

## Transfer of *Diploneis andina* Frenguelli to the genus *Muelleria* (Naviculaceae, Bacillariophyceae)

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Frenguelli (1924: 257) created the subgenus *Muelleria* (“*dedicado a O. Müller*”) within *Navicula* Bory to accommodate a few taxa previously included in *Navicula* together with others formerly referred to *Diploneis* Ehrenberg ex Cleve. He recognized as diagnostic features the presence of narrow siliceous ribs running parallel to the raphe and proximal raphe endings bent in the same direction (Frenguelli 1924). In a later publication (Frenguelli 1935), he treated *Muelleria* as a genus but without a valid citation of the place of publication of the subgenus; however, Frenguelli’s (1945: 172) treatment as a genus is valid as he cited Frenguelli’s (1924) effectively published subgeneric description (see Spaulding & Stoermer 1997). A type was not designated for either the subgenus *Muelleria* or the genus *Muelleria* and a lectotype—*Muelleria linearis* (O.Müller) Frenguelli—was subsequently designated by Round & al. (1990: 695).

Species of *Muelleria* have a symmetrical valve outline about apical and transapical planes; valve shape variable from linear to linear-elliptical, centrally constricted, or centrally expanded; apices rounded, slightly rostrate or capitate; two longitudinal canals located one in each side of the raphe, continuous or discontinuous at the central area; raphe straight, with external proximal endings hooked and extending unilaterally (Spaulding & al. 1999), internally terminating in a raised silica thickening or rectelevatum (Van de Vijver & al. 2010). The genus is generally found in wet or damp terrestrial habitats, such as wet soils, moss vegetations and moist rocks (Spaulding & al. 1999), generally in small numbers (Van de Vijver & al. 2010), and currently includes 44 taxa (Guiry & Guiry 2024). Although many of the species comprised in the genus have a distribution restricted to southern South America and the Antarctic region (Van de Vijver & al. 2010, Kochman-Kędziora & al. 2017), several taxa have also been described from North America and Europe (Levkov & al. 2019 and included references).

Frenguelli (1942) described *Diploneis andina* Frenguelli (1942: 100) from a sample of epiphytes on algae, collected in a little meltwater stream in the Neuquén province (northwestern Patagonia, Argentina). Oxidised material and six permanent slides are stored as “Series 375” in the “Joaquín Frenguelli Diatom Collection”, housed at herbarium LPC (División Ficología, Facultad de Ciencias Naturales y Museo, Universidad Nacional de La Plata, La Plata, Argentina). The relative abundance of this species was originally reported as “rare” in the type locality and has not been reported since. The slides were here examined with LM (Leica DM 2500 equipped with DIC optics) and six specimens were found and photographed with a Leica DFC 425 digital camera. The location in the slides of the specimens found was referenced with a S7 England Finder slide (Graticules Pyser-SGI Ltd.).

Although it has proved impossible to find *Diploneis andina* valves under SEM, several features, characteristic for the genus *Muelleria* are evident on the LM observations, including the unilaterally hooked central raphe endings and the presence of longitudinal ribs (representing the internal canals) bordering the raphe, supporting the transfer of *D. andina* to the genus *Muelleria*. Since Frenguelli (1942) did not formally designate a holotype for his new species, but he illustrated two specimens



associated to Series 375, indicating the type from one gathering, one of the slides as lectotype, for the species in accordance with ICN Art. 9.3 and Art. 9.11 (Shenzhen Code, Turland & *al.* 2018).

***Muelleria andina*** (Frenguelli) J.M.Guerrero, Vouilloud & Serino, *comb. nov.* (Figs 1–13)

Basionym: *Diploneis andina* Frenguelli, 1942, *Revista Museo de La Plata* (n. s.), (Sección Botánica No. 20): 100, pl. 3: figs 10–11 (as “*Diploneis andina* sp. nov.”).

**Lectotype (here designated)** Slide 375(2) of Frenguelli Diatom Collection at LPC. Figs 2 and 3 (Finder: U/40-1) represent the lectotype.

Registration (new combination): <http://phycobank.org/104841>

Registration (lectotypification): <http://phycobank.org/104842>

Type locality: Argentina, Neuquén province, small stream fed by meltwater, in the proximity of the Copahué volcano caldera, 1800 m a.s.l. (37° 51' 16.3" S, 71° 7' 38.2" W). Collected by J. Frenguelli on February 5, 1932.

Description: Valves lanceolate with triundulate margins (undulations being less pronounced in some specimens) and protracted to rostrate apices, broadly rounded at the poles. Valve dimensions (n=6): length 31.0–38.5 µm, width 11.0–12.5 µm. Axial area moderately broad, widening to the centre, forming an elliptical central area. Raphe filiform, straight. Central raphe endings unilaterally hooked. Rectelevatum discernible between central endings. Terminal raphe fissures bifurcate. Longitudinal canals (visible as longitudinal lines) positioned on either side of the axial area. Striae evenly spaced to slightly more distantly spaced near the central area, radial at mid-valve, becoming parallel towards the poles, 16–18 in 10 µm, formed by coarse, transapically elongated areolae.

Note: Compared to our measurements, Frenguelli (1942) reported in his original description higher valve dimensions (length 39–45 µm and width 15 µm) and a lower stria density (13 in 10 µm). These discrepancies in morphometrics are usual when re-examining Frenguelli's original materials (see Vouilloud & *al.* 2022 and references therein).

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Frenguelli, J. (1924). Resultados de la Primera Expedición a Tierra del Fuego (1921) - Diatomeas de Tierra del Fuego. *Anales de la Sociedad Científica Argentina* 97: 231–266; 98: 5–63.

Frenguelli, J. (1935). Análisis diatomológicos de trípolis chilenos. *Revista Chilena de Historia Natural* 39: 147–152.

Frenguelli, J. (1942). XVII Contribución al conocimiento de las diatomeas argentinas. Diatomeas del Neuquén (Patagonia). *Revista del Museo de La Plata Nueva Serie 5 (Botánica 20)*: 73–219.

Frenguelli, J. (1945). XIX contribución al conocimiento de las diatomeas argentinas. Las diatomeas del Platense. *Revista del Museo de La Plata Nueva Serie 3 (Sección Paleontología 16)*: 77–221.

Guiry, M.D. & Guiry, G.M. (2024). AlgaeBase. World-wide electronic publication, National University of Ireland, Galway. <https://www.algaebase.org>; searched on 8 August 2024.

Kochman-Kędziora, N., Noga, T., Van de Vijver, B. & Stanek-Tarkowska, J. (2017). A new *Muelleria* species (Bacillariophyta) from the Maritime Antarctic Region. *Fottea* 17: 264–268.

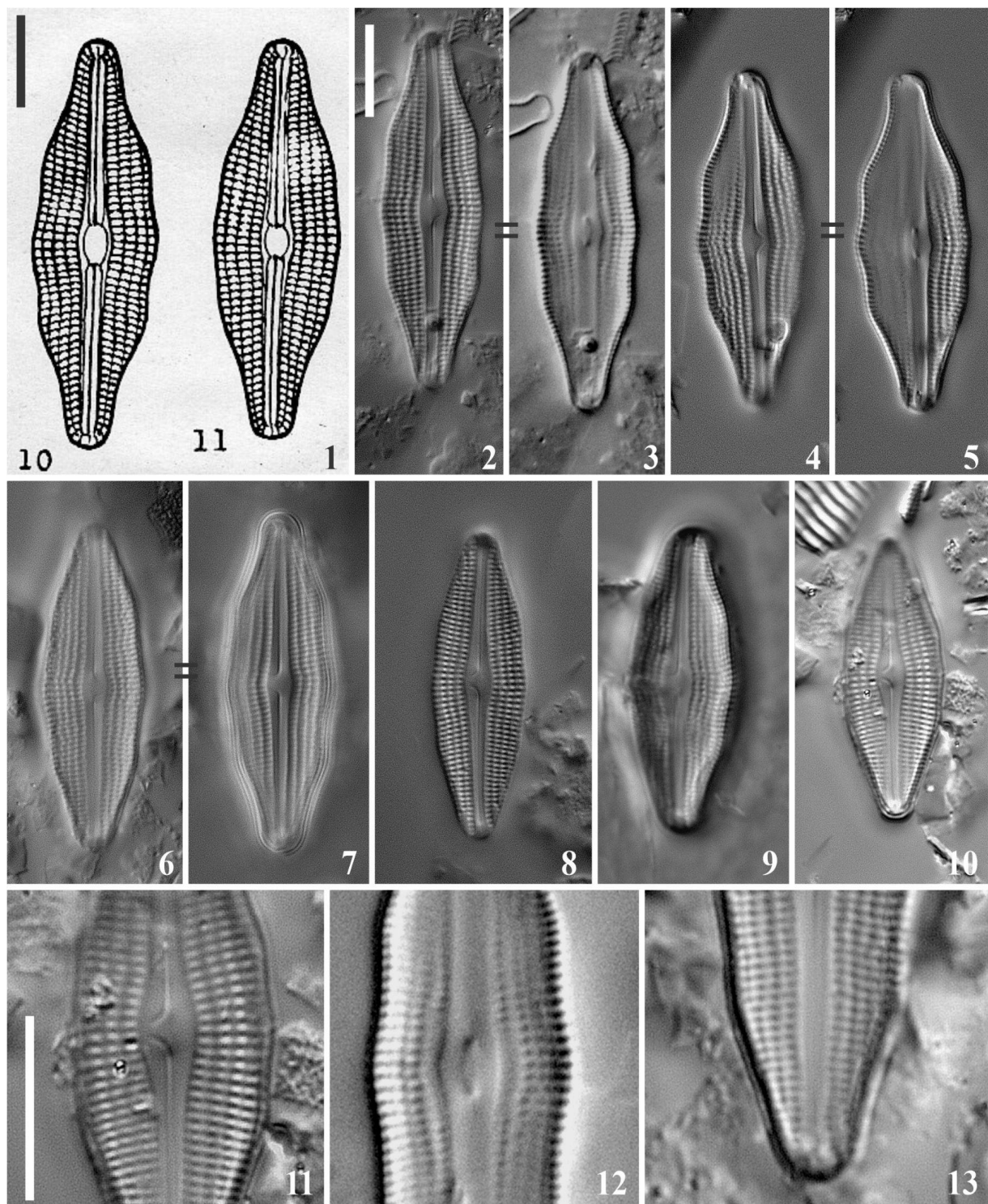
Levkov, Z., Vidaković, D., Cvetkoska, A., Mitić-Kopanjan, D., Krstić, S., Van de Vijver, B. & Hamilton, P.B. (2019). Observations of the genus *Muelleria* (Bacillariophyceae) from the Republic of North Macedonia. *Plant Ecology and Evolution* 152: 293–312.

Round, F.E., Crawford, R.M. & Mann, D.G. (1990). *The diatoms. Biology and morphology of the genera*. pp. [i–ix], 1–747. Cambridge: Cambridge University Press. Spaulding, S.A. & Stoermer, F.R. (1997). Taxonomy and distribution of the genus *Muelleria* Frenguelli. *Diatom Research* 12: 95–113.



- Spaulding, S.A., Kociolek, J.P. & Wong, D. (1999). A taxonomic and systematic revision of the genus *Muelleria* (Bacillariophyta). *Phycologia* 38: 314–341.
- Turland, N.J., Wiersema, J.H., Barrie, F.R., Greuter, W., Hawksworth, D.L., Herendeen, P.S., Knapp, S., Kusber, W.-H., Li, D.-Z., Marhold, K., May, T.W., McNeill, J., Monro, A.M., Prado, J., Price, M.J. & Smith, G.F., editors (2018). *International Code of Nomenclature for algae, fungi, and plants (Shenzhen Code)* adopted by the Nineteenth International Botanical Congress Shenzhen, China, July 2017. *Regnum Vegetabile*, Vol. 159. pp. [i]–xxxviii, 1–253. Glashütten: Koeltz Botanical Books.
- Van de Vijver, B., Mataloni, G., Stanish, L. & Spaulding, S.A. (2010). New and interesting species of the genus *Muelleria* (Bacillariophyta) from the Antarctic region and South Africa. *Phycologia* 49: 22–41.
- Vouilloud, A.A., Guerrero, J.M. & Morales, E.A. (2022). Revision of type material of *Fragilaria pinnata* var. *subcapitata* Frenguelli (Bacillariophyceae). Typification and taxonomic status. *Phytotaxa* 566: 133–139.





**Fig. 1.** Reproduction of the original illustrations of *Diploneis andina* (Frenguelli 1942, pl. 3: figs 10–11), **Figs 2–13.** LM-DIC specimens of *Muelleria andina* (Frenguelli) Guerrero, Vouilloud & Serino, *comb. nov.* from the original material. **Fig. 11.** Detail of the central area showing deflected proximal raphe endings. **Fig. 12.** Detail of the central area showing the rectelevatum and longitudinal canals on either side of the axial area. **Fig. 13.** Detail of the rostrate apex. Note the bifurcate distal raphe ending. Figs 2–3: slide 375(2), Finder: U/40-1. Figs 4–5: slide 375(3), Finder K/29-1-2. Figs 6–7: slide 375(4), Finder: U/33-2. Fig. 8: slide 375(3), Finder G/30-3. Fig. 9: slide 375(6), Finder: W/32. Fig. 10: slide 375(5), Finder: E/32-4. Scale bar = 10  $\mu$ m.