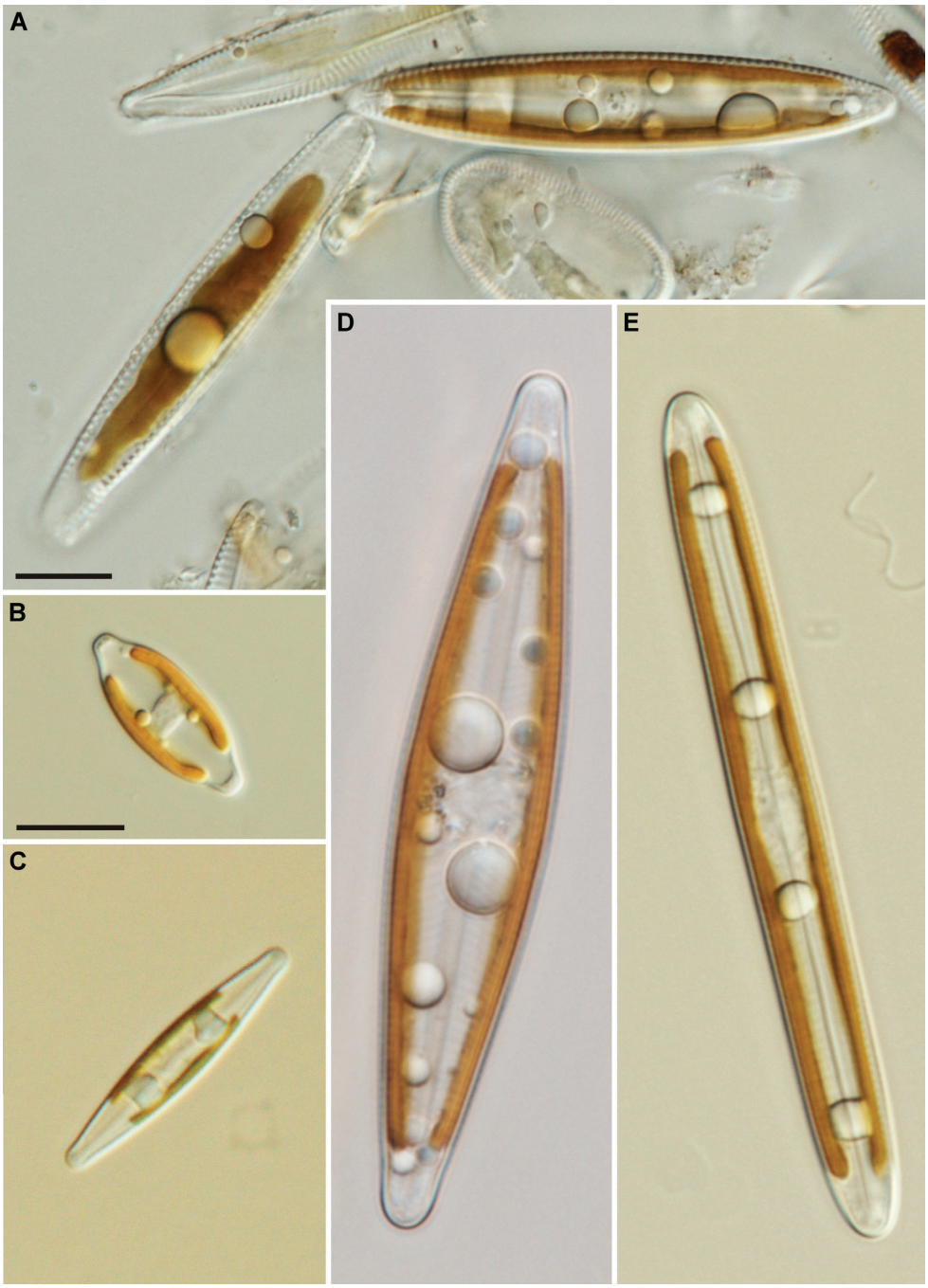


Fig. 144. *Navicula* spp. **A-E.** LM, living cells. **A.** *N. tripunctata*, valve view (right) and girdle view (left). **B-E.** Valve views. **B.** *N. radiosa* Kützing. **E.** *N. angusta* Grunow.
Scale bars = 10 µm (A-E).

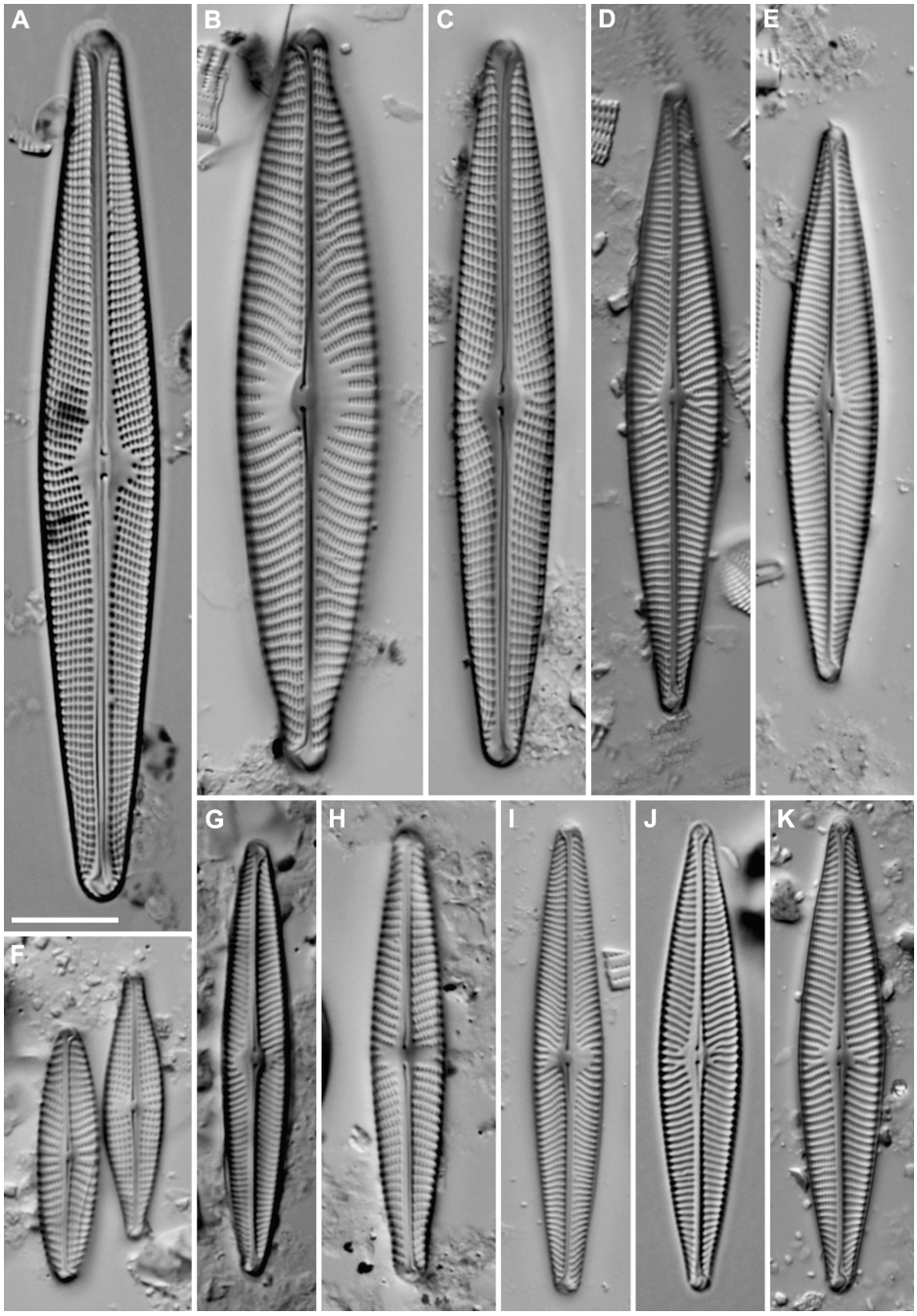


Fig. 145 *Navicula* spp. **A-K.** LM, cleaned valves of various species. **B.** *N. viridula* (Kützing) Ehrenberg. **E.** *N. zanonii* Hustedt. **I.** *Navicula nielsfogedii* J.C. Taylor & Cocquyt.
Scale bar = 10 µm (A-K).

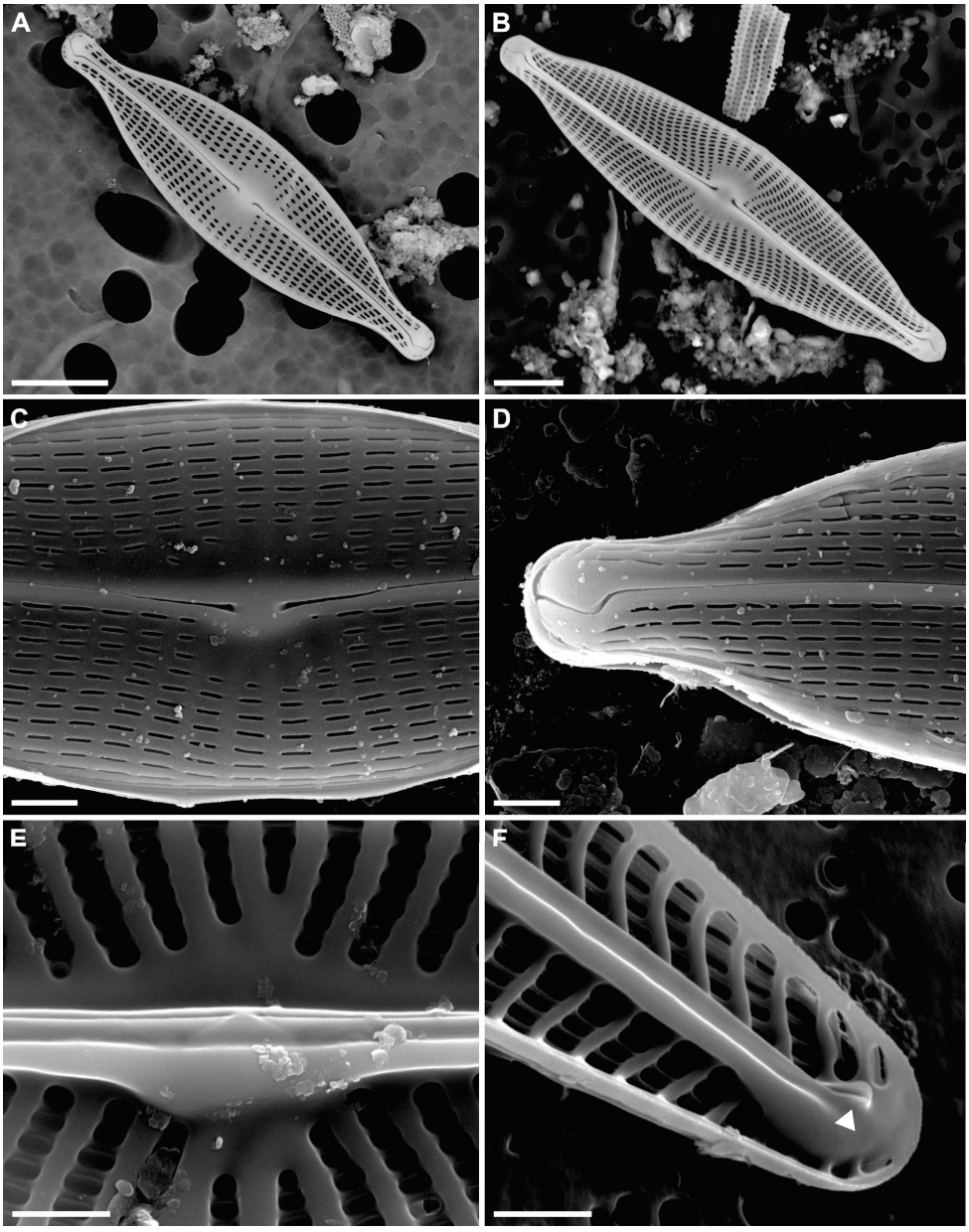


Fig. 146. *Navicula* spp. **A-F.** SEM. **A-D.** External view of valves. **C.** Detail of central raphe endings. **D.** Detail of terminal raphe ending. **E-F.** Internal view of valve. **E-F.** *N. nielsfogedii*, detail of central raphe endings (**E**) and terminal raphe ending (**F**), note helictoglossa (arrow).
Scale bars = 5 µm (A-B), 1 µm (C-F).

Nupela Vyverman & Compère 1991

Type species: *Nupela giluwensis* Vyverman & Compère

SYNONYM:

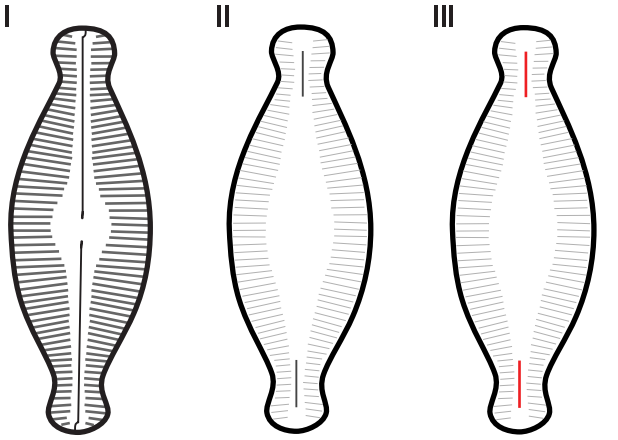
Navicula Bory 1822 pro parte

Characteristics – Cells **isovalvar** or **heterovalvar**, **biraphid**, small, elliptical to linear-elliptical, slightly asymmetric to the apical axis, with broadly rounded or protracted capitate or sub-capitate apices. Striae difficult to discern under LM (Fig. 147: E-R) composed of single rows of round or elongate areolae (Fig. 148: B-F). Raphe straight and simple (I; Fig. 148: C) extending on to the valve mantle, the opposite valve has short or very short and indistinct straight raphe branches which do not extend on to the valve mantle (III). Central area is asymmetrical and may be unilaterally expanded and may or may not reach the valve margins. Axial area often large (Fig. 148: B, D) and may be ornamented with valve face undulations .

Plastid structure – Cells with one plastid with lobes extending under the valve face (Fig. 147: A-D).

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

Ecology – Cells solitary, free living and motile. Found in the benthos of slightly acidic to circumneutral waters with low conductivities.



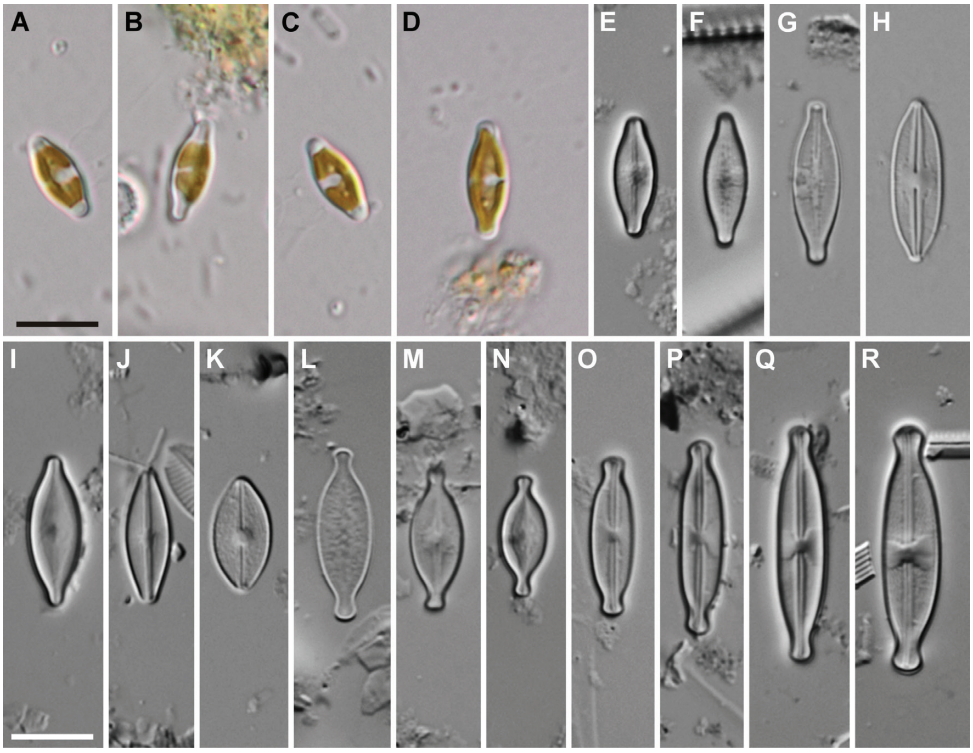


Fig. 147. *Nupela* spp. **A-R.** LM. **A-D.** Living cells. **E-R.** Valve views of cleaned material.
Scale bars = 10 µm (A-R).

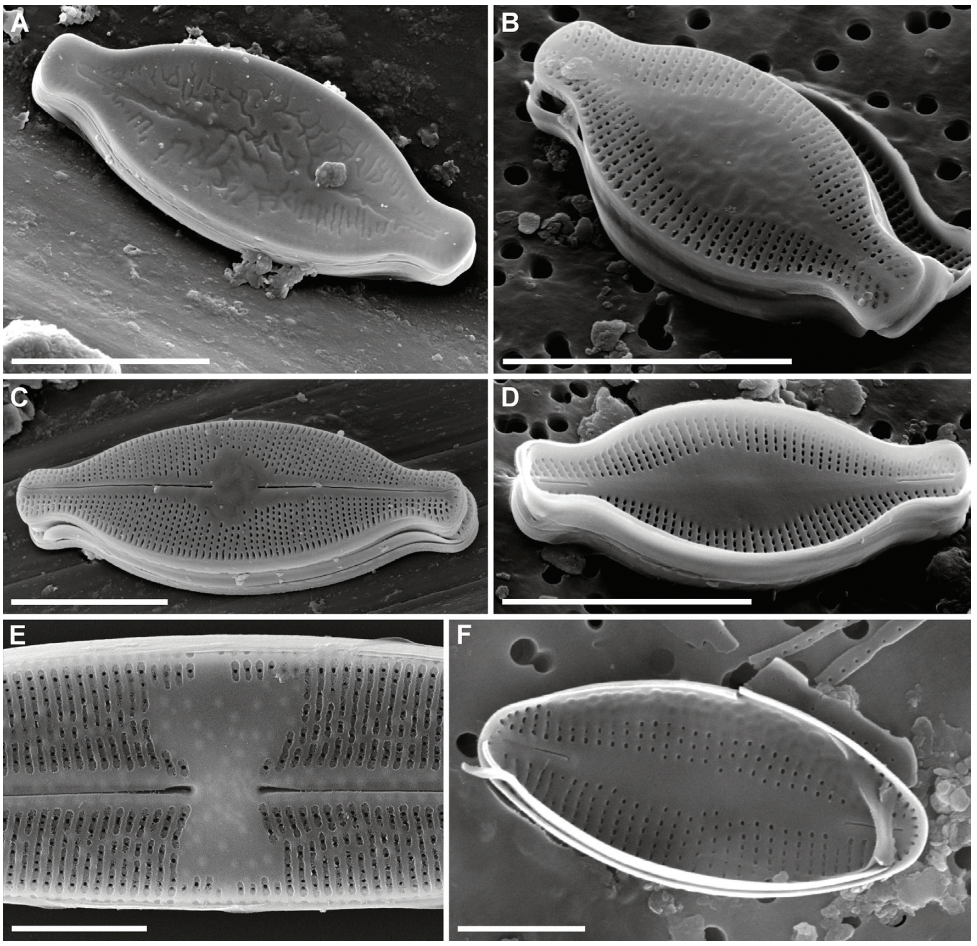


Fig. 148. *Nupela* spp. **A-F.** SEM. **A-C.** External view of valves, note short raphe branches (**B**). **D-F.** Internal view of valves, note short raphe branches (**D, F**). Scale bars = 5 µm (A-D), 2 µm (E-F).

Seminavis D.G. Mann 1990

Type species: *Seminavis gracilenta* (Grunow ex A.W.F. Schmidt) D.G. Mann

SYNONYM:

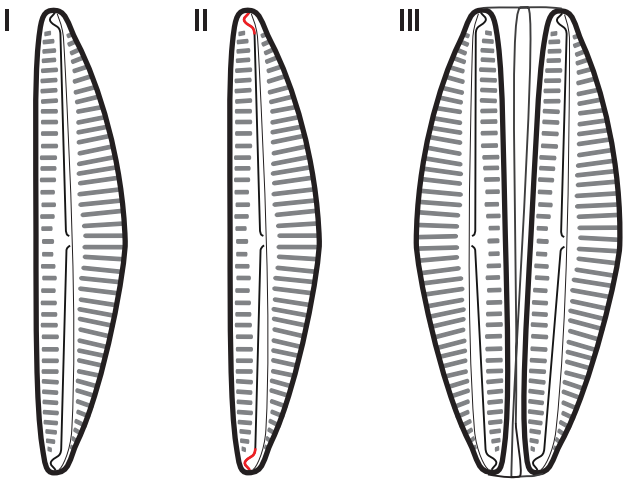
Amphora Ehrenberg ex Kützing 1844 pro parte

Characteristics – Cells **dorsiventral**, **biraphid**, straight ventral margin, curved dorsal margin with rounded apices. Striae discernable under LM (Fig. 149: A-C), composed of linear areolae only possible to resolve with SEM (Fig. 149: D-F). Raphe straight and simple (Fig. 149) carried in a sternum, terminal endings deflected to the dorsal side (II). Axial area and central area of different width and shape on dorsal and ventral sides. Differentiated from *Amphora* by the structure of the areolae and the plastids (naviculoid).

Plastid structure – Cells with 2 plate-like plastids, one along each side of the girdle.

Identification of species – Up till now only one species known from freshwaters of tropical Africa: *Seminavis strigosa* (Hustedt) Danielidis & Economou-Amili.

Ecology – Cells solitary, free living and motile. Found in the benthos of eutrophic waters with moderate to high conductivities.



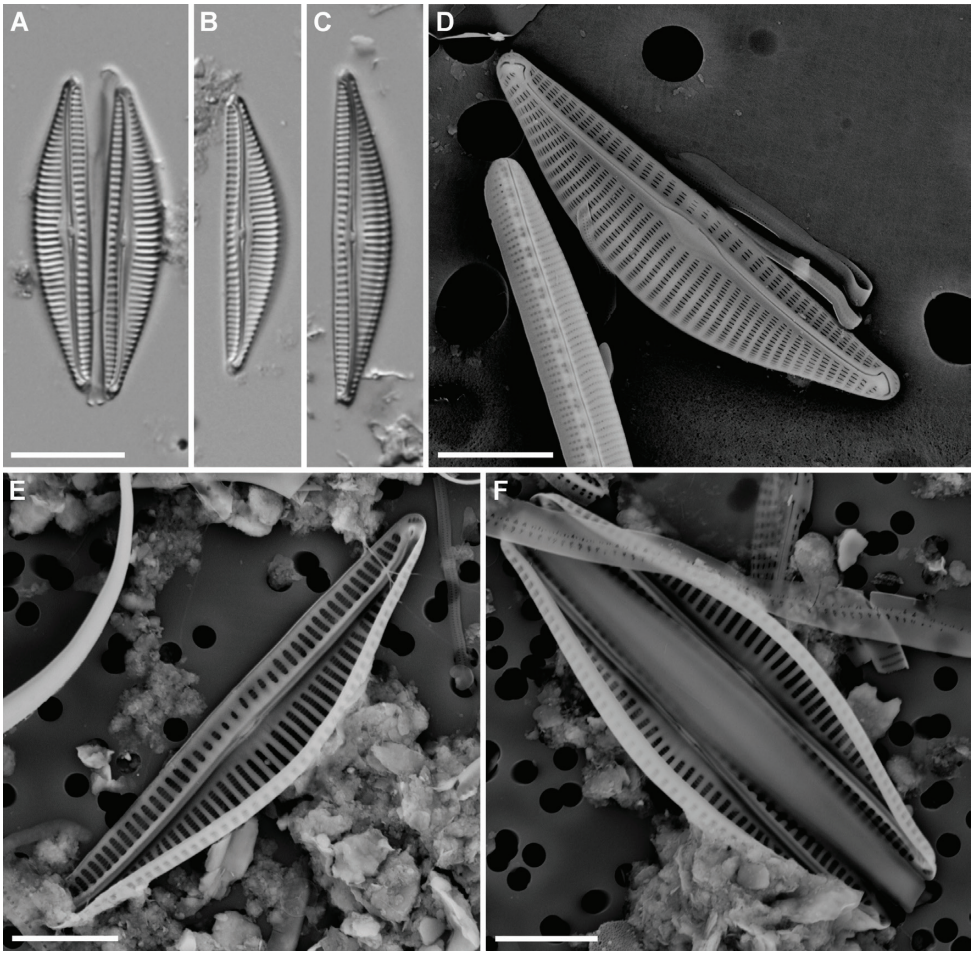


Fig. 149. *Seminavis strigosa.* **A-C.** LM, valve views. **D-F.** SEM. **D**. External view of valve. **E-F.** Internal view of valves.
Scale bars = 10 µm (A-C), 5 µm (D-F).

Gyrosigma Hassall 1845

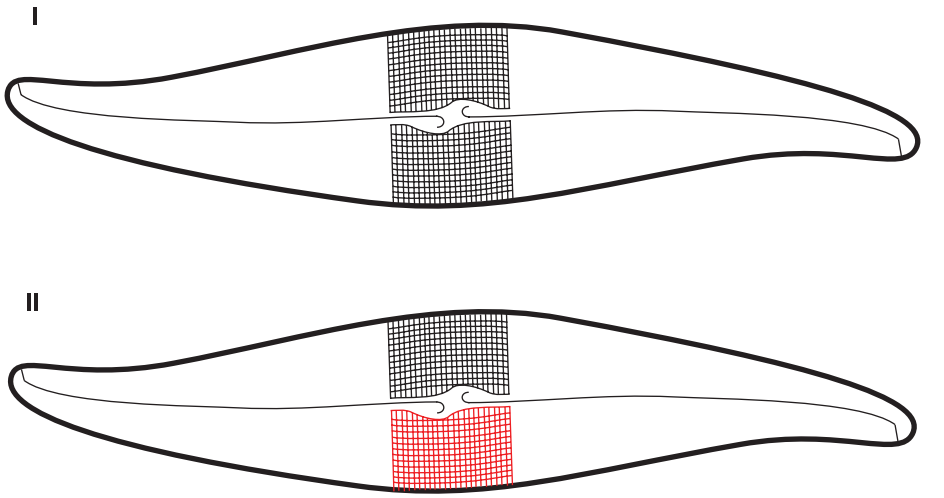
Type species: *Gyrosigma hippocampus* (Ehrenberg) Hassall

Characteristics – Cells **biraphid**, **sigmoid**, large to very large with rounded apices. Striae fine, transapical and longitudinal striae visible at right angles to each other (II; Fig. 151: C-D). Raphe sigmoid and simple (Fig. 150: C-D). Central area small and may contain special structures such as small silica ribs.

Plastid structure – Two plate-like chloroplasts sometimes with lobed margins lie along each side of the girdle (Fig. 150: A-B). Many lipid bodies scattered throughout the cell.

Identification of species – Species can be identified by cell size, cell shape, shape of the apices (degree of sigmoidality), structure and density of the transapical and longitudinal striae, structure of the central area as well as the shape and extent of the central raphe endings.

Ecology – Cells solitary, free living and motile. Found in the benthos of oligotrophic to eutrophic waters in both low and moderate conductivities.



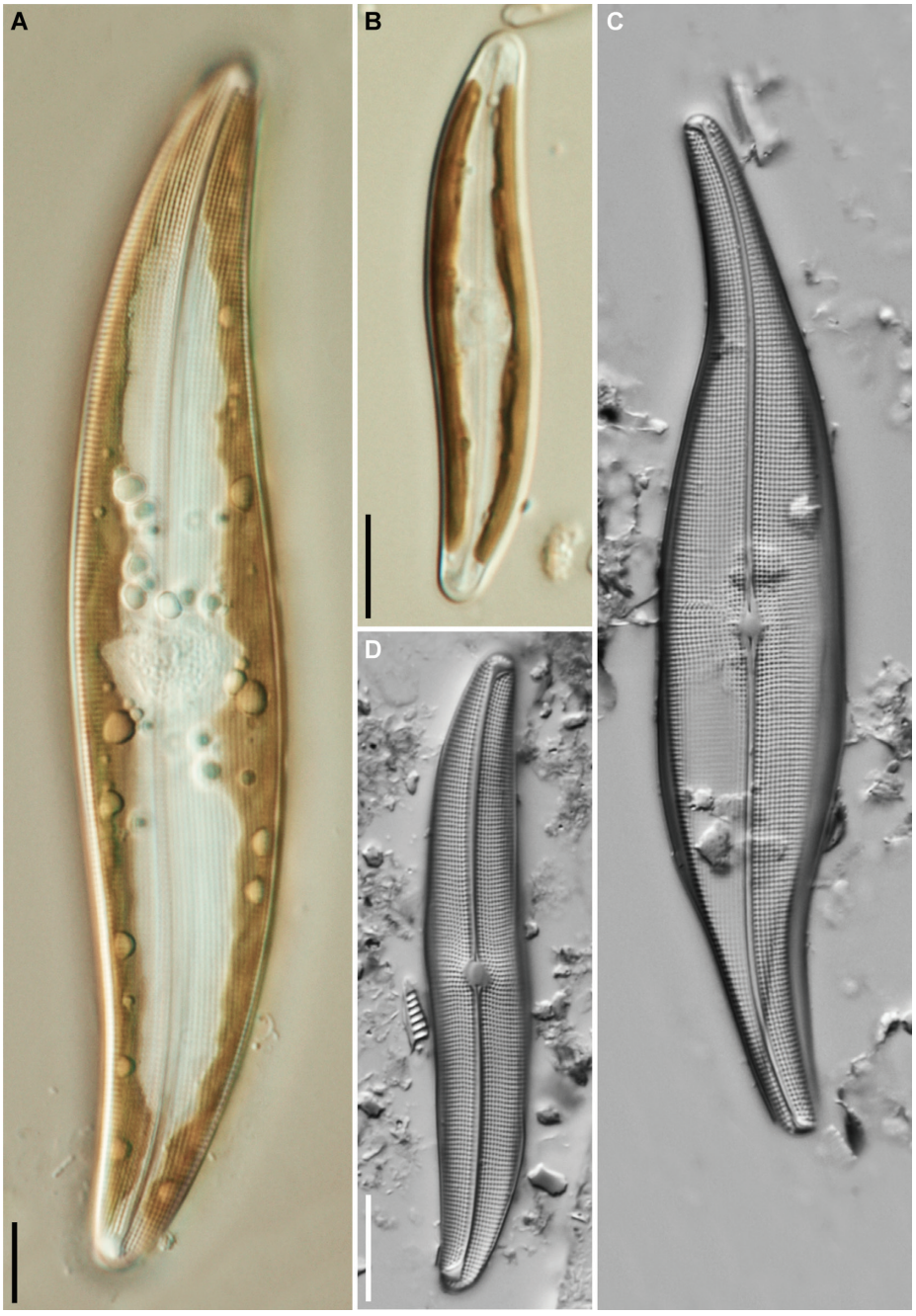


Fig. 150. *Gyrosigma* spp. **A-D.** LM. **A**. Living cell of *G. rautenbachiae* Cholnoky, note many lipd bodies. **B.** Living cell of *G. scalproides* (Rabenhorst) Cleve. **C.** Cleaned valve of *G. parkeri* (Harrison) Boyer. **D.** Cleaned valve of *G. scalproides*. Scale bars = 10 µm (A-D).

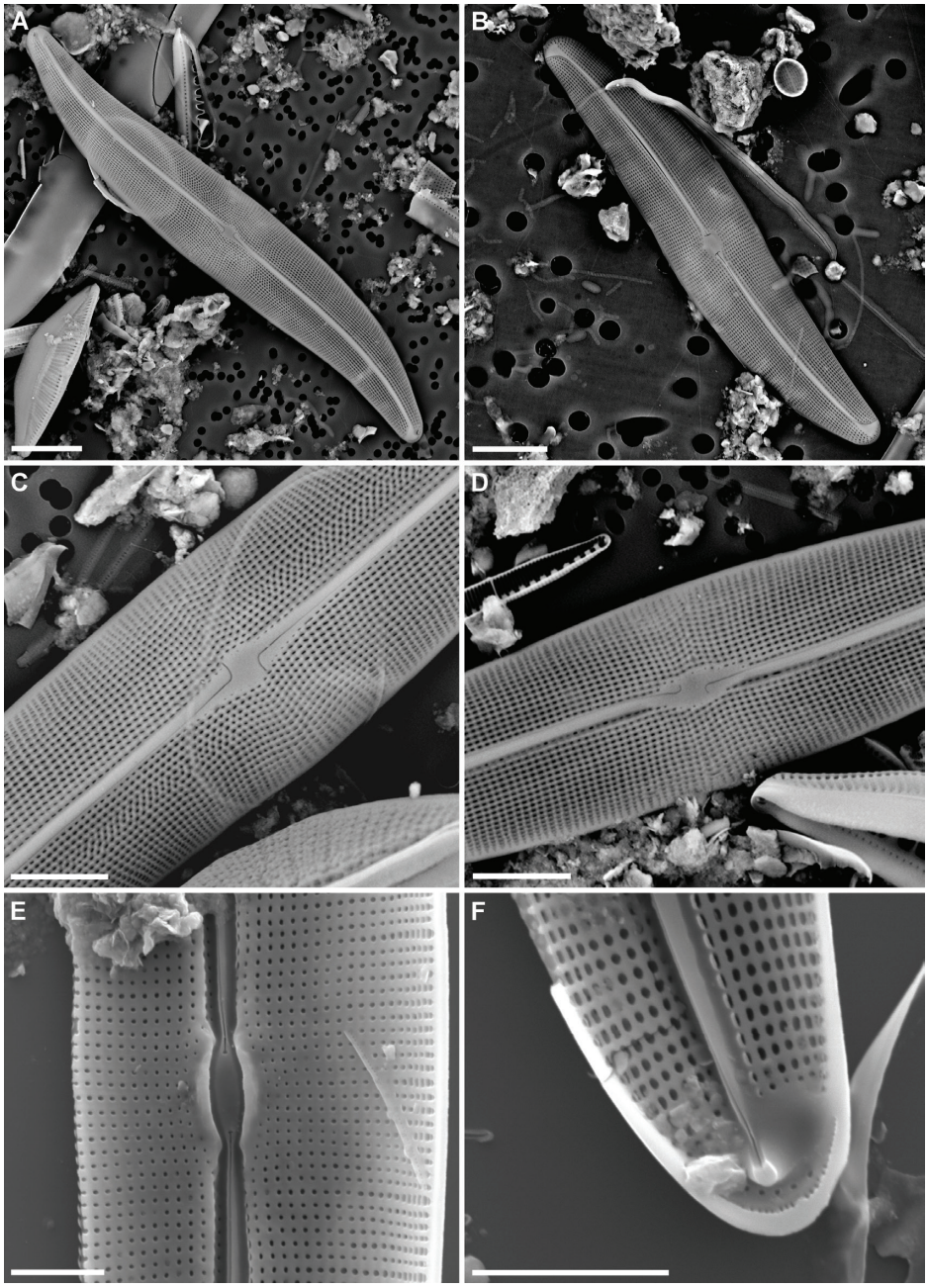


Fig. 151. *Gyrosigma* spp. **A-F.** SEM. **A-D.** External view of valves. **B.** *G. scalproides.* **C-D.** Detail of central raphe endings. **E-F.** Internal view of valves. **E.** *G. rautenbauchiae*, detail of internal central raphe endings. **F.** Detail of internal terminal raphe ending and helictoglossa.
Scale bars = 10 µm (A-B), 5 µm (C-F).

Pleurosigma W. Smith 1852

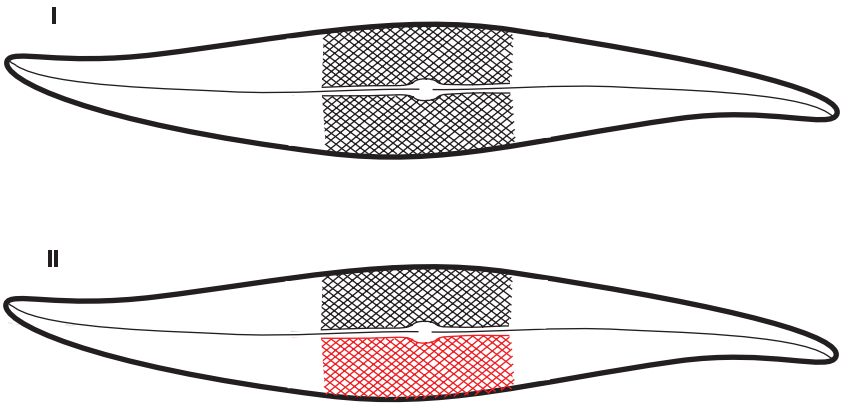
Type species: *Pleurosigma angulatum* (E.J. Quekett) W. Smith

Characteristics – Cells **biraphid**, **sigmoid**, large to very large with acutely rounded apices. Striae fine, transapical and longitudinal striae run diagonal to each other (II). Raphe sigmoid and simple (Fig. 152). Central area small, axial area very narrow.

Plastid structure – Two plate-like plastids, sometimes with lobed margins, lying along each side of the girdle (Fig. 152: 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 central area and the relative angle of the diagonal striae.

Ecology – Cells solitary, free living and motile. Found in the benthos of alkaline mesotrophic to eutrophic waters in moderate to high conductivities.



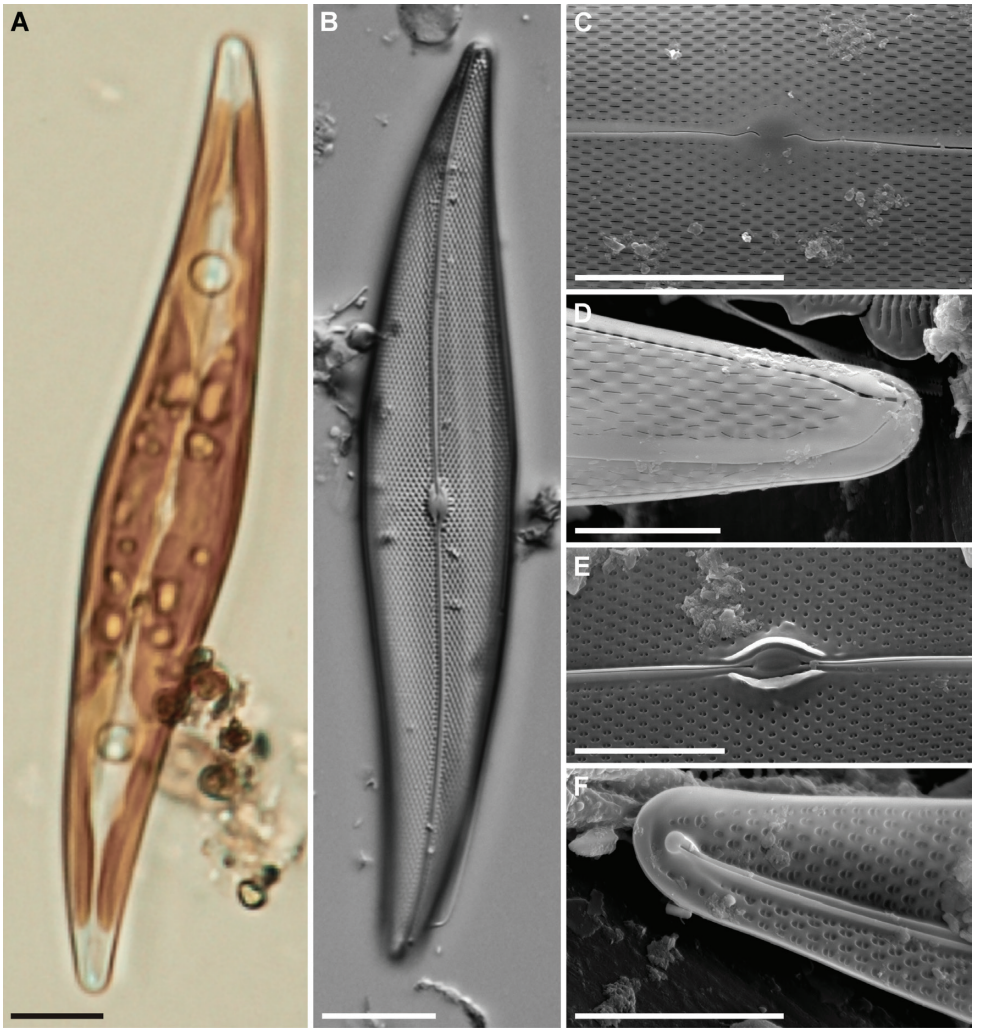


Fig. 152. *Pleurosigma salinarum* Grunow. **A-B.** LM. **A**. Living cell. **B.** Cleaned valve**. C-F.** SEM. **C-D.** External view of valve, detail of central raphe endings (**C**) and apex (**D**). **E-F.** Internal view of valve, detail of central raphe endings (**E**) and terminal raphe ending with helictoglossa (**F**).
Scale bars = 10 µm (A-B), 5 µm (C-F).

Craticula Grunow 1868

Type species: *Craticula perrotettii* Grunow

Characteristics – Cells **biraphid**, lanceolate with rostrate, capitate or broadly rounded apices. Striae parallel through the length of the valve. Areolae regularly arranged, very small and difficult to observe under LM (Fig. 154: A, B, D) but forming longitudinal striae (II). Cells of different species vary dramatically in size. Under certain conditions the cell forms a craticula (Fig. 1543: C), internal silica thickenings composed of a central rib and transverse ribs.

Plastid structure – Cells with one or two plastids on either side of the nucleus on each side of the girdle (clearly visible in large cells). Typically several small lipid droplets occur in the cytoplasm linking the plastids with one large droplet near to each pole (Fig. 153: C).

Identification of species – Species in this genus are distinguished based on cell size and shape as well as longitudinal and transverse striae density. The structure and shape of the central area can also be a useful characteristic.

Ecology – Cells solitary and motile. Found in the benthos of oligotrophic acidic water and extending into alkaline waters with high conductivity as well as very hard waters. Craticulae are formed when cells are exposed to high osmotic pressure.