Typification of *Surirella striatula* Turpin, the *typus generis* of the genus *Surirella* (*Surirellaceae, Bacillariophyceae*)

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In 1827, Pierre Jean François Turpin (1775–1840) described in volume 51 of the *Dictionnaire des sciences naturelles* the genus *Surirella* based on the sole species *Surirella striatula* Turpin (1827a: 408) he observed in material sent to him by Dr Suriray ("J'ai cru devoir en former un genre nouveau et le dédier à mon estimable compatriote le docteur Suriray, comme un foible témoignage de ma sincère amitié" [I felt it necessary to create a new genus and dedicate it to my esteemed compatriot, Doctor Suriray, as a humble token of my sincere friendship]). Turpin (1827b) also added an illustration (here reproduced as Fig. 1) showing several frustules together with other algal species he observed in the sample. The sample itself had been collected in 1826 from a brackish habitat near the coast of Le Havre (Normandy, France) ("Au mois d'août de l'année 1826" [In the month August of the year 1826]). According to Turpin (1827a: 409), the valves have an average length of 100 µm. In 1828, Turpin published a second contribution on *S. striatula*, repeating most of the information he already provided in 1827, except that he added an alar canal density of 15 per 10 µm.

Although the species was very quickly transferred several times to other genera such as *Navicula striatula* (Turpin) Ehrenberg (1832: 81), both Kützing (1844: 62) and Smith (1853: 32) kept the species in the genus *Surirella*. In 1871, Pfitzer modified the name in *Suriraya striatula* (Turpin) Pfitzer (1871: 112) stating that the genus name was incorrectly written as *Surirella*. Turpin (1827a, b, 1828) never used the orthography "*Suriraya*", and validly described the genus *Surirella*, even if he named the genus after Dr Suriray who gave him the material ("J'en ai formé un genre nouveau, dédié au docteur Suriray, auquel nous sommes redevables de cette découverte, et de plusieurs observations dont il a déjà enrichi la science." [I made of it a new genus, dedicated to doctor Suriray to whom we are indebted for this discovery, and for several observations with which he has already enriched science]). In any event, the strictures that apply to honorific epithets (ICN Art. 60.8, Turland & al. 2025) do not apply to generic nouns (Art. 20.1, 60.1).

Surirella striatula quickly became a widely reported marine diatom species. According to AlgaeBase (Guiry & Guiry 2025), the species is observed on every continent with the sole exception of Antarctica, although it is unclear if all such records truly represent *S. striatula*. For instance, the two valves illustrated from Chile in Rumrich & al. (2000: pl. 188: figs 1, 2) and identified as *S. striatula*, show a more acute foot pole, different from the original Turpin drawing that shows a broadly rounded foot pole. The five *S. striatula* valves illustrated in Ruck & Kociolek (2004, pl. 50) present a very broad morphological variability in valve outline, valve width, and shape of the axial area, making it highly unlikely that they all represent the same taxon. Van Meel (1954, pl. LXI [61]: fig. 12) reported this taxon from Lake Tanganyika, East Africa. However, the drawing he provided was reproduced from Hustedt (1930: pl. 445: fig. 869) and therefore does not represent the valve(s) observed in this East African lake. Moreover, *S. striatula* has never been reported from this lake by other investigators. Even in reported European populations, the species also seems to show the same broad variability. Hendey (1964: pl. XL [40], figs 2, 3) shows two

valves that clearly have a different valve outline and a different valve structure, despite both being identified as *S. striatula*.

All these records led to a currently very broad morphological concept of *Surirella striatula*. As *Surirella striatula* has never been properly typified in the past, the name cannot be unambiguously applied to most of these occurrences. Typifying the species would be the first step for a better understanding of this apparently widespread species. Unfortunately, Turpin's material and slides cannot be found at **PC** (Germinal Rouhan & Line Le Gall, pers. comm.). Stafleu & Cowan (1986) state that the herbarium and types of Turpin should either be in **P**/**PC** (Muséum national d'Histoire naturelle, Paris, France). De Wolf & Sterrenburg prepared in 2003 an updated, but unfortunately unpublished, list of all diatom collections worldwide listing the whereabouts of all diatom gatherings in these collections (see de Wolf & Sterrenburg 1991). Although the list* was never published in full nor verified later for being 100% accurate, it is a highly appreciated and trustworthy document for diatom collections. According to this list, de Wolf & Sterrenburg contacted in 2000 the then curator, Bruno de Reviers, who provided a list of all diatom materials present in **P**/**PC**. Unfortunately, neither in **P**/**PC**, nor in any other diatom collections in the world, any material or slides from Turpin have been conserved. This leaves the drawings Turpin made in 1828 as the only available material for typification. Ruck & Kociolek (2004: 31) erroneously considered material from Falaise (Normandy, France) as type material despite the figure legend of Turpin's drawing clearly stating that the species was living in brackish water near Le Havre ("Habit. Eaux saumâtres, environs du Havre, 1826). Le Havre is a city on the Normandy coast, while Falaise is located further inland at about 40 km from the sea. Given the lack of original Turpin material (unmounted or slide), a search was necessary to find a morphologically similar population as close to the type locality as possible to represent our current understanding of *S. striatula*.

In the Van Heurck diatom collection, part of **BR** (Meise Botanic Garden, Belgium), two samples have been conserved collected by de Brébisson at the coastal village of Dives, not far from Le Havre on the other side of the Seine River mouth. One of the samples contains a lot of valves that closely resemble Turpin's drawing of *Surirella striatula*. Another sample, collected by de Brébisson near Falaise, proved to contain a different *Surirella* species, *S. cuneata* (O.N.Witt) A.W.F.Schmidt (Van de Vijver, pers. obs). The William Smith collection, also partly conserved in **BR**, contained several samples, collected near Newhaven, East Sussex on the south coast of England, with small populations of a *Surirella* species also showing a high similarity with the Turpin drawings.

Given that Turpin's original materials are lacking, the species has not been typified, the current very broad morphological concept and the confusion about the original material in literature, we propose to designate here one of the drawings in Turpin (1828) as lectotype and proposed one of the populations from Dives collected by de Brébisson as epitype in accordance with Art. 9.9 (Turland & al. 2025).

Surirella striatula Turpin (Figs 1–22)

Original publication: *Surirella striatula* Turpin 1828: *Mémoires du Musée d'Histoire Naturelle* 16, p. 363, pl. 15: figs 2-10

Lectotype (designated here): valve drawn by Turpin on plate 3 in Turpin (1827) *Dictionnaire des sciences naturelles, Planches, Deuxième partie, règne organisé. Botanique*, reproduced here as Fig. 1.

Epitype (designated here for the above lectotype of *Surirella striatula* Turpin**)**: slide **BR**-4923, (**BR**, Meise Botanic Garden, Belgium); Brébisson sample from Dives, Normandy, France; representative epitype specimens are shown in Figs 2–22.

* An unpublished pdf available of their listings is available on request from B. Van de Vijver.

Registration: http://phycobank.org/106055

Description: Valves ovate, heteropolar with broadly rounded headpole and a rounded to cuneate footpole. Slight apical torsion often present near footpole. Valve dimensions (n=25): length 123–166 µm, width 76.5–106 µm, length/width ration: 1.4–1.6 (1.7). Widest part located almost mid-valve in larger valves, more towards headpole in smaller valves. Valve face slightly undulated, perpendicular to apical area, 8–10 alar canals in 10 µm mid-valve, becoming denser (up to 12 in 10 µm) towards apices. Transapical undulations (corrugations) in most valves extending from valve margin to almost valve middle leaving a narrow, slightly zig-zagging axial area due to the alternating undulations on both sides of the axial area (Figs 5, 11), parallel mid-valve becoming radiate near the footpole and strongly radiate near the headpole. Striae discernible in LM, present on top of transapical valve undulations (Fig. 6), reaching valve centre (16)17–18 in 10 µm near valve margin, parallel mid valve becoming radiate near the apices. Striae biseriate, composed of apically elongated slit-like areolae (Figs 6–9), irregularly placed along stria (Fig. 18). Near apices and axial area, striae uniseriate (Figs 9, 13). Internally poroid openings round with slightly raised rim (Figs 12–16). Occasionally, round poroids with slightly raised rim more or less aligned, present in depressions of transapical valve undulation (Figs 6, 9) together with numerous silica granules scattered on valve face, aligned with striae (Figs 7, 8) and visible in LM as punction on the valve face. Granules composed of spherical top part connected to valve by tentacle-like supports (Figs 8, 21). Internally silica granules with tentacle-like supports opening by a small round poroid with slightly raised rim (Figs 19, 20, 22). Raphe canal smooth, occasionally isolated poroids present (Figs 8, 17). Externally raphe canal interrupted near both apices. Terminal raphe fissures straight on headpole, slightly enlarged near footpole. Internally raphe continuous on headpole (Fig. 13). Alar canals much broader than depressions (Figs 5, 6, 11). Canaliculi visible in external view (Fig. 6), sometimes accentuated by weak silica ridges (Fig. 17). Internally broad alar canals subdivided in 2–5 canaliculi (Figs 11, 14, 19). Valve mantle with uni- to biseriate striae at level of alar canals (Fig.10), smooth at levels of depressions of transapical valve undulations. Mantle part towards the edge lacking perforation but showing weak transapically elongated elevations, aligned on two rows parallel to valve mantle edge, ca 10 in 10 µm (Fig. 10). Observation of girdle bands not made.

A major difference between the epitype material from Dives and the original drawing given by Turpin (1827, pl. 3) is that the alar canals are not divided into canaliculi near the vale margin in Turpin's drawings. It is possible that Turpin made his observation on untreated material, obscuring small features such as the canaliculi. The apparent difference in the number of alar canals (8-10 per 10 µm versus 15 per 10 µm) is not existing. If the valves depicted in Turpin's drawings have a length of 100 µm, as he stated, there are 15 alar canals per 10 µm near the axial area. This corresponds to the number of alar canals per 10 µm near the axial area in the epitype material because the alar canals widen towards the valve margin, resulting in a smaller number of them being present in 10 µm. What is different, however, is that the alar canals near the valve margin in the epitype material are much wider than the spaces between them, whereas in Turpin's drawings the alar canals are of the same width even narrower than the spaces between them.

Line Le Gall and Germinal Rouhan (Muséum national d'Histoire naturelle, Paris, France) are thanked for verifying the whereabouts of the Turpin material in **P/PC**. Wolf-Henning Kusber and David M. Williams are thanked for their constructive remarks that greatly improved this manuscript.

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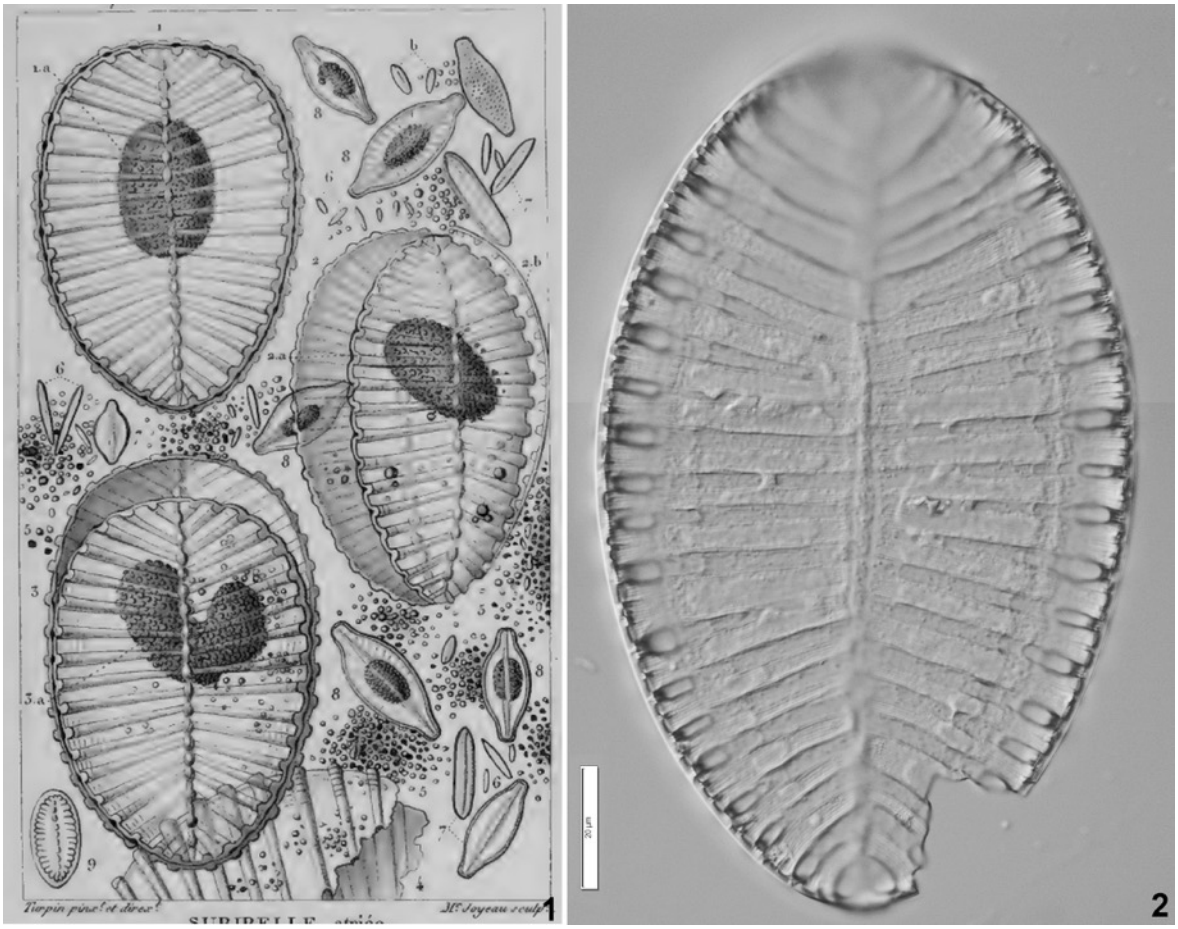
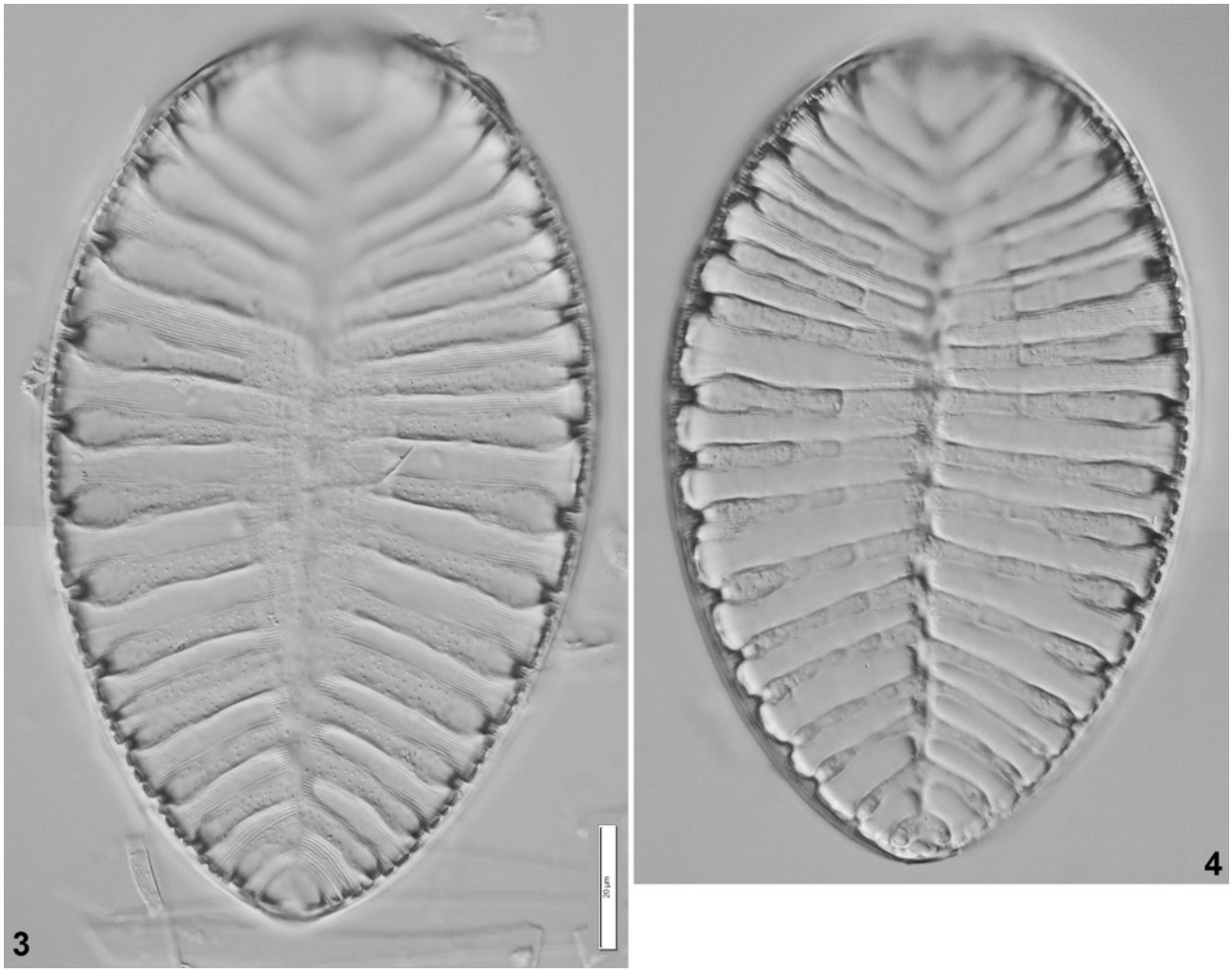
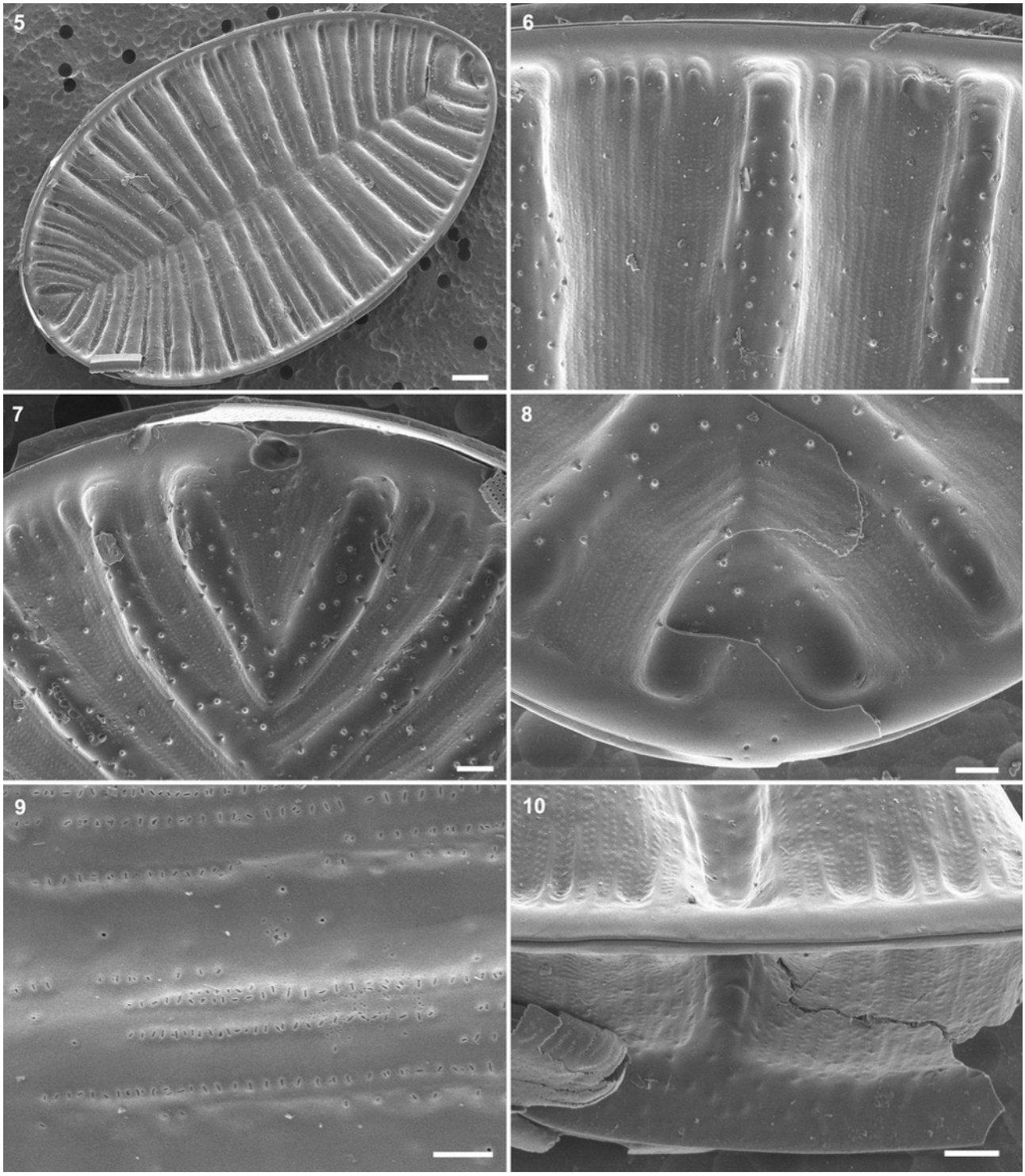


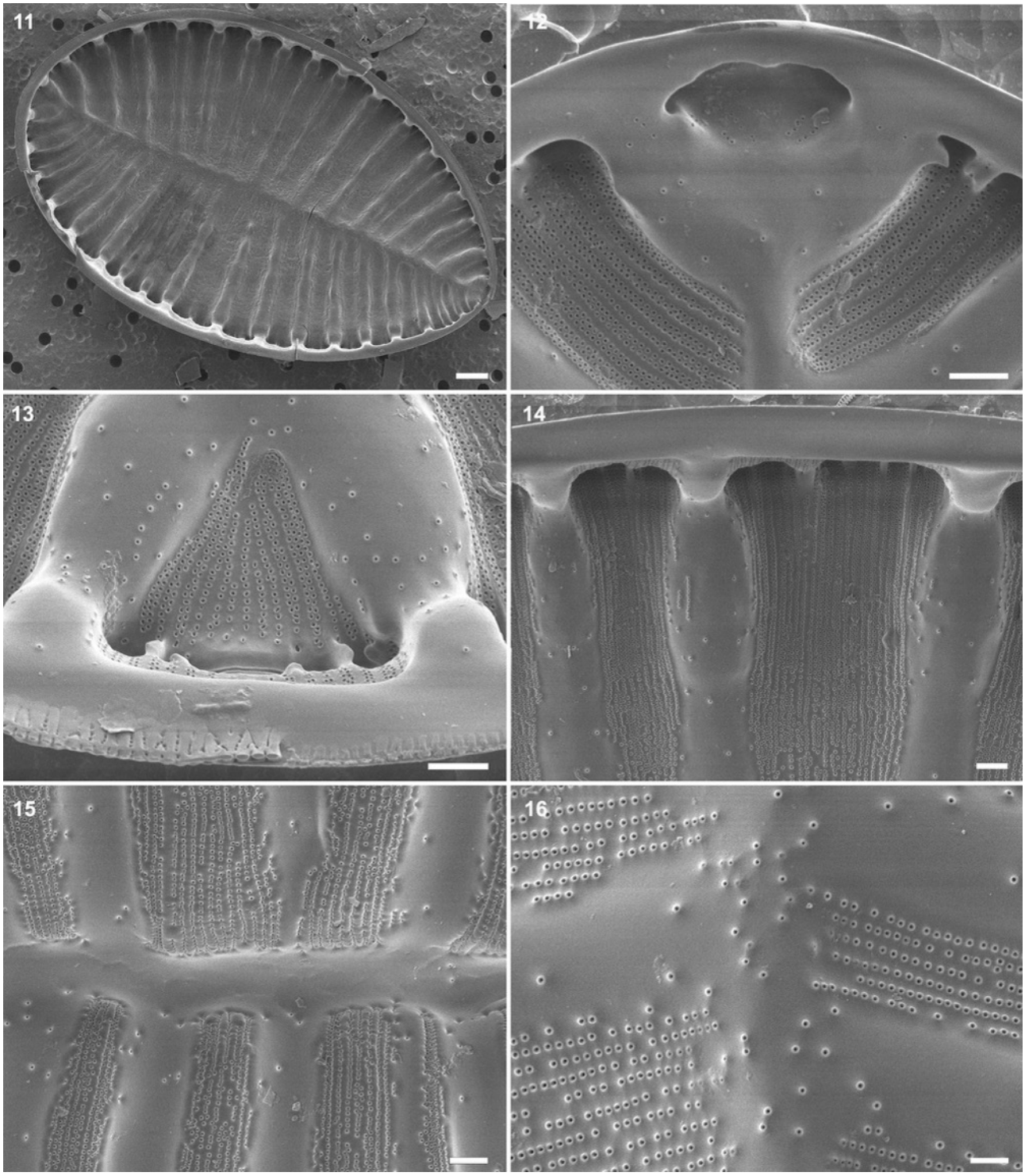
Figs 1, 2. *Surirella striatula* Turpin. **Fig. 1**. Original drawing of *Surirella striatula* (Turpin 1827, plate 3), here designated as lectotype. **Fig. 2**. LM picture taken from the epitype slide (**BR**-4923, Dives, Normandy, France) of one (slightly broken) valve. Scale bar = 20 µm.



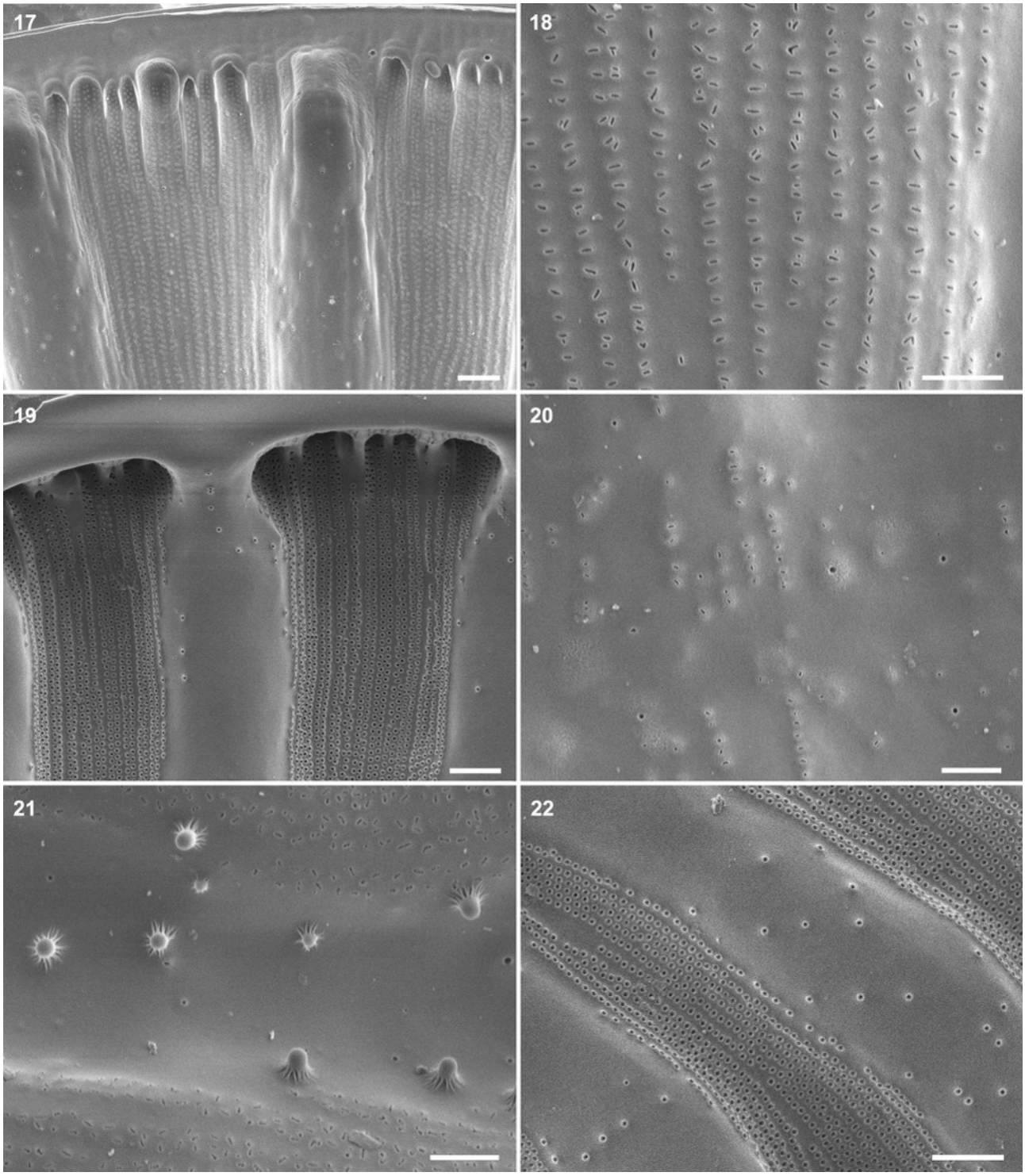
Figs 3, 4. *Surirella striatula* Turpin. LM pictures taken from the epitype slide (**BR**-4923, Dives, Normandy, France). Scale bar = 20 µm.



Figs 5–10. *Surirella striatula* Turpin. SEM pictures taken from the epitype material (**BR**-4923, Dives, Normandy, France). **Fig. 5.** SEM external view of entire valve. **Fig. 6.** SEM external detail of an alar canal with visible canaliculi and silica granules in the depression of the transapical valve undulations. **Fig. 7.** SEM external detail of the headpole. **Fig. 8.** SEM external detail of the footpole with slightly enlarged terminal raphe fissures. **Fig. 9.** SEM external detail of the uniseriate striae near the axial area. Note the isolated poroids on the depression of the transapical valve undulations. **Fig. 10.** SEM external detail of the valve mantle showing striae at the level of the alar canals and weak transapical elongated elevations aligned on two rows parallel to the valve mantle edge. Scale bar Fig. 5 = 10 µm, Figs 6–8, 10 = 2 µm, Fig. 9 = 1 µm.



Figs 11–16. *Surirella striatula* Turpin SEM pictures taken from the epitype material (**BR**-4923, Dives, Normandy, France). **Fig. 11.** SEM internal view of an entire valve. **Fig. 12.** SEM internal detail of the footpole. **Fig. 13.** SEM internal detail of the headpole showing a continuous raphe. **Fig. 14.** SEM internal detail of an alar canal with canaliculi. **Figs 15–16.** SEM internal details of the axial area with uniseriate striae. Note the irregularly scattered poroids. Scale bar Fig. 11 = 10 µm, Figs 12–15 = 2 µm, Fig. 16 = 1 µm.



Figs 17–22. *Surirella striatula* Turpin. SEM pictures taken from the epitype material (**BR**-4923, Dives, Normandy, France). **Fig. 17.** Detail of an external alar canal view with weak silica ridges at the level of the canaliculi. **Fig. 18.** SEM external view of the striae with the apically elongated irregularly placed, poroids. **Fig. 19.** SEM internal detail of the biseriate striae and irregularly placed poroids on the internal depressions of the transapical valve undulations. **Fig. 20.** SEM internal valve face view of some small, slightly raised poroids. **Fig. 21.** SEM external valve face view showing silica granules composed of a spherical top part connected to the valve by tentacle-like supports. **Fig. 22.** SEM internal valve face view showing the openings, connected to the external silica granules with tentacle-like supports. Scale bars 17, 22 = 2 µm, 18–21 = 1 µm.