Nupela biconfusa (VanLandingham) *comb. nov.* (Bacillariophyta) based on the type material of *Achnanthes tenuissima* Hustedt

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The diatom genus *Nupela* Vyverman & Compère (1991: 175, figs 1-10) includes over 81 species names (as well as two infraspecific names) of which 80 have been flagged as accepted taxonomically (Guiry & Guiry 2018). The genus shares morphological similarities with the naviculoid families *Brachysiraceae* D.G.Mann and *Diadesmidaceae* D.G.Mann (Falasco *et al.* 2015), and recent entries on the Genbank® suggests indeed that the species would belong to the family *Brachysiraceae*, based on *rbc*L and 18S ribosomal genes. Many species currently assigned to the genus were transferred from other genera, such as *Achnanthes sensu lato* (due to the 'monoraphid' condition), *Brachysira* Kützing, *Navicula* Bory, *Neidium* Pfitzer and *Stauroneis* Ehrenberg. The generitype, *Nupela giluwensis* Vyverman & Compère (1991: 178, figs 1-10), was originally collected and described from shallow mountain lakes (tarns) on the Mount Giluwe (Papua New Guinea), characterized by a peaty bottom, low conductivity and moderately low pH (Vyverman & Compère 1991).

Achnanthes tenuissima Hustedt (1937: 196, pl. 13: figs 26, 27) was described in his comprehensive taxonomic account of diatoms from tropical Asia (Java, Bali and Sumatra) as an aerophilic species gathered from several freshwater sources and brooks of Java, observed in the pH range 6.8-8.1 with maximum development at pH 7.5-7.8. However, the name was a later homonym [*Achnanthes tenuissima* Pantocsek (1902: 641, pl. 13, fig. 77)] and thus, illegitimate. VanLandingham introduced a replacement name for the Hustedt taxon: *Achnanhtes biconfusa* VanLandingham (1967: 10, 67).

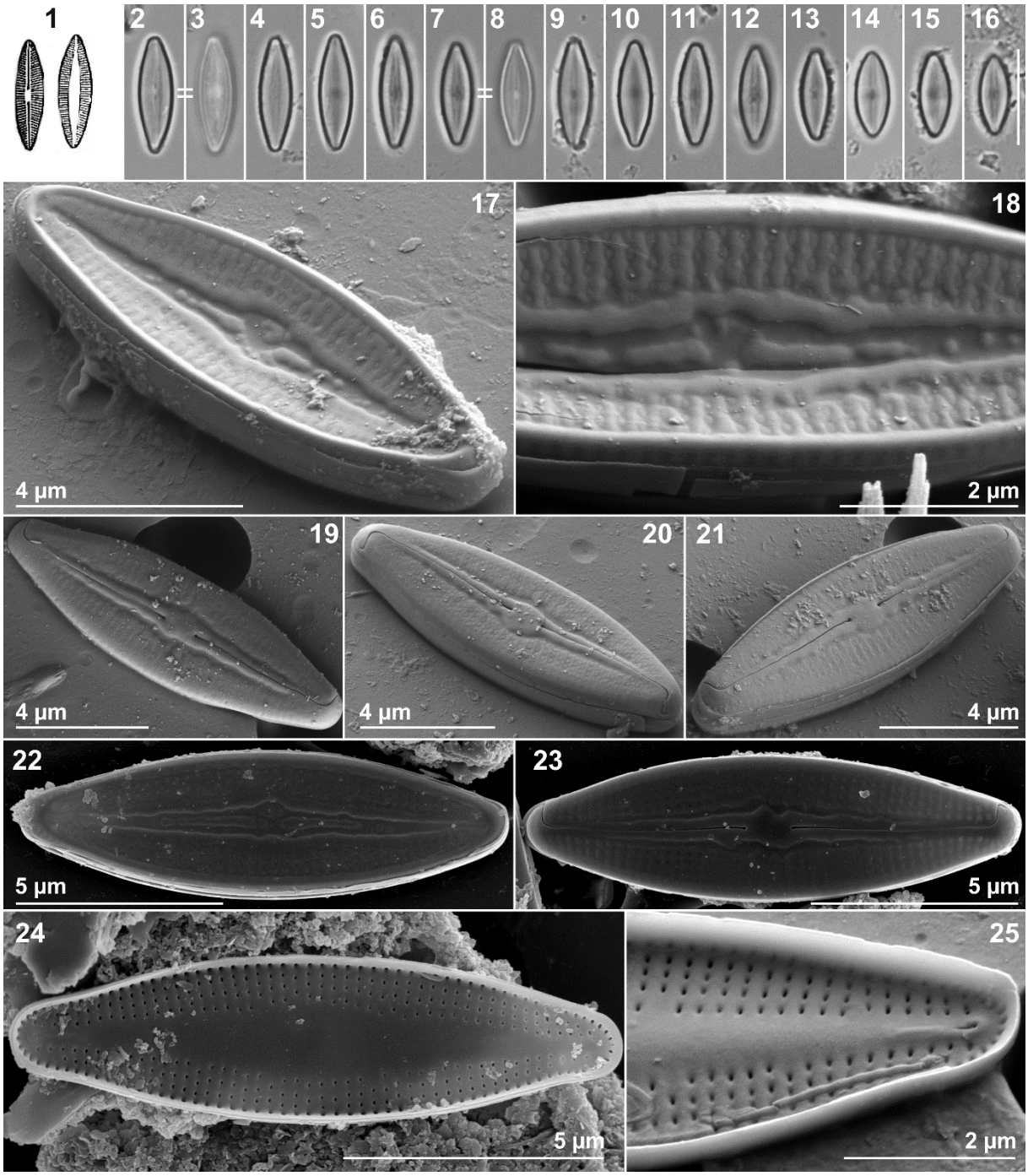
Ultrastructural information on this species has not been reported in the literature (Gaul *et al.* 1993, Henderson & Reimer 2003) although it was well illustrated and lectotypified by Simonsen (1987: 211-212, pl. 325, figs 41-49). Here we detail under light (LM) and scanning electron microscopy (SEM) the original gathering of this species described by F. Hustedt using his original material deposited at the Hustedt Collection (**BRM)** at Alfred Wegener Institute, Bremerhaven Germany, as follows.

Light microscopy images (Figs 2-16) shows lanceolate valves, rather irregular in shape with sub-rostrate apices that agrees with images from the lectotype defined by Simonsen (1987: 211-212, pl. 325: figs 41-49). The "monoraphid" condition was previously emphasized by Hustedt (here reproduced as Fig. 1) although some rapheless valves can present rough depressions that could be misleading: e.g. SEM Fig. 22 will probably be seen as a raphe valve in LM, such as the case of Figs 7-8, where the same frustule can show 'raphid' conditions for both valves. This is clear in rapheless valves with axial area widely lanceolate, externally ornamented by several irregular depressions and a longitudinal one that resembles a raphe in LM (Figs 17, 18, 22). The ultrastructural analysis (Figs 17-25) reveals the presence of striae composed by few areolae on both valves with outer openings of areolae slightly transapically elongated and occluded by delicate hymenate layer. Inner openings of areolae are small, round to oval.

Based on the observations of the material the following combination is here proposed:

***Nupela biconfusa* (VanLandingham) C.E.Wetzel & Ector, *comb. nov.* (Figs 1-25)**
Basionym: *Achnanthes biconfusa* VanLandingham 1967, *Catalogue of the fossil and recent genera and species of diatoms and their synonyms. Part I.* Acanthoceras *through* Bacillaria, p. 10, 67.

Replaced synonym: *Achnanthes tenuissima* Hustedt 1937, p. 196; pl. 13, figs 26, 27, *nom. illeg.*, *non Achnanthes tenuissima* Pantocsek 1902, p. 641, pl. 13, fig. 77.



Figs 1-25. *Nupela biconfusa* (VanLandingham) C.E.Wetzel & Ector, *comb. nov.* Fig. 1: Reproduction of *Achnanthes tenuissima* Hustedt 1937, figs 26, 27. LM and SEM images from sample AS619 (**BRM**!), Java, Indonesia. Figs 2-16: LM showing the monoraphid condition (Figs 2-3, 7-8). Scale bar = 10 µm. Figs 17-23: external SEM showing rapheless (Figs 17, 18, 22) and raphe valves (Figs 19-21, 23) morphologies. Fig. 24. Internal view of rapheless valve showing rounded

areolae occluded externally. Fig. 25. Valve extremity showing partially occluded raphe fissure in internal view.

Lectotype: INDONESIA. Sumatra. Slide Ma2/89, Sample AS619 (**BRM!**). "*Bach Ajer Upi, Sumatra, Ranaumeer, RB1h, Tuffwand*", 29.1.1929, leg. Ruttner.

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