV, figs. 7 a-c ; pl. VI, figs. 4, 5)

Lorica 41-60 µm long, 21-26 µm broad ; trapezoidal, sides converging gradually to the front in a cylindrical expanded collar, oblique and irregular at the distal end (5-7 × 7-8 µm). Posterior end abruptly narrowed to a conical pointed cauda (10-12 × 5-7 µm). Wall yellowish to light brown, coarse, thick, with numerous irregularly distributed, exogenous particles adhering on its surface. Widespread.
Samples : 22, 31.

## CONCLUSIONS

Among the 43 taxa of *Strombomonas* found in the Camaleão Lake, 3 were considered as new taxa : *S. brasiliensis*, *S. fluviatilis* var. *major* and *S. gibberosa* var. *major*.

Eleven taxa were only recorded from America : *S. argentiniensis*, *S. brevicaudata*, *S. cylindrica* var. *minor*, *S. elegans*, *S. globulosa*, *S. minuta*, *S. scabra* var. *intermedia*, *S. scabra* var. *ovata* fo. *caudata*, *S. sacabra* var. *ovata* fo. *minor*, *S. telli* and *S. tetraptera*.

Five of them were only found in warm regions of Central and South America : *S. argentiniensis*, *S. scabra* var. *intermedia*, *S. scabra* var. *ovata* fo. *caudata*, *S. telli* and *S. tetraptera*. Fourteen were recorded for the first time from South America : *S. acuminata* var. *amphora*, *S. asymmetrica*, *S. balvayi*,

*S. brevicaudata, S. cylindrica* var. *minor, S. elegans, S. eurystoma, S. fluviatilis* var. *elegans, S. gibberosa* var. *longicollis, S. globulosa, S. minuta, S. planctonica* fo. *planctonica, S. planctonica* fo. *bucharica* and *S. praeliaris*. Nineteen presented a widespread distribution.

Three were examined and photographed by means of a S.E.M. for the first time : *S. gibberosa, S. ovalis* and *S. praeliaris*. The highest numbers of *Strombomonas* taxa were found in the samples number 31 and 22, presenting 26 and 22 taxa respectively. Both were obtained during the low water period (0.35 m), presenting high concentration of dissolved oxygen (10,2 µg/l) and dissolved solids (105 mg/l), high conductivity (762 µS/cm), low transparency (0.10 m) and slightly basic pH (7.6). Samples number 67 and 89 were the less diverse, presenting 4 taxa each one. In the sample 89 only *S. scabra* and 3 varieties of this species were registered.

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