

**Typification of *Brachysira aponina* Kützing (*Brachysiraceae*, *Bacillariophyta*)**

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The diatom genus name *Brachysira* Kützing was introduced by Kützing in December 1836 as n° 153 (Decade XVI) in his exsiccata series '*Algarum aquae dulcis germanicarum*'. The genus description was very brief "(Nov. genus *Diatomacear.*) *Frons minutissima, constituta e frustulis paralleliter et irregulariter coadunatis. (Scenodesmo affinis sed non Desmidiaceae).*" [(New diatom genus) Very small thallus, composed of parallel and irregularly connected frustules. (Related to *Scenodesmus* but not Desmidiaceae)]. The material for sample 153 contained *Brachysira aponina* Kützing, described as "*frustulis rectis oblongis obtusis*" [with straight, oblong, obtuse frustules]. The species was found in a cyanobacterial mat of *Merizomyria aponina* in a hot spring of 30 °C near Abano Terme, a small town in the Province of Padua (Veneto region, northern Italy). In 1844, Kützing abandoned the concept of a separate genus and transferred the species to the genus *Navicula* as *Navicula aponina*. De Toni (1890: 971) placed the species in the monotypic section *Brachysira* of the genus *Libellus*, described by Cleve [1873 as *Libellus aponinus* (Kützing) De Toni], referring to the material from Abano.

Round & Mann (1991) reinvestigated Kützing's material and reconstructed the taxonomic history of the genus *Brachysira* in attempt to identify an unknown species from Eilat (Israel). They resurrected the genus *Brachysira*, elaborated the original Kützing description and transferred three former *Navicula* taxa to the genus. Their genus description lacked, however, a good characterization of the cingulum. Round & al. (1990: 540) added some details of the girdle bands describing the particular nature of the valvocopula that forms a kind of long chamber. However, they omitted to designate a lectotype for *Brachysira aponina*.

In the present contribution, we detail observations on specimens of *Brachysira aponina* from a slide prepared from Kützing's (1836) Decade XVI, sample 153 at **BR**, using light and scanning electron microscopy. Special attention is given to the description of the girdle bands. We here designate this sample 153 as lectotype for this name in accordance with ICN Art. 9.3 and 9.4 (Turland & al. 2018).

Brachysira aponina Kützing (Figs 1–26)

Publication details: *Brachysira aponina* Kützing (1836), *Algarum aquae dulcis germanicarum* Decade XVI, n° 153.

Lectotype (here designated): slide BR-4634, prepared from Kützing sample Decade XVI, n° 153, material present in the Van Heurck collection (**BR**).

Description: Frustules in girdle view rectangular with rounded edges (Fig. 1). Valves lanceolate with weakly convex margins and non-protracted, acutely rounded apices. Clearly raised marginal ridge entirely surrounding the valve face, separating the gently sloping shallow mantle (Figs 20, 21). Ridge gradually disappearing towards the apices. Valve dimensions (n=25): length 15–45 µm, width 4–6 µm. Axial area narrow, linear, gradually widening towards the central area. Central area small, apically elliptical, formed by widened axial area, raised. Raphe filiform, straight bordered by two longitudinal ridges, running from apex to central area. Central raphe endings simple to weakly inflated, straight. Terminal raphe fissures absent, endings covered by triangular silica flap extending from the apices (Fig. 22). Striae uniseriate, composed of always 2 transapically elongated areolae (Figs 20, 21), separated from the mantle areolae by the



longitudinal ridges. Areolae internally covered by a continuous hymen. Internal central raphe endings deflected. Girdle composed of several open copulae. Valvocopula quite distinct from the other copulae, showing a narrow but shallow, not penetrating groove running along its entire course (Fig. 24). Both parts of the valvocopula regularly connected by small siliceous bridges (Figs 25, 26, arrows). Advalvar part of the valvocopula showing a continuous series of large, window-like chambers (Fig. 25). One row of very small, rounded areolae present on the abvalvar part (Figs 25, 26).

Etymology: *aponinus*, -a, -um, Latin adj. A, pertaining to warm baths; from *Aponus*, a warm medical fountain at Abano. Derived from the Greek ἄπονος (pain-curing).

The type population of *Brachysira aponina* was found in an inland hot spring in northern Italy together with *Pinnularia kuetzingii* Krammer and *Halamphora* sp. *Brachysira aponina* is commonly found in very brackish to marine conditions, often as epiphyte on seagrass communities (Frankovich & al. 2006). It is a single marine representative of a genus that is known to prefer oligotrophic, acid to alkaline conditions, usually indicating high water quality (Lange-Bertalot & Moser 1994).

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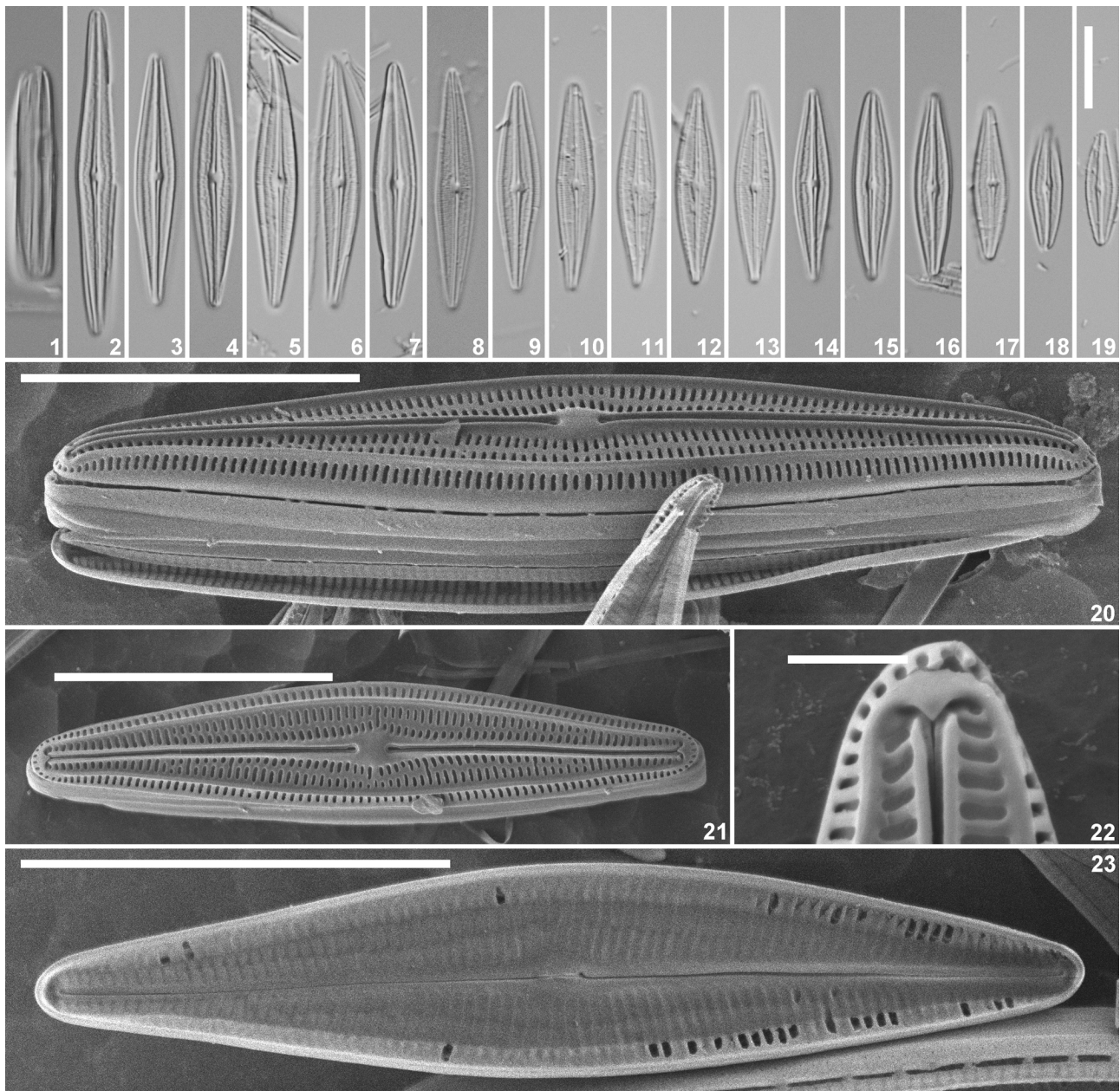
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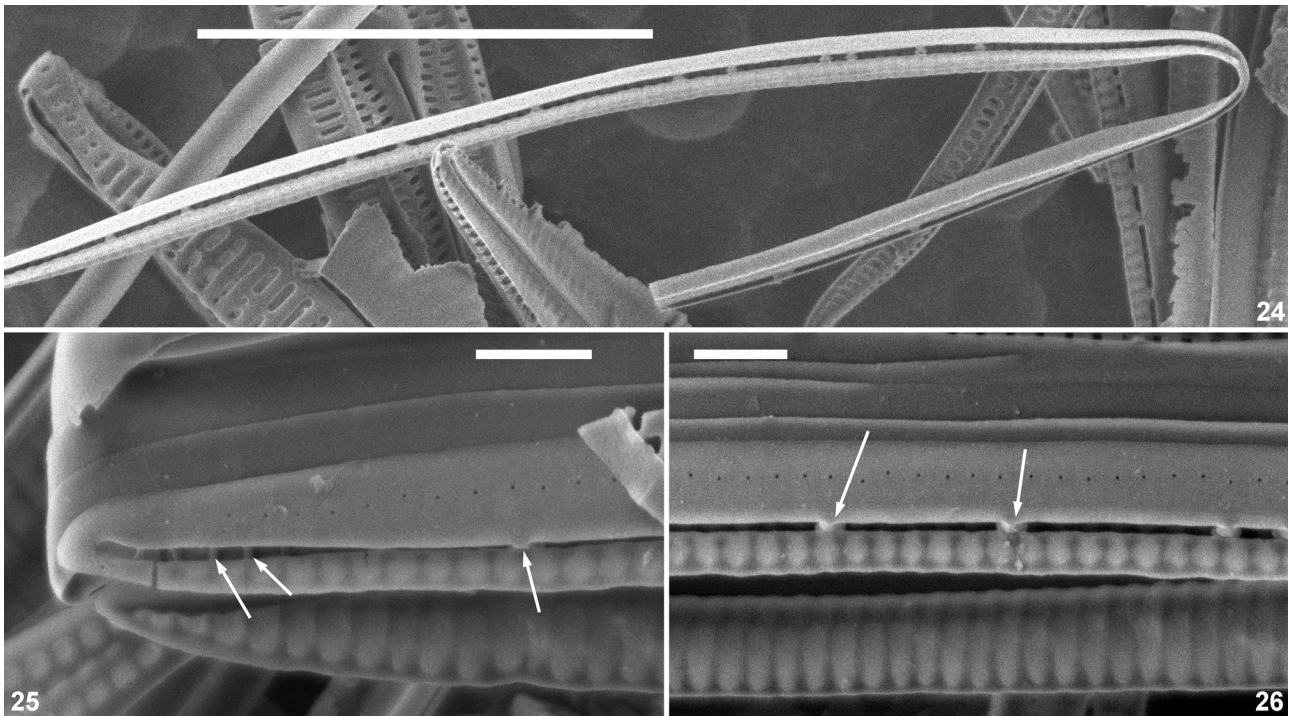
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Figs 1–23. *Brachysira aponina* Kützing. Original material from Kützing Decas XVI, sample 153. **Figs 1–19.** Cell diminution series cycle of *B. aponina* Kützing showing the lectotype material (Kützing Decas XVI, sample 153). **Fig. 1** shows a frustule in girdle view. **Fig. 20.** SEM external view of an entire frustule showing the open girdle bands, the typical marginal ridge and the ornamentation of valve face and mantle. **Fig. 21.** SEM external view of an entire valve showing the raphe, the raised central area and the striae. **Fig. 22.** SEM external detail of the valve apex with the triangular silica flap covering the terminal raphe ending. **Fig. 23.** SEM internal view of an entire valve with the deflected central raphe endings and the hyenes covering the areolae. Scale bars = 10 μm , except for Fig. 22 where scale bar = 1 μm .



Figs 24–26. *Brachysira aponina* Kützing. Original material from Kützing Decas XVI, sample 153. **Fig. 24.** SEM view showing part of (a broken) valvocopula with the longitudinal groove. **Fig. 25.** SEM external view of the tip of the valvocopula showing the groove, the advalvar part with the window-like openings and the silica bridges connecting the parts across the groove (arrows). **Fig. 26.** SEM external detail of the valvocopula with the silica bridges (arrows). Scale bars = 10 μm (Fig. 24) and 1 μm (Figs 25 & 26).