Taxonomic and nomenclatural notes on two desmid species from Brazil (*Desmidiaceae, Zygnematophyceae*)

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Some desmid names proposed in Förster (1964, 1981), Scott & al. (1965) and Grönblad & Croasdale (1971) were not validly published, and we here propose the validation of two of these relevant to the desmid flora of Brazil.

"Euastrum foersteri" was originally proposed by Scott & Croasdale (in Scott & al. 1965: 32, figs 69-70) including "*Euastrum arciferum* var. *longispinum* Kurt Förster & Eckert" (in Förster 1964: 349, pl. 6: fig. 5; pl. 40: fig. 20). However, both names were not validly published. "*Euastrum foersteri*" was not based on a single gathering (ICN Art. 40.2, Shenzhen Code, Turland & al. 2018), but on two collections: a lake at the mouth of Igarapé Mentaí (sample Nr. 10) and Igarapé Curi, a lake-shaped mouth (sample Nr. 16). Despite Grönblad & Croasdale (1971: 40) designating fig. 70 of Scott & al. (1965) as the holotype, this species remains invalid because the designated fig. 70 is based on sample Nr. 10 and according to Scott & al. (1965), the authors added this sample (collected on November 12, 1952) to sample Nr. 11 (collected on November 14, 1952), and thus it does not correspond to the required single gathering. Furthermore, a full and direct reference that should be given to its author and place of valid publication, with page or plate reference and date was not clearly indicated (ICN Art. 41.5, Shenzhen Code, Turland & al. 2018). We here validate "*Euastrum foersteri*" and support the comments of Scott & al. (1965) that the species strongly differs from *E. arciferum* O.Borge as described by Borge (1918: 59, pl. 5: fig. 2). We here provide a description and the type designation based on the species studied by Scott & Croasdale (in Scott & al. 1965) and Förster (1964). Moreover, we linked here all taxa and their published illustrations that represent this species and its distribution for Brazil.

Euastrum foersteri A.M.Scott & Croasdale ex C.B.Araújo & C.E.M.Bicudo*, sp. nov.*

Replaced designation: "*Euastrum Foersteri* A,M.Scott & Croasdale" in Scott, Grönblad & Croasdale *Acta Botanica Fennica*, 69: 32, figs 69, 70, 1965, *nom. inval.*

Description: Cell as long as wide; semicell subquadrangular, 4-lobed, apical margin with deep median incision, rounded apical angles, one long, pointed spine; lateral margins concave, subquadrangular, basal angles with short, divergent, bifurcate spines; each semicell with a large truncate central papilla; median constriction deep, median sinus open, acute-angled; cell wall smooth; chloroplast axial. Cells 25-30 µm long (with spines), 19-21 µm (without spines), 20-26 µm wide (with spines), 16.5-21 µm (without spines), 4-4.5 µm isthmus width, 13-14 µm wide at apex (without spines).

Holotype: Förster (1964: pl. 6: fig. 5 [top specimen, two views of the same specimen], as "*Euastrum arciferum* var. *longispinum* Förster"; ICN Art. 40.5, Turland & al. 2018), here reproduced as Fig. 1.

Type locality: Rio da Femmeas, state of Tocantins, Brazil.

PhycoBank Registration: 103604

Etymology: Named in honour of the eminent desmidologist Kurt Förster (1918–1983), who originally described the material.

Occurrence in Brazil: Rio da Femmeas, Tocantins state (Förster 1964, Goiás state; as "*Euastrum*

arciferum var. *longispinum* Kurt Förster", *nom. inval.*); Arapiuns river – Lake Curi and Lake Mentaí (Scott & al. 1965, as "*Euastrum foersteri* Scott & Croasdale", *nom. inval.*), Lake Jurucuí (Förster 1969, "*Euastrum foersteri* Scott & Croasdale", *nom. inval.*), Pará state; Nhamundá Region, Amazonas state (Thomasson 1977, just citation).

The name "*Pleurotaenium tridentulum* var. *tenuissimum*" introduced by Grönblad & Croasdale (in Scott & al. 1965: 30, pl. 2: figs 33-34) and a new combination "*Pleurotaenium tenuissimum* Förster" (Förster 1981: 246) were not validly published since they were also not based on a single gathering (ICN Art. 40.2, Shenzhen Code, Turland & al. 2018), and a type locality was not designated from the two localities listed in Scott *& al*. (1965): "Rio Arapiuns", above the "Ponta Icuxi" (Nr. 20, a tributary of the Tapajós River, Pará state, Brazil) and the mouth of "Rio Uaupés" (Nr. 21, a tributary of the Rio Negro basin, state of Amazonas, Brazil). Although Grönblad & Croasdale (1971: 40) designated fig. 34 of Scott *& al.* (1965) as the holotype, the designation "*Pleurotaenium tridentulum* var. *tenuissimum*" remains invalid as a full and direct reference the place of valid publication, with page or plate reference and date were not given (ICN Art. 41.5, Shenzhen Code, Turland *& al.* 2018). Furthermore, the shape of "*Pleurotaenium tridentulum* var. *tenuissimum*" deviates considerably from the shape of *P. tridentulum* species (Förster 1981). Furthemore, *Pleurotaenium tridentulum* (Wolle) West is now considered a heterotypic later synonym of *Pleurotaenium sceptrum* (Roy) West & G.S.West (e.g. Prescott & al. 1975; Araújo & al. 2022). Thus, we here validate "*Pleurotaenium tenuissimum*" by providing it with a formal description and a type based on the material studied by Grönblad & Croasdale (in Scott & al. 1965) and Kurt Förster (in Förster 1969, 1974, 1981). Also, we link here all taxa and their published illustrations that represents this species and its distribution in Brazil.

Pleurotaenium tenuissimum Kurt Förster ex C.B.Araújo & C.E.M.Bicudo*, sp. nov.*

Replaced designation: "*Pleurotaenium tenuissimum* Kurt Förster", *Algological Studies/Archiv für Hydrobiologie, Supplement Volumes* 28: 246, 1981, *nom. inval.*

Description: Cells longer than wide; semicell cylindrical, apex subquadrangular with 4 more or less conical rounded warts squarely arranged; lateral margins parallel, abruptly attenuated to the apex; median constriction shallow; median sinus poorly developed; no central swelling; cell wall hyaline; chloroplast axial; 4-8 pyrenoids by semicell. Cells 238-255 µm long, 6.5-8 µm wide, 2.5-3 µm wide at apex.

Holotype: Scott & al. (1965: pl. 30: fig. 34, as "*Pleurotaenium tridentulum* var. *tenuissimum*"; ICN Art. 40.5, Turland *& al.* 2018), here reproduced as Fig. 4 (fig. 33, left).

Type locality: Arapiuns River, a tributary of the Tapajós River, State of Pará, Brazil.

PhycoBank Registration: 103602

Etymology: From Latin *tenuis*, *-e* (adj.), thin, fine, slender (narrow); superlative *tenuissimus,- a, -um,* (very slender).

Occurrence in Brazil: This species is reported from the Amazon region as *Pleurotaenium tridentulum* var. *tenuissimum* Grönblad & Croasdale", *nom. inval.*; Amazonas state (Scott & al. 1965; Förster 1969, 1974; Uherkovich & Rai 1979, just citation); Pará state (Scott & al. 1965), as "*Pleurotaenium tenuissimum* Kurt Förster", *nom. inval.* (Förster 1981).

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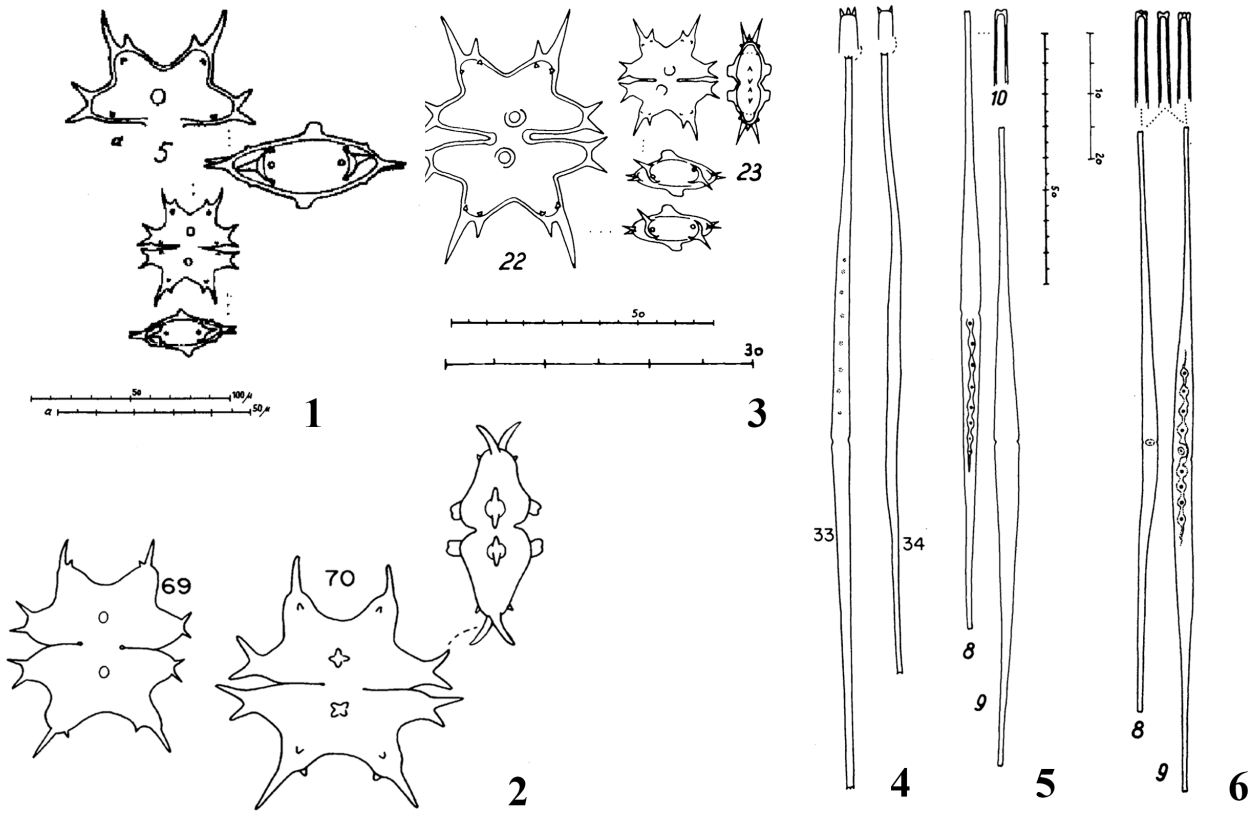
Araújo, C.B., Furtado, M.F.M., Melo, S., Takiyama, L.R., Cantuária, P.C., Bicudo, C.E.M. (2022). Some interesting desmids (Desmidiaceae, Zygnematophyceae): first records, taxonomic notes, and distribution for the Amazon Brazilian flora. *Check List* 18(6): 1337–1346, 13 figs.

Borge, O. (1918). Die von Dr. A. Löfgren in São Paulo gesammelten Süsswasseralgen. *Arkiv för*

Botanik 15(13): 1–108.
Förster, K. (1964). Desmidiaceen aus Brasilien, 2: Bahia, Goyaz, Piauhy und Nord-Brasilien. *Hydrobiologia* 23: 321–505.
Förster, K. (1969). Amazonische Desmidieen, 1: Areal Santarém. *Amazoniana* 2(1/2): 5–116.
Förster, K. (1974). Amazonische Desmidieen, 2: Areal Maués - Abacaxis. *Amazoniana* 5: 135–242.
Förster, K. (1981). Revision und Validierung von Desmidiaceen-Namen aus früheren Publikationen, 2. *Algological Studies* 28: 236–251.
Grönblad, R. & Croasdale, H. (1971). Desmids from Namibia (SW Africa). *Acta Botanica Fennica* 93: 1–40.
Prescott, G.W., Croasdale, H.T. & Vinyard, W.C. (1975). *A synopsis of North American desmids. Part II. Desmidiaceae: Placodermae. Sect. 1*. pp. 1-275, 57 pls. Lincoln: University of Nebraska Press.
Scott, A.M., Grönblad, R. & Croasdale, H. (1965). Desmids from the Amazon Basin, Brasil. *Acta Botanica Fennica* 69: 3–93.
Thomasson, K. (1977). Two conspicuous desmids from Amazonas. *Botaniska Notiser* 130: 41–51.
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:
Uherkovich, G. & Rai, H. (1979) Algen aus den Rio Negro und seinen Nebenflüssen. *Amazoniana* 6(4): 611–638.



Figs. 1-6. Nomenclatural types of desmid names proposed herein. **Fig. 1.** Holotype (top two views) of *Euastrum foersteri sp. nov.*: original illustration of "*Euastrum arciferum* var. *longispinum* Kurt Förster & Eckert" (in Förster 1964: p. 349, pl. 6: fig. 5). **Fig. 2.** *Euastrum foersteri sp. nov.*:

as originally illustrated by Scott & Croasdale (in Scott & al. 1965: p. 32, pl. 4, figs 69-70 as "*Euastrum foersteri*"). **Fig. 3.** *Euastrum foersteri sp. nov*.: as originally illustrated by Förster (1969: 33, pl. 9: figs 22, 23. Scale bar: fig. 22: 30µm; fig. 23: 50 µm, as "*Euastrum foersteri*"). **Fig. 4.** *Pleurotaenium tenuissimum sp. nov.*: holotype (left "33"), the original illustration of "*Pleurotaenium tridentulum* var. *tenuissimum*" published by Grönblad & Croasdale (in Scott & al. 1965: 30, pl. 2: figs 33, 34). **Fig. 5.** *Pleurotaenium tenuissimum sp. nov.*: holotype originally illustrated by Förster (1969: 28, pl. 6: figs 8-10. Scale bar: figs 8-9: 50 µm; fig. 10: 30 µm) as "*Pleurotaenium tridentulum* var. *tenuissimum*". **Fig. 6.** *Pleurotaenium tenuissimum* sp. nov.: material originally illustrated by Förster (1974: 153, pl. 4: figs 8, 9) as "*Pleurotaenium tridentulum* var. *tenuissimum*".