

Afrocymbella Krammer 2003Type species: *Afrocymbella reichardtii* Krammer

SYNONYM:

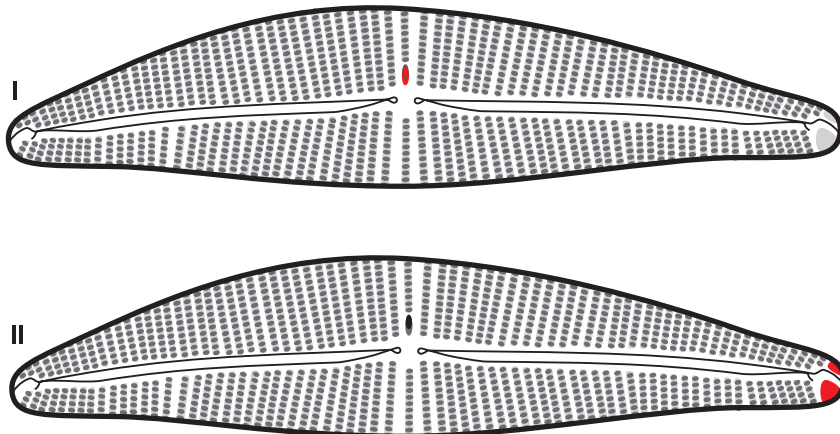
Gomphocymbella O. Müller 1905 pro parte

Characteristics – Cells **biraphid**, large and rather robust, valve shape **dorsiventral** and **heteropolar** (characteristics of both *Cymbella* and *Gomphonema*). Clearly visible elongate **stigma** on the dorsal side of the cell closely associated with the central striae (I, Fig. 72: B-C). Small apical pore field to the right and the left of the raphe on the foot pole (II, Fig. 71: B, Fig. 72: D).

Plastid structure – Single plastid with 2 lobes connected by a bridge (H-shape) (Fig. 72: A). Large pyrenoid against one margin in the central area (see *Cymbella*), several lipid droplets scattered through the cell.

Identification of species – Species in this genus are distinguished based on cell size and shape and the shape of the apices. Striae density and angle relative to the **transapical axis** are also important characteristics to consider.

Ecology – Cells solitary, mostly observed free living occasionally attached. Found in tropical African alkaline oligotrophic waters in both planktonic and benthic habitats.



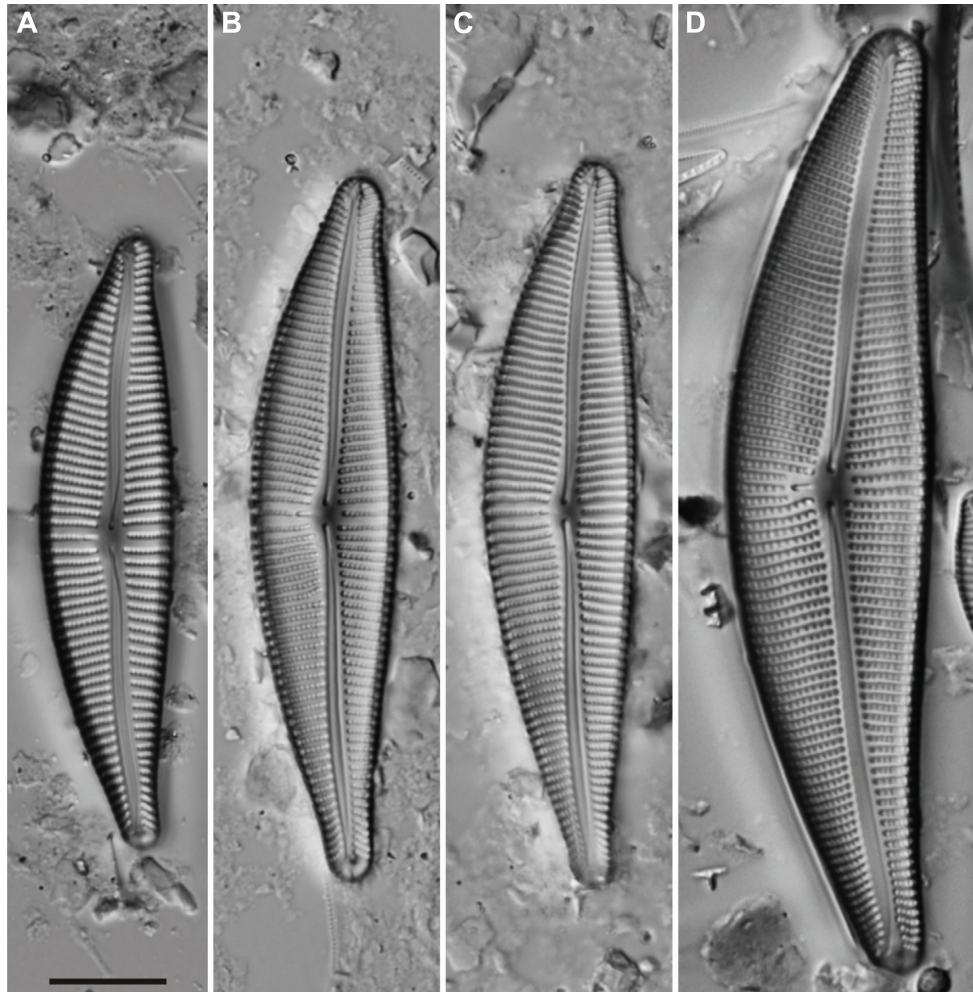


Fig. 71. *Afrocybella* spp. **A-D.** LM. **A-C.** Valve view of *Afrocybella beccarii* (Grunow) Krammer. **D.** Valve view of *A. reichardtii* var. *procera* Krammer. Scale bar = 10 μ m.

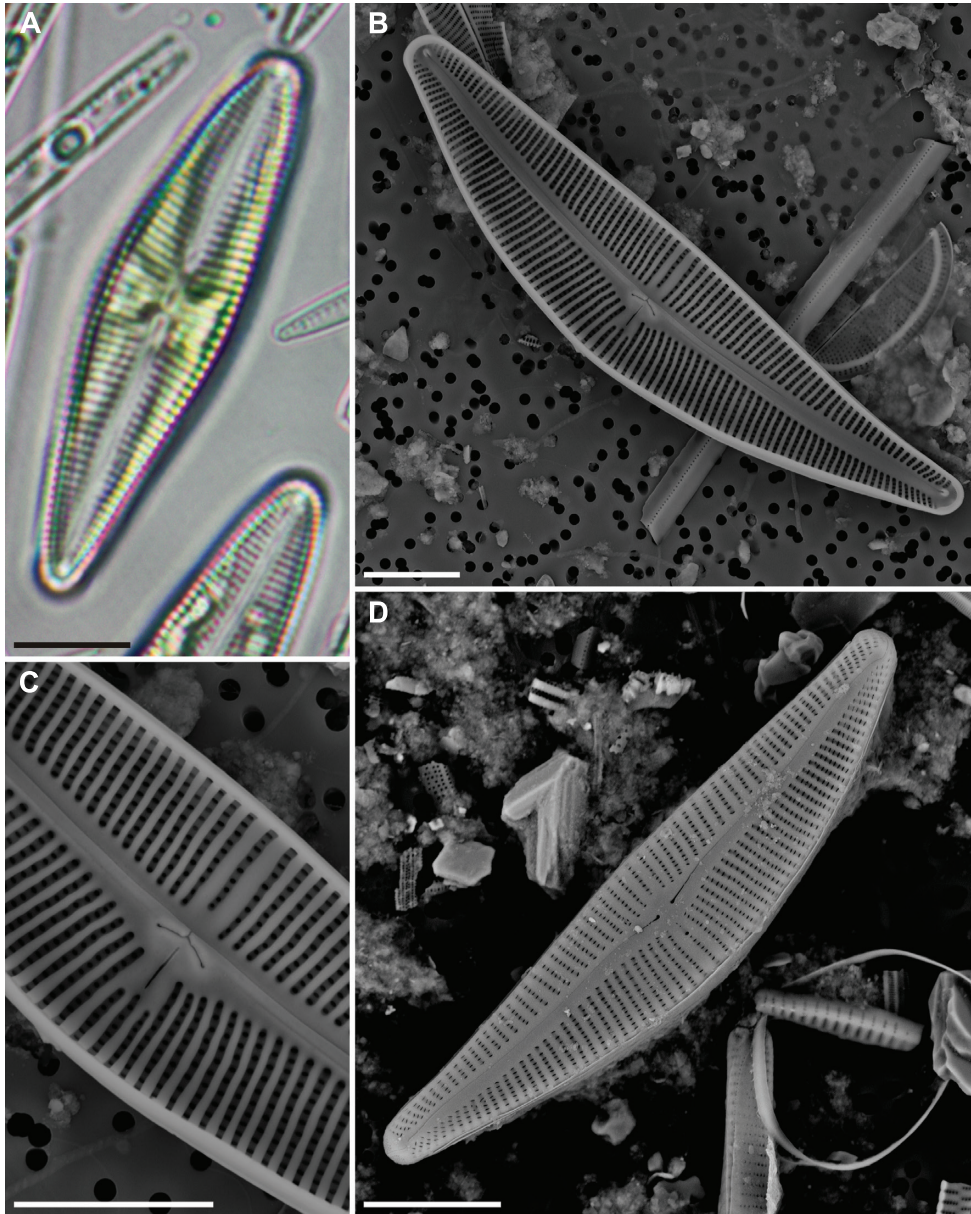


Fig. 72. *Afrocybella* spp. **A.** LM. Living cell of *Afrocybella barkeri* Cocquyt & Ryken, valve view . **B-D.** SEM. **B-C.** Internal view of valve of *A. beccarii*. **D.** External view of valve of *A. beccarii*.
 Scale bars = 10 μm (A-C), 8 μm (D).

Cymbella C. Agardh 1830

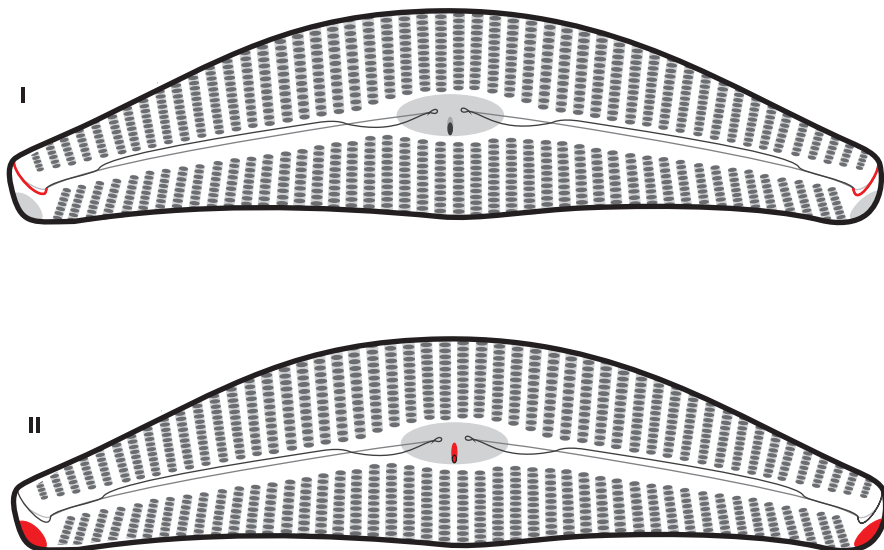
Type species: *Cymbella cymbiformis* C. Agardh

Characteristics – Cells **biraphid**, slightly to strongly **dorsiventral**, raphe complex, terminal raphe endings bent towards the dorsal side (I, Fig. 75: A-C). **Stigma(ta)** (II) in general present in the **central area** on the ventral side. Apical pore field found at the apices (II); may be difficult to discern under LM.

Plastid structure – Cells with one H-shaped plastid and a large pyrenoid (Fig. 74: D) in the centre against one girdle. Several small lipid droplets scattered throughout the cell (Fig. 73: A-B; Fig. 74: B).

Identification of species – Species can be identified by cell size, cell shape, shape of the apices, structure and density of the striae and the size, number and position of the stigmata in relation to the striae. Shape and extent of the central area as well as the curvature of the raphe are important.

Ecology – Cells solitary, mostly attached but occurs also free living and motile. Found in the benthos of oligotrophic to mesotrophic waters preferring alkaline habitats.



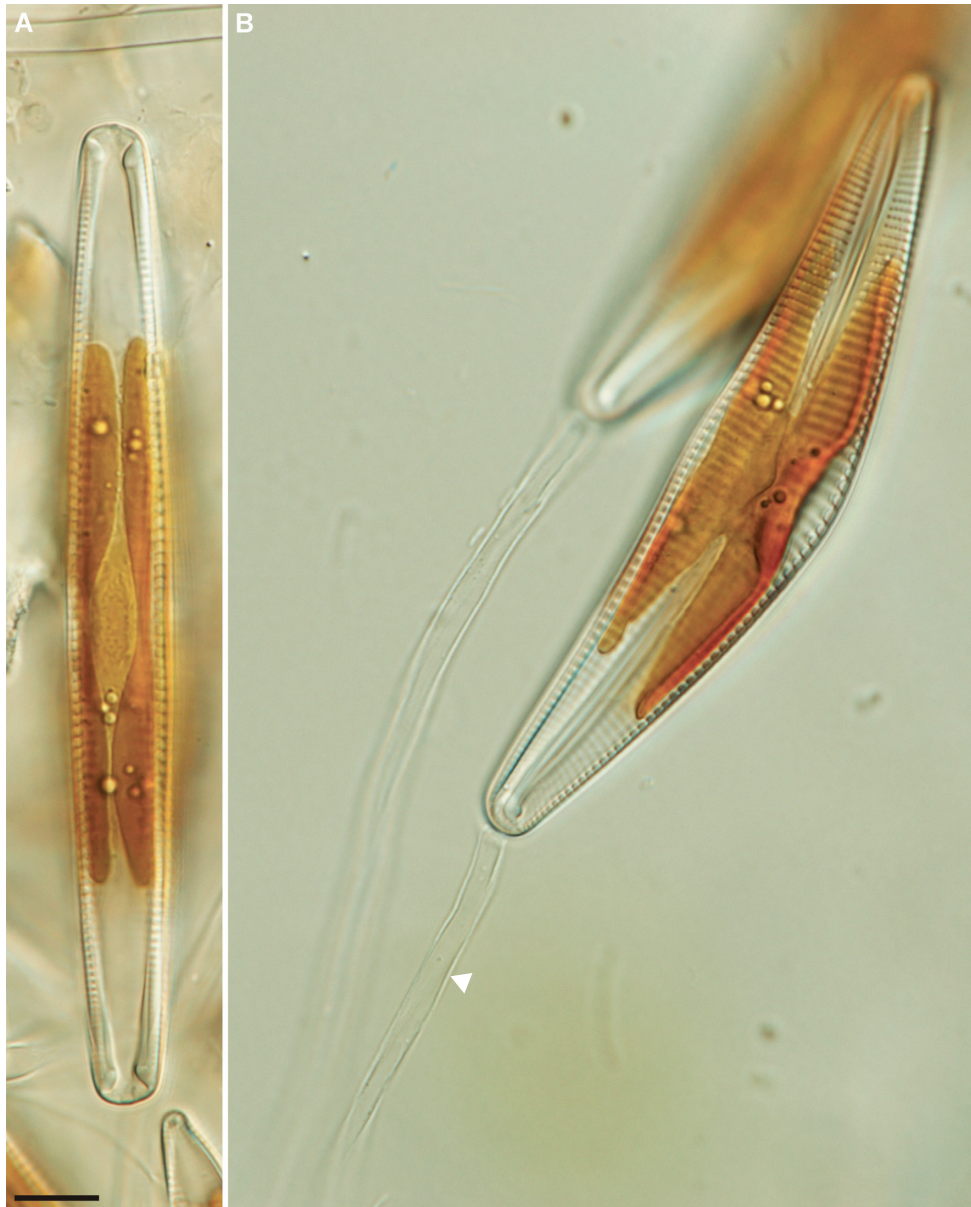


Fig. 73. *Cymbella* spp. **A-B.** LM. **A.** Living cell, girdle view. **B.** Living cells with mucilage stalks (arrow).
Scale bar = 10 μ m.

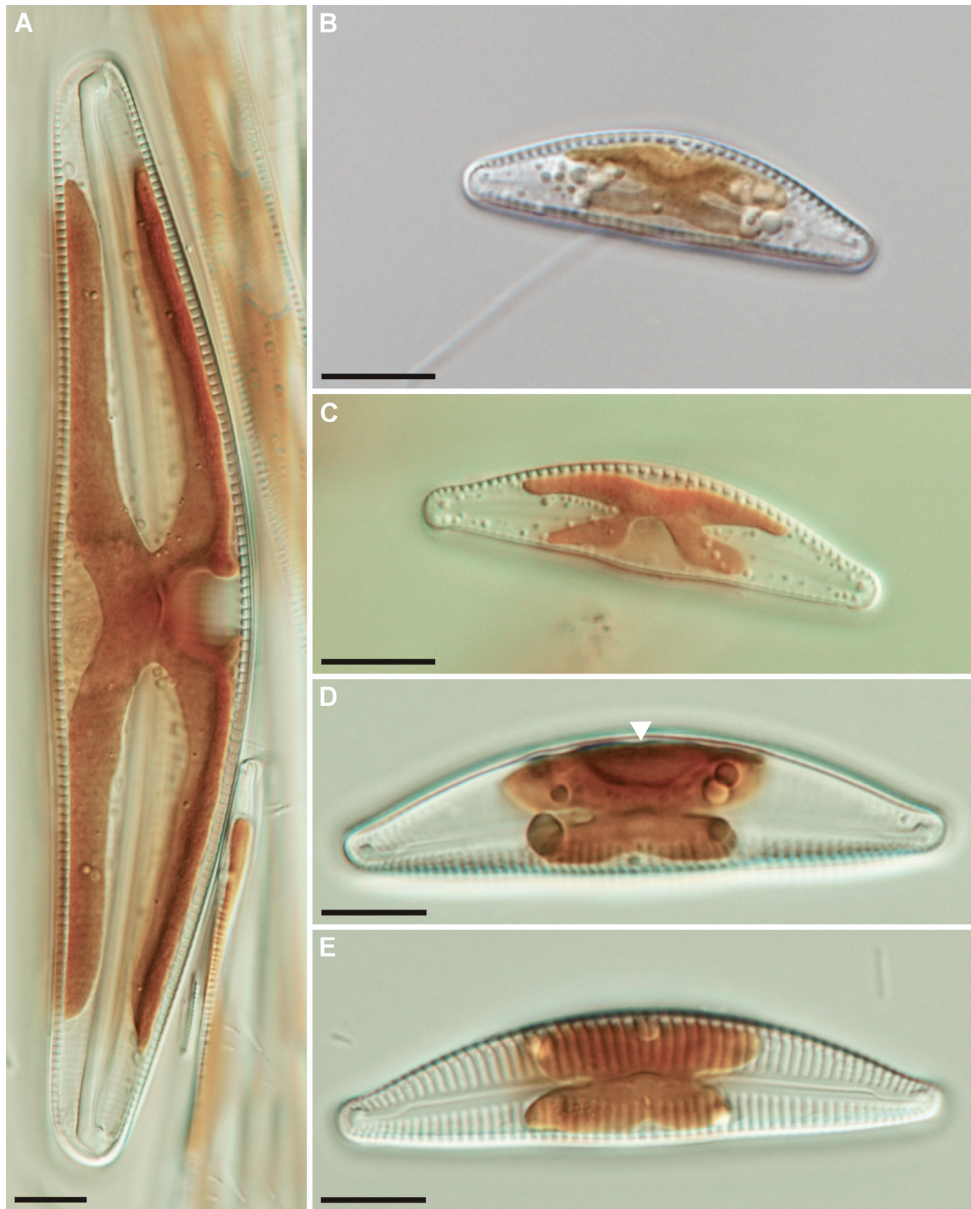
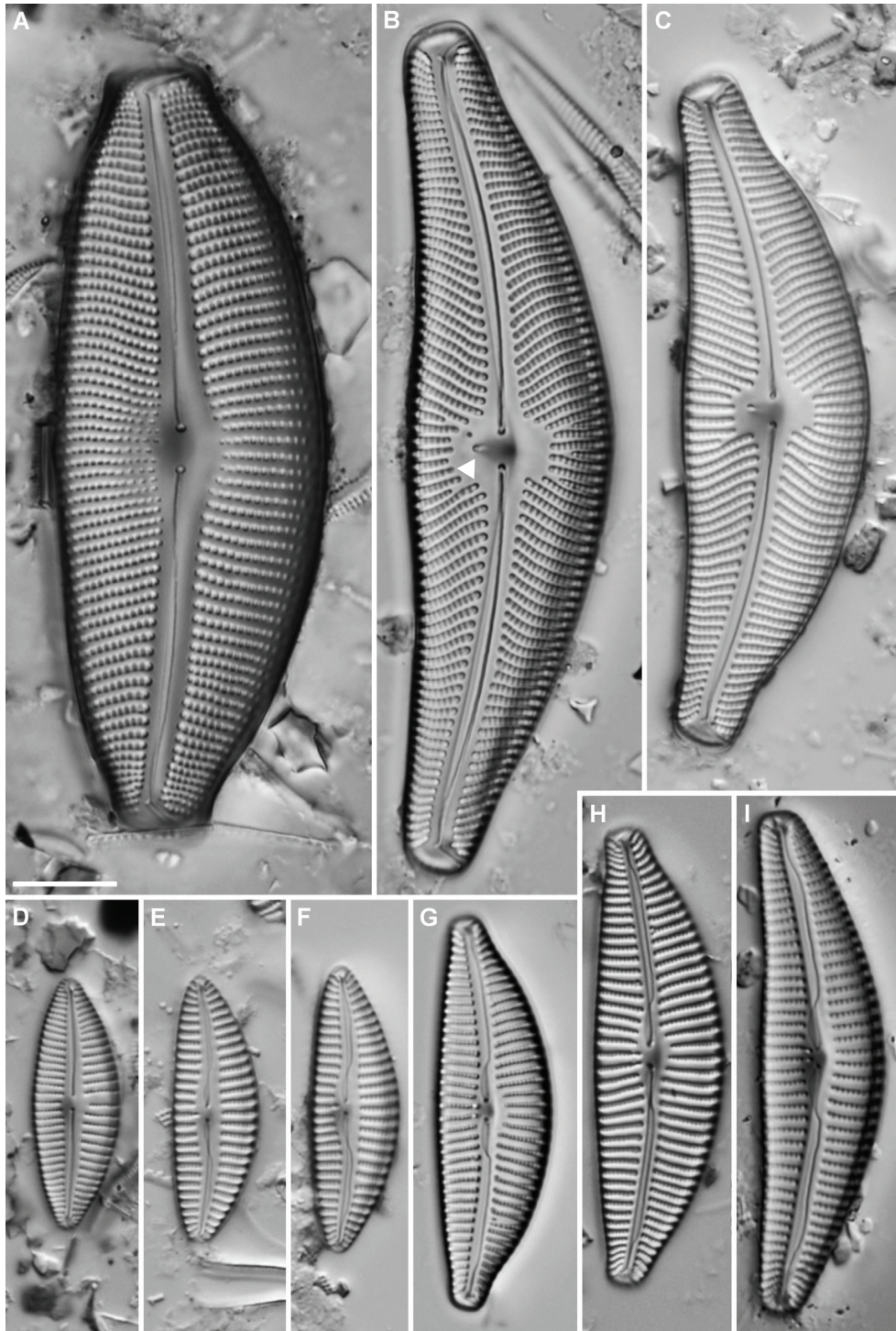


Fig. 74. *Cymbella* spp. **A-E.** LM. **A-B.** Valve views of living cells. **A.** *Cymbella aspera* (Ehrenberg) H. Peragallo. **B.** Cell with a large number of lipid droplets. **C.** *Cymbella kappii* (Cholnoky) Cholnoky. **D-E.** *Cymbella turgidula* Grunow, same cell different foci, note large pyrenoid (arrow - **D**).
Scale bars = 10 μ m (A-E).



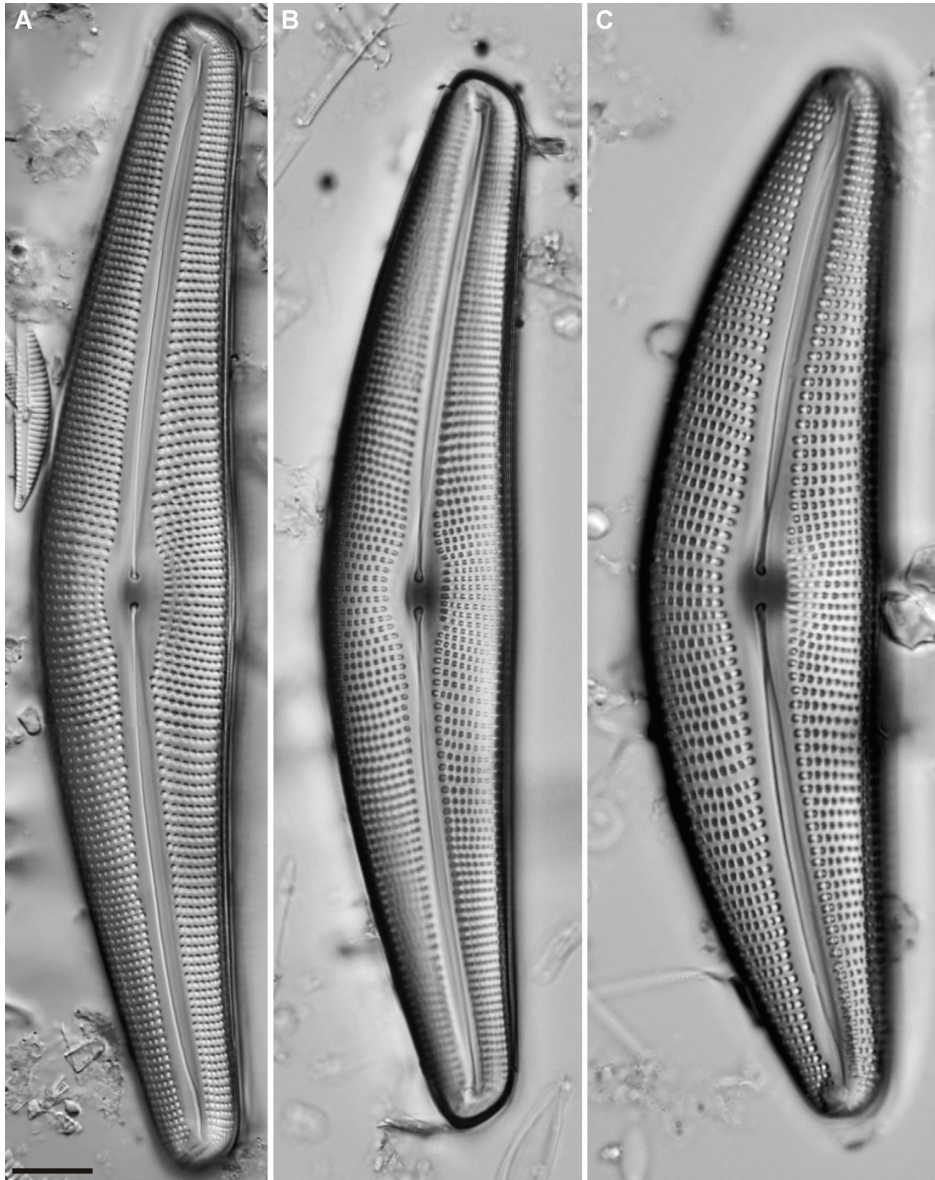


Fig. 76. *Cymbella* spp. **A-C.** LM, valve views. **A-B.** *Cymbella aspera*.
C. *Cymbella* sp.

Scale bar = 10 μ m.

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Fig. 75. *Cymbella* spp. **A-I.** LM, valve views. **A.** *Cymbella cucumis* A.W.F. Schmidt. **B-C.** *C. tumida* (Br bisson) Van Heurk, note stigma (arrow - **B**). **D.** *C. kolbei* Hustedt. **E-F.** *C. zambesiana* Krammer. **G.** *Cymbella* sp. **H.** *C. turgidula*.
I. *Cymbella* sp.

Scale bar = 10 μ m.

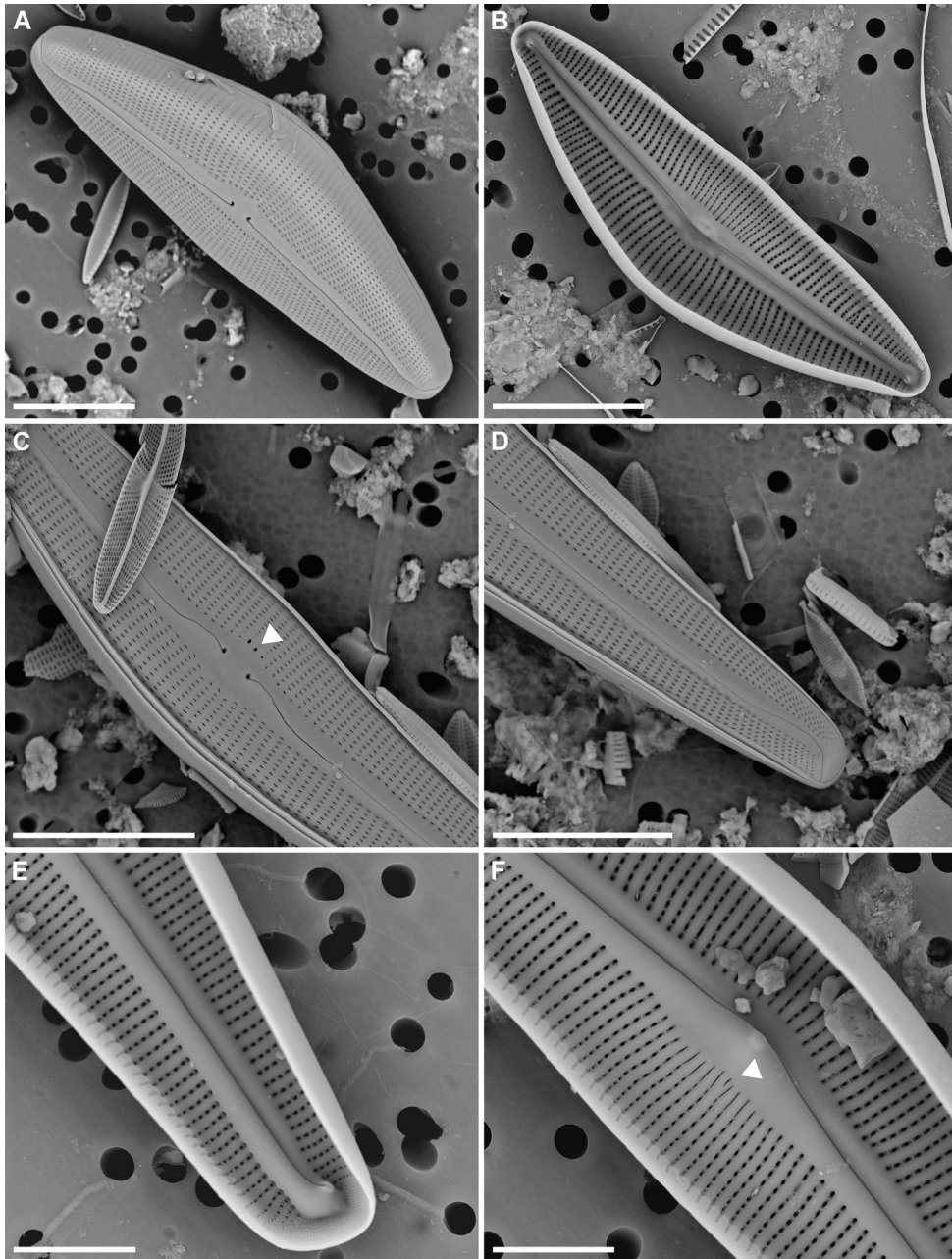


Fig. 77. *Cymbella* sp. **A-F.** SEM. **A.** *Cymbella aspera*, external view of valve. **B.** *C. aspera* internal view of valve. **C-F.** *C. cymbiformis*. **C.** External view of valve, central area, note external openings of stigmata (arrow). **D.** External view of valve, cell apex. **E.** Internal view of valve, cell apex. **F.** Internal view of valve, central area, note structure of stigma (arrow).
Scale bars = 20 μ m (A-D), 10 μ m (E-F).

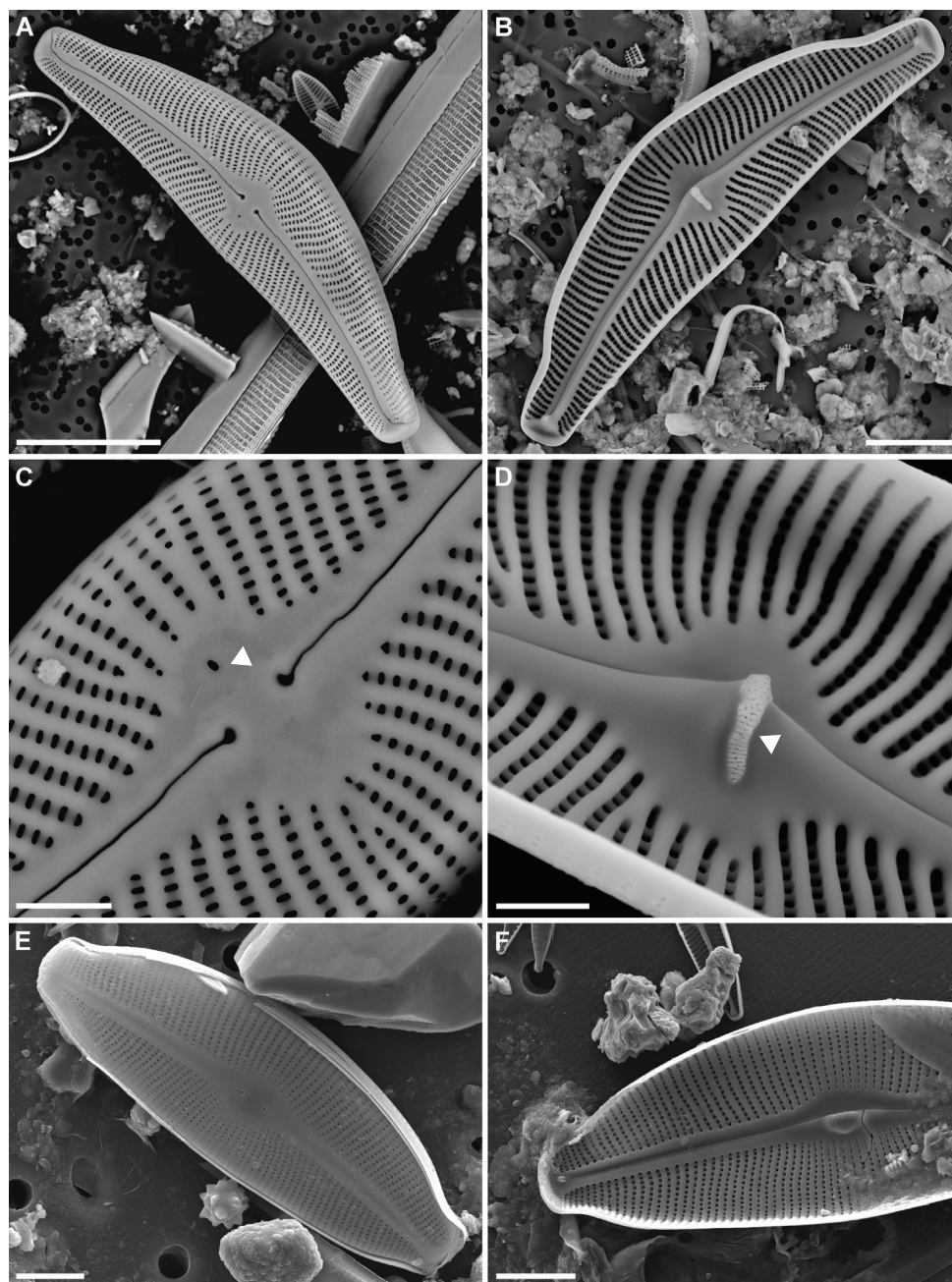


Fig. 78. *Cymbella* sp. **A-F.** SEM. **A-D.** *Cymbella tumida*. **A.** External view of valve. **B.** Internal view of valve. **C.** Central area, external view, note opening of stigma (arrow). **D.** Internal view of stigma (arrow). **E.** *C. cucumis*, external view of valve. **F.** *C. cucumis*, internal view of valve.
 Scale bars = 20 μm (A-B), 3 μm (C-D), 10 μm (E-F).

Cymbopleura (Krammer) Krammer 1999

Type species: *Cymbopleura subaequalis* (Grunow) Krammer

SYNONYM:

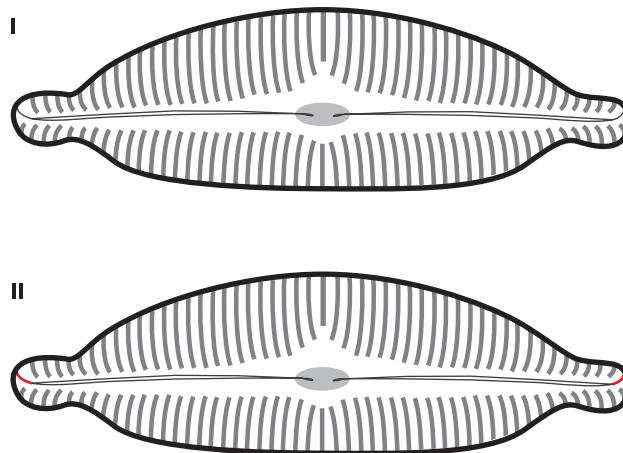
Cymbella C. Agardh 1830 pro parte

Characteristics – Cells **biraphid**, weakly **dorsiventral**, dorsal margin more curved than the ventral margin. Striae slightly radiate throughout the valve. Raphe complex and terminal raphe endings bent towards the dorsal side (II). (Fig. 79: G). **Stigma** absent. **Apical pore fields** absent although SEM may be needed to determine this.

Plastid structure – Cells with one H-shaped plastid and a large pyrenoid in the centre of the cell against one girdle. Several small lipid droplets scattered throughout the cell (Fig. 79: A-B).

Identification of species – Species can be identified by cell size, cell shape, shape of the apices and structure and density of the striae.

Ecology – Cells solitary and motile. Found in the benthos of oligotrophic slightly acidic waters.



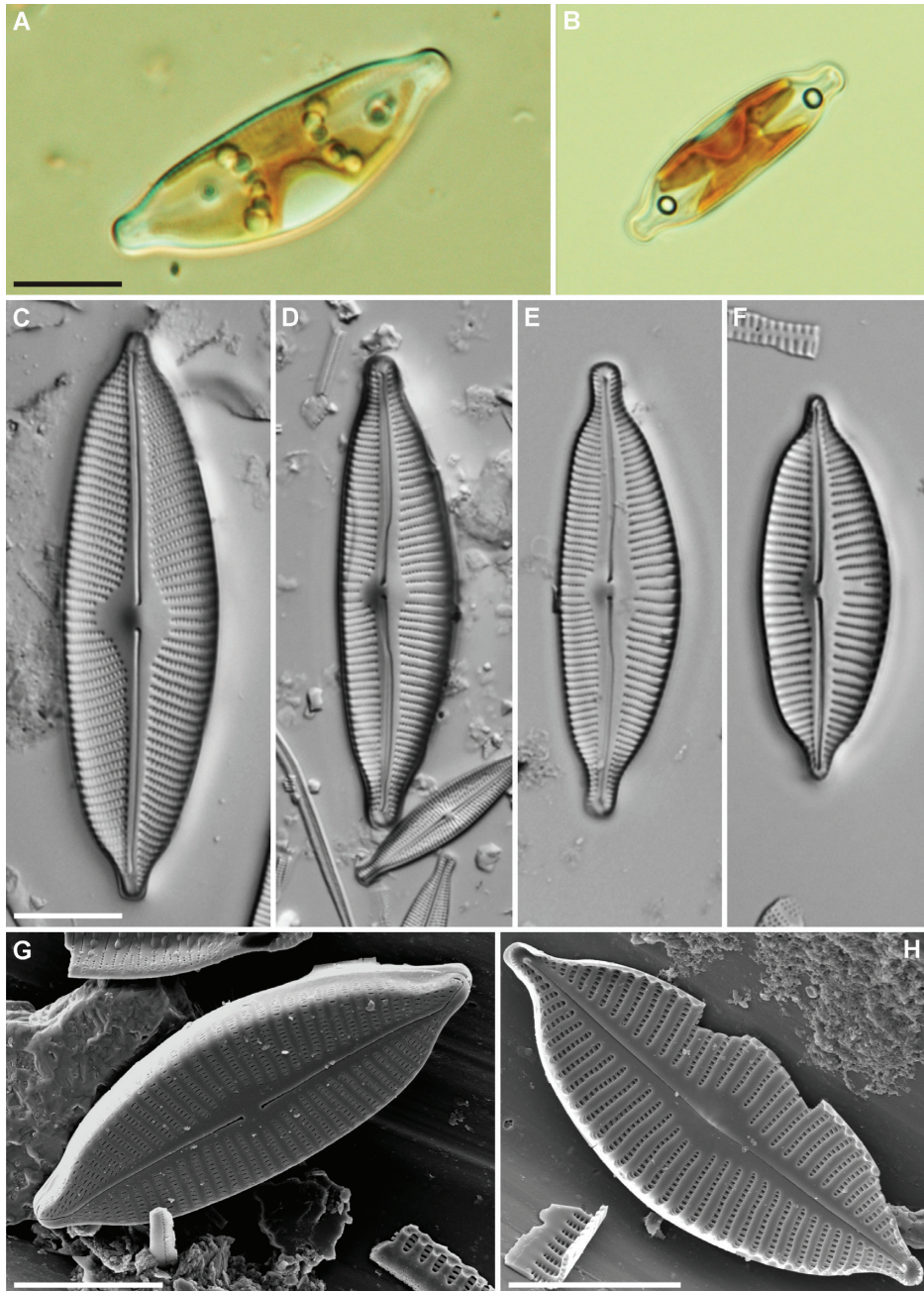


Fig. 79. *Cymbopleura* spp. **A-F.** LM, valve views. **A-B.** Living cells. **C-F.** Cleaned valves. **C.** *Cymbopleura* sp. **D-E.** *Cymbopleura amphicephala* (Nägeli) Krammer. **G-H.** SEM. **G.** *Cymbopleura* sp., external view of valve. **H.** *Cymbopleura* sp., internal view of valve. Scale bars = 10 μm (A-H).

***Encyonema* Kützing 1833**Type species: *Encyonema paradoxum* Kützing

SYNONYM:

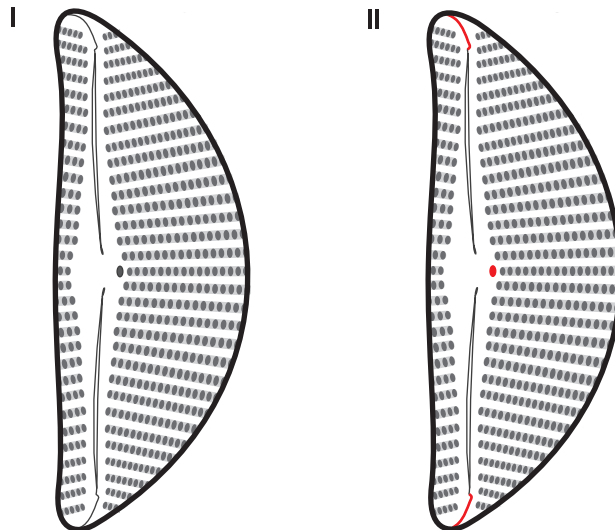
Cymbella C. Agardh 1830 pro parte

Characteristics – Cells **biraphid**, **dorsiventral**, dorsal margin strongly curved, ventral margin more or less straight or slightly curved. Raphe complex and terminal raphe endings bent towards the ventral side (II, Fig. 81: A-F). **Stigma(ta)** usually absent but if present located in the central area on the dorsal side (II, Fig. 81: C-E). **Apical pore fields** absent.

Plastid structure – Cells with one H-shaped plastid and a large pyrenoid in the central region against the ventral side (Fig. 80: C). Several small lipid droplets scattered throughout the cell (Fig. 80: E).

Identification of species – Species can be identified by cell size, cell shape, shape and curvature of the apices, structure and density of the striae.

Ecology – Cells solitary, in mucilage tubes or free living and motile. Found in the benthos of oligotrophic to mesotrophic waters in both acidic and alkaline habitats at various trophic levels.



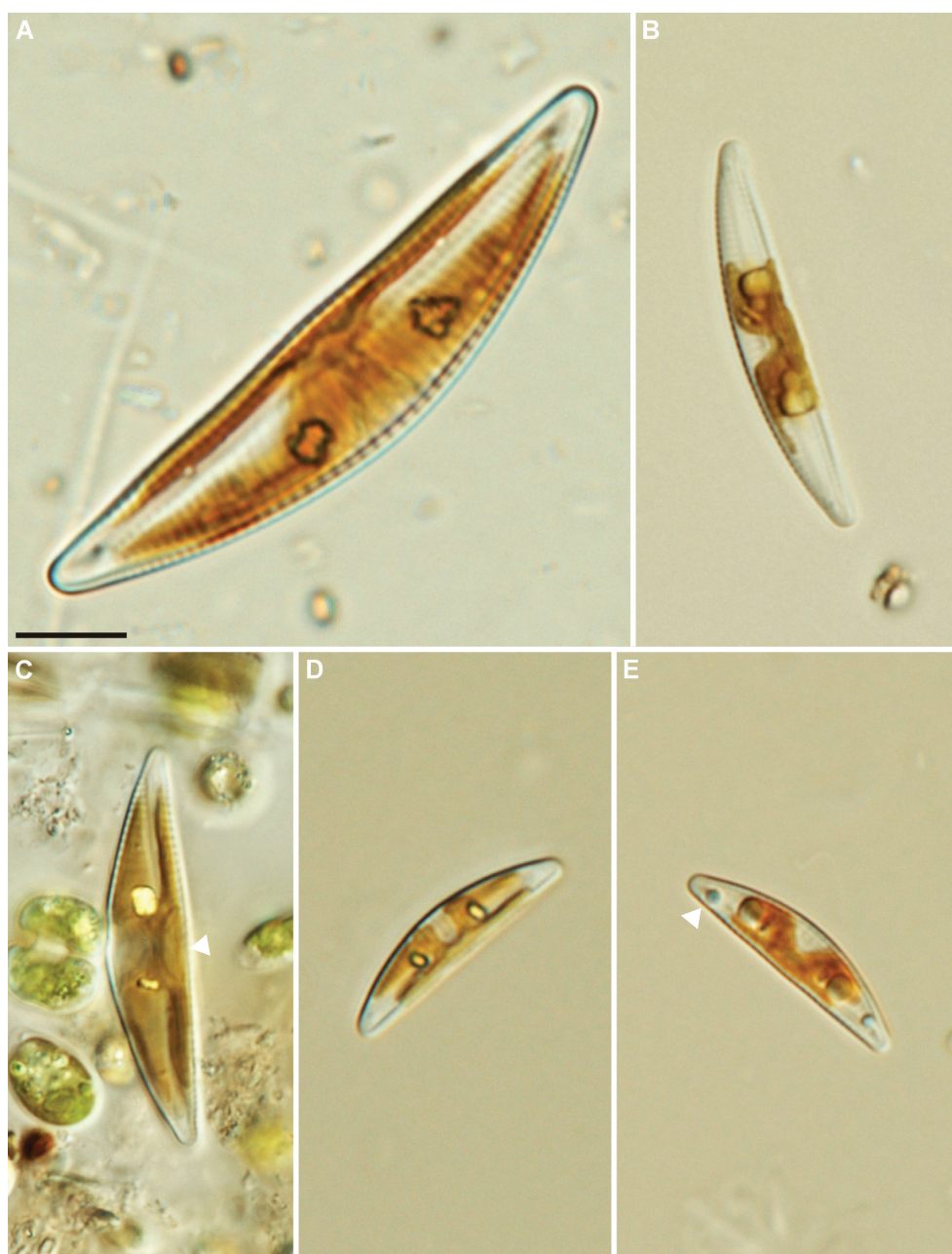


Fig. 80. *Encyonema* spp. **A-E.** LM. Living cells, valve views, note pyrenoid (arrow - **C**) and lipid droplets (arrow - **E**).
Scale bar = 10 μ m.

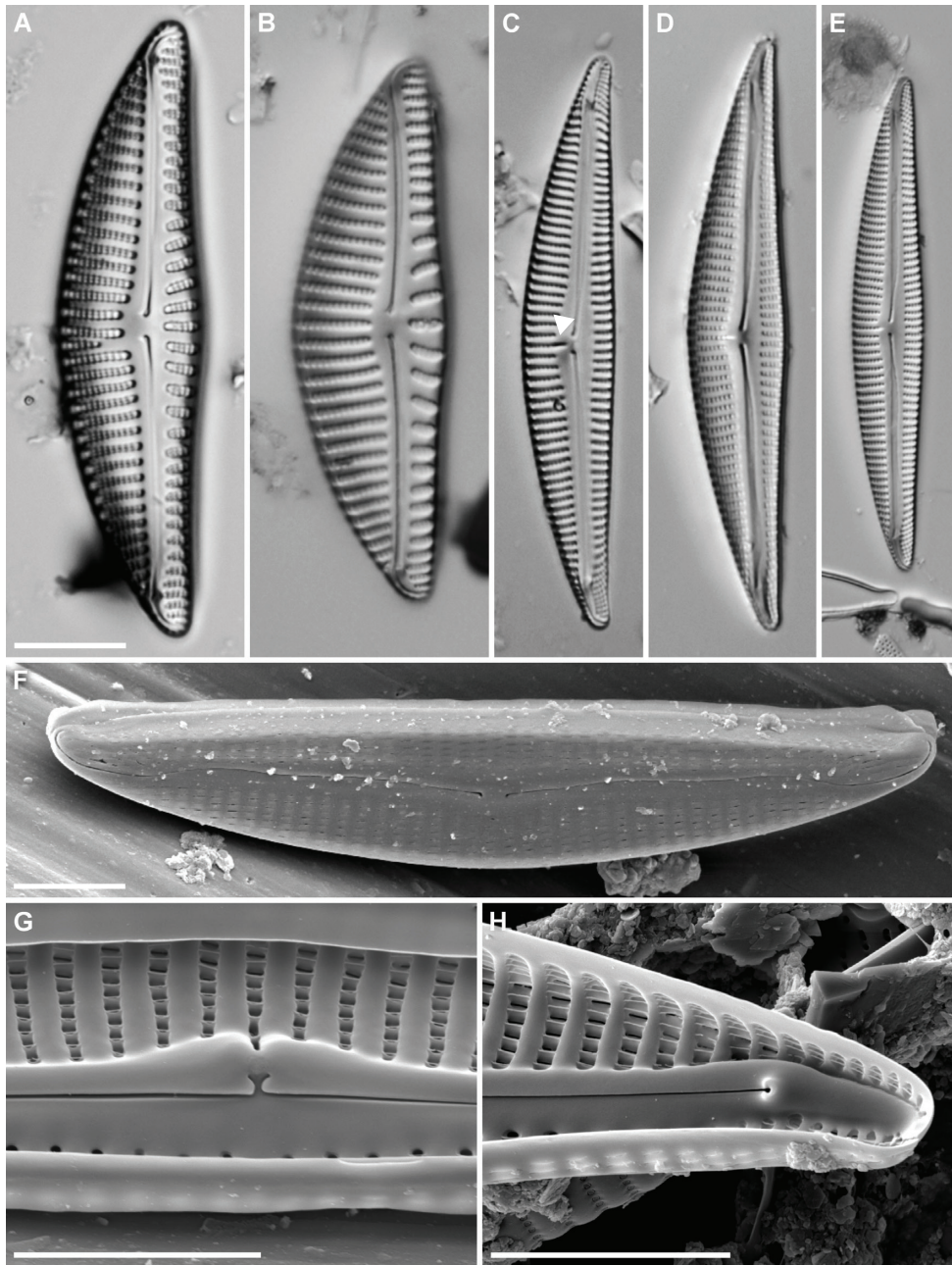


Fig. 81. *Encyonema* spp. **A-E.** LM. Valve views, note stigma on dorsal side (arrow - **C**). **F-H.** SEM. **F.** Valve view of complete valve. **G.** Internal view of valve, detail of central area and central raphe endings. **H.** Internal view of valve, detail of cell apex showing helictoglossa.
 Scale bars = 10 μ m (**A-E**), 5 μ m (**F-H**).

Encyonopsis Krammer 1997

Type species: *Encyonopsis cesatii* (Rabenhorst) Krammer

SYNONYM:

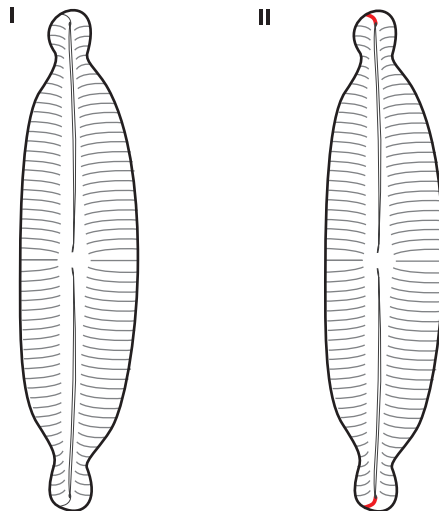
Cymbella C. Agardh 1830 pro parte

Characteristics – Cells **biraphid**, of variable size, slightly to moderately **dorsiventral**, raphe complex and terminal raphe endings bent towards the ventral side (II, Fig. 83: B). **Apical pore fields** absent.

Plastid structure – Cells with one H-shaped plastid and a large pyrenoid in the central region against the ventral side. Several small lipid droplets scattered throughout the cell (Fig. 82: A).

Identification of species – Species can be identified by cell size, cell shape, shape of the apices, structure and density of the striae as well as structure of the axial area.

Ecology – Cells solitary, free living and motile. Found in the benthos of oligotrophic to mesotrophic waters in both acidic and alkaline habitats at various trophic levels.



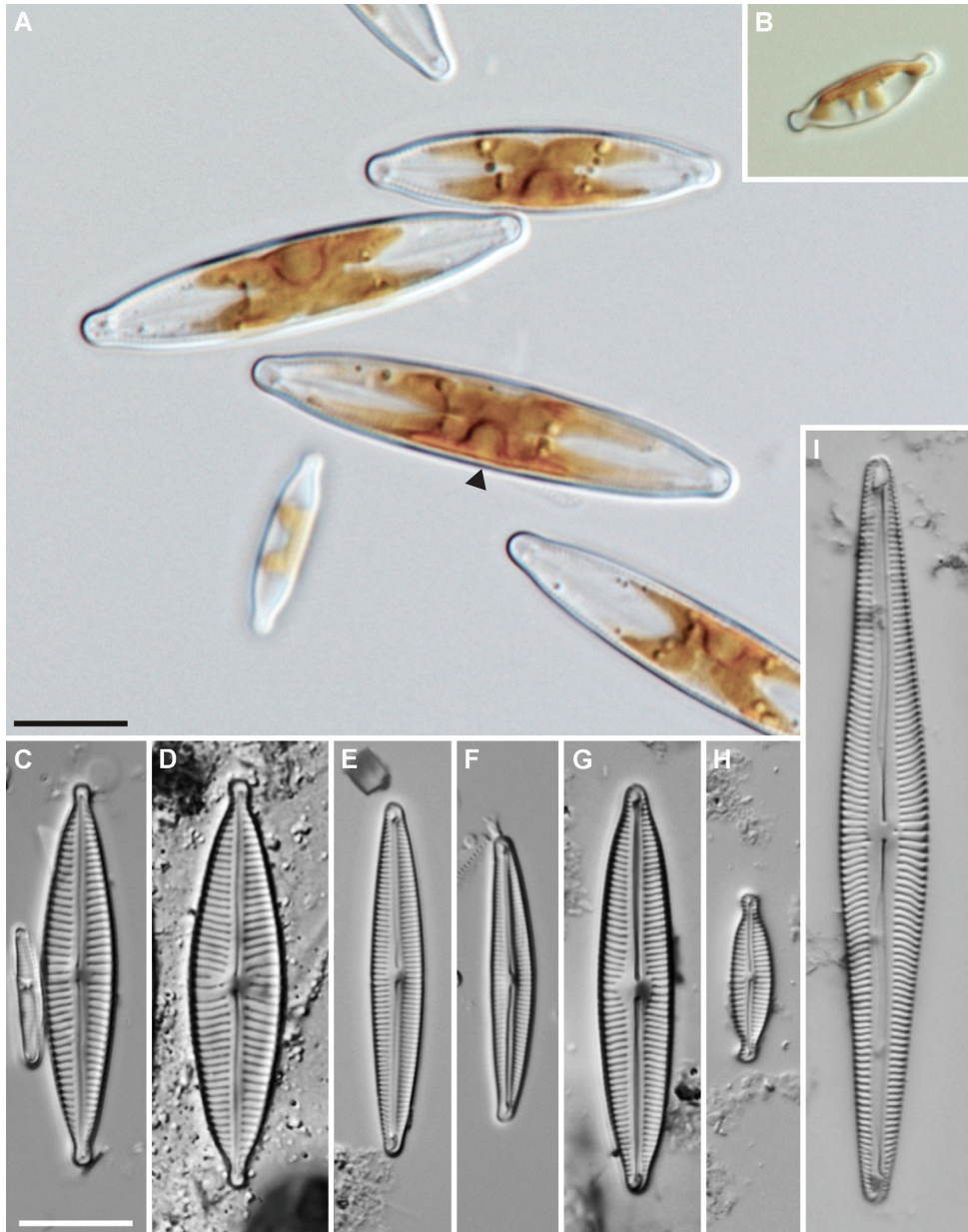


Fig. 82. *Encyonopsis* spp. **A-I.** LM. **A.** Living cells, valve views, note pyrenoid (arrow). **B.** Living cell, valve view of *Encyonopsis microcephala* (Grunow) Krammer. **C-D.** Valve views of *Encyonopsis frequentis* Krammer. **E-F.** Valve views of *E. neerlandica* Van de Vijver, Verweij, Van der Wal & Mertens. **G.** *E. falaisensis* (Grunow) Krammer, valve view. **H.** *E. microcephala*, valve view. **I.** *E. treinishii* Bahls, valve view. Scale bars = 10 µm.

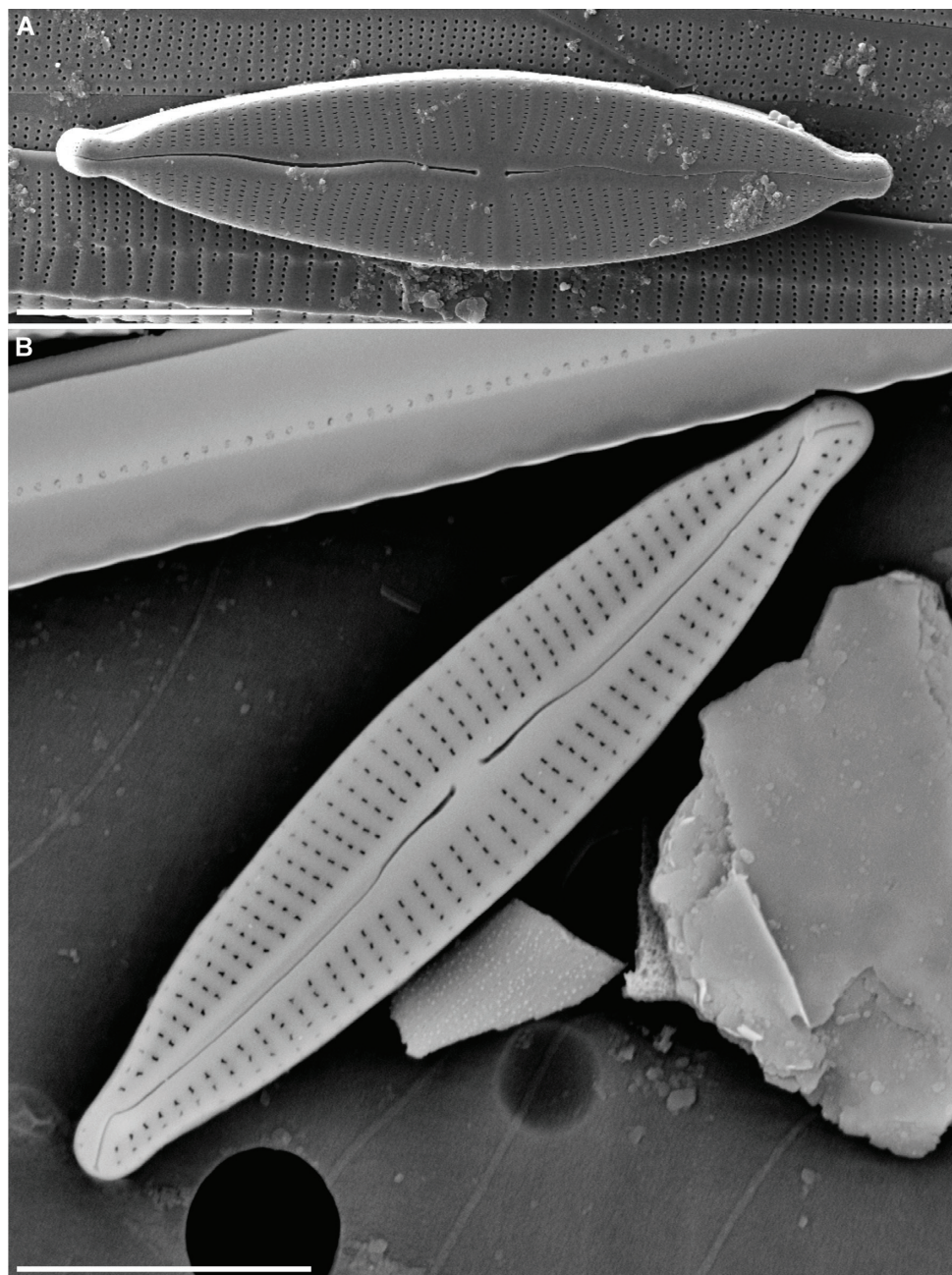


Fig. 83. *Encyonopsis* spp. **A-B.** SEM. **A.** *Encyonopsis frequentis*, external view of valve. **B.** External view of valve of *E. neerlandica*.
Scale bars = 10 μ m (A), 5 μ m (B).

Placoneis Mereschkowsky 1903Type species: *Placoneis gastrum* (Ehrenberg) Mereschkowsky

SYNONYM:

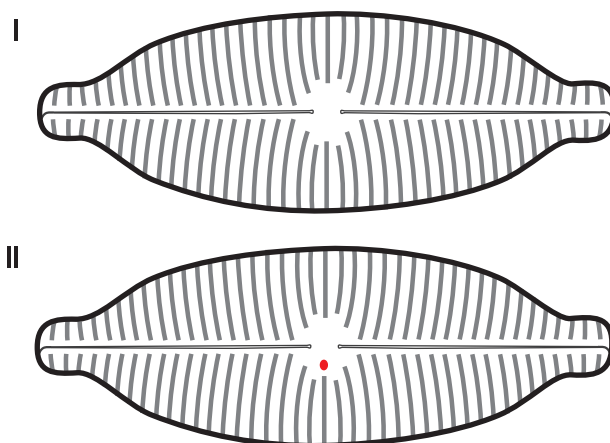
Navicula Bory 1822 pro parte

Characteristics – Cells **biraphid**, generally large and robust, elliptical with broadly rounded, rounded or sub-capitate apices. Striae easily discernable under LM (Fig. 84) and composed of single rows of round or elongate, **denticulate** (internally occluded) areolae (Fig. 85: F). Raphe straight with expanded central endings (Fig. 85: A-B), terminal raphe endings bent towards same (Fig. 85: B) or opposite (Fig. 85: A) directions. Central area generally expanded with **stigma(ta)** occasionally present (II; Fig. 84: B; Fig. 85: E).

Plastid structure – Single plastid has a central axis along the apical axis of the cell with four lobes at each end which extend under the valves. Many scattered lipid bodies.

Identification of species – Species can be identified by cell size, cell shape, shape of the apices, structure and density of the striae as well as structure of the central area and the shape of the central raphe endings and the presence/absence of a stigma.

Ecology – Cells solitary, free living and motile. Found in the benthos of a variety of water types, in tropical Africa this taxon seems to favour oligotrophic waters with low to moderate conductivities.



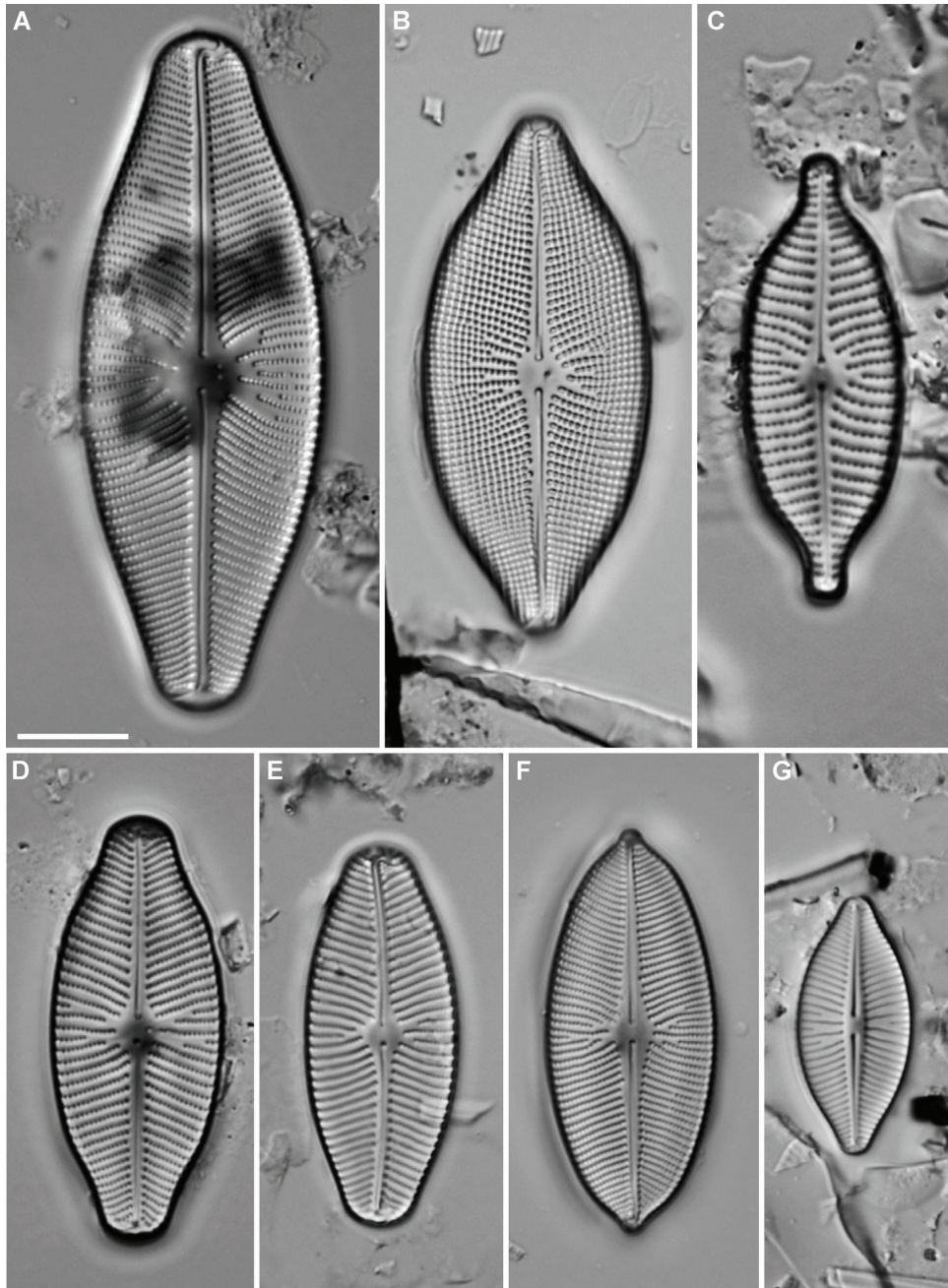


Fig. 84. *Placoneis* spp. **A-G.** LM. **A.** *Placoneis* sp., valve view. **B.** “*Navicula omegopsis*” Hustedt, valve view. **E.** *P. cocquytiae* Fofana, Sow, J.C. Taylor, Ector & Van de Vijver, valve view. **F.** “*Navicula ashantiensis*” Foged, valve view. **G.** *P. hambergii* (Hustedt) Bruder, valve view.
Scale bar = 10 μ m.

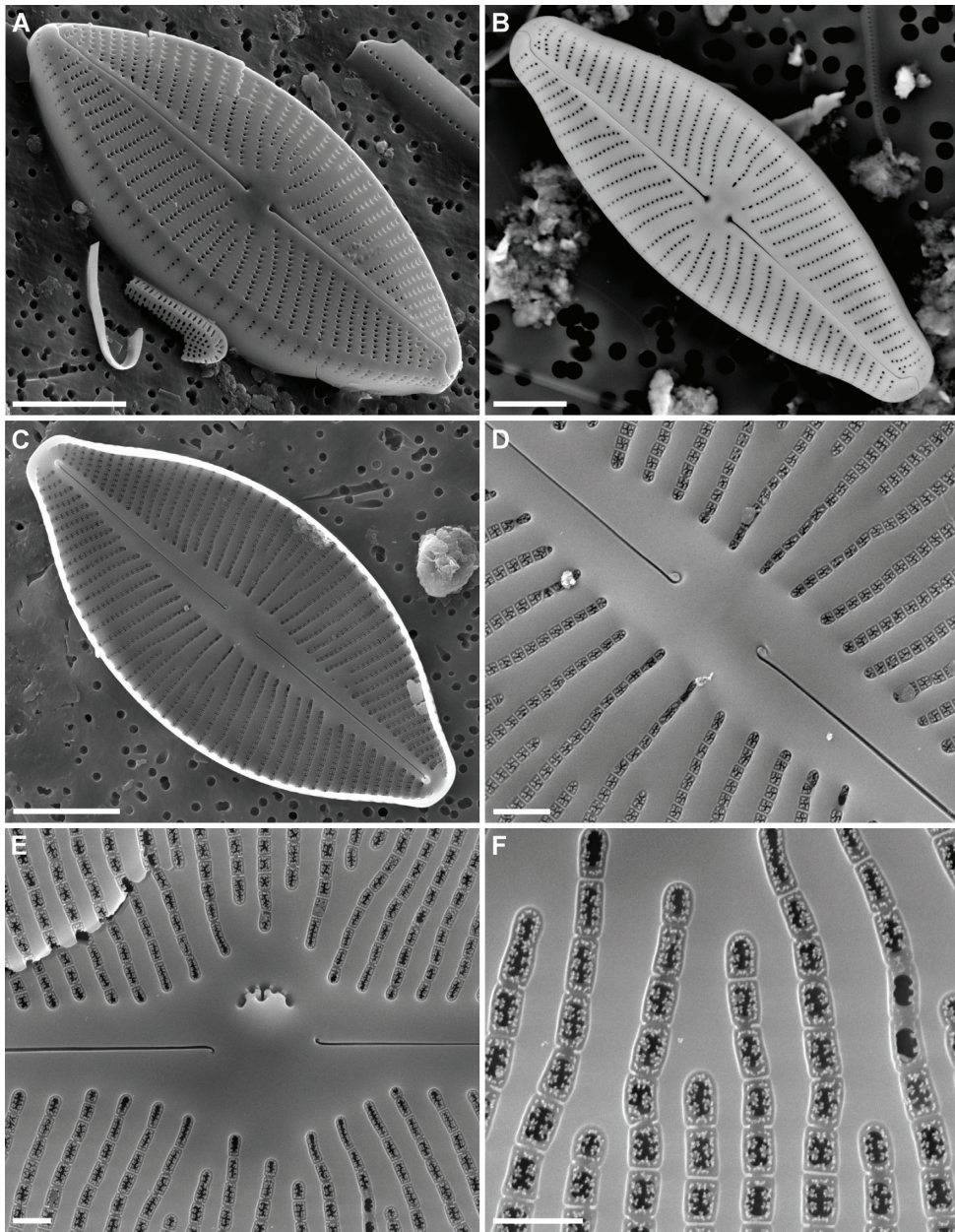


Fig. 85. *Placoneis*. **A-F.** SEM. **A-B.** External view of valve. **C.** Internal view of valve. **D.** Detail of the internal central raphe endings. **E.** Internal view of valve, note the stigmata in the central area. **F.** Internal view of valve, detail of the striae composed of single rows of denticulate areolae.
Scale bars = 10 μm (A-C), 1 μm (D-F).

Gomphonema Ehrenberg 1832

Type species: *Gomphonema acuminatum* Ehrenberg

Characteristics – Cells **biraphid**, **heteropolar**, highly variable in cell size, valve shape and apex shape. Striae composed of single or double rows of areolae which may not be discernable under LM. Raphe straight and simple (Fig. 87: D-H). Central area (II) variable in size and usually with one stigma present. Apical pore field present at the foot pole (III; Fig. 91: C). Rarely large species from tropical Africa have an isolated apical spine (Fig. 91: A, B).

Plastid structure – Single H-shaped plastid extending under both valve faces with a central pyrenoid against the girdle (Fig. 86; Fig. 87: A-C).

Identification of species – Species can be identified by cell size, cell shape, shape of the apices, structure and density of the striae as well as structure of the central and axial area. The proximity of the stigma to the striae and the presence of an apical spine are also important characters.

Ecology – Cells solitary or in pairs commonly attached by mucilage stalks (Fig. 86; Fig. 87: A-C) and forming colonies. Also solitary, free living and motile. Found in the benthos of oligotrophic to eutrophic waters in both low and moderate conductivities.

