



Taxonomic and nomenclatural notes on desmids II. Intraspecific taxa of *Euastrum neosinuosum* O.V.Anissimova & Guiry (*Zygnematophyceae*, *Desmidiaceae*)

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Euastrum sinuosum Lenormand ex W.Archer (in Prichard, 1861: 729), an illegitimate name, was replaced by *Euastrum neosinuosum* O.V.Anissimova & Guiry (Anissimova & Guiry 2021: 2). From about 1889, many varieties and forms of *E. sinuosum* were published. To date, we have found 33 such infraspecific taxa that have been repeatedly discussed in the literature (e.g., Růžicka, 1981), many of which are quite different morphologically from the nominal taxon and either deserve taxonomic recognition under the new name or should be reassigned to other species. We analyzed protologues and illustrations, and based on this, we propose the following nomenclatural and taxonomic changes.

Euastrum neosinuosum O.V.Anissimova & Guiry (2021: 2) var. *neosinuosum* (Figs 1-5)

Replaced name: *Euastrum sinuosum* Lenormand ex W.Archer in Prichard (1861: 729), *nom. illeg.*

Synonyms: *Euastrum circulare* var. *falaisense* Brébisson, 1856: 122 ('*falaisensis*'). *Euastrum sinuosum* var. *perforatum* Willi Krieger, 1937: 503, pl. 62: fig. 24. *Euastrum sinuosum* f. *polonicum* Raciborski 1889: 103, pl. 5: fig. 9. ('var. *jenneri* f. *polonica*').

Note: While designations such as "*Euastrum sinuosum* var. *jenneri* f. *polonica*" are useful for taxonomists, such polynomials have no nomenclatural status and are here cited using the form "[var. *jenneri*] f. *polonica*" when cited as basionyms or synonyms.

Euastrum neosinuosum var. *africanum* (Woodhead & Tweed) O.V.Anissimova & Guiry, *comb. nov.* (Fig. 6)

Basionym: *Euastrum sinuosum* var. *africanum* Woodhead & Tweed, *Hydrobiologia* 12: 185, fig. 15, 1958.

Euastrum neosinuosum f. *angustius* (Kurt Förster & Eckert) O.V.Anissimova & Guiry, *comb. nov.* (Figs 7-10)

Basionym: *Euastrum sinuosum* f. *angustius* Kurt Förster & Eckert ('var. *subjenneri* f. *angustior*') in Förster, *Revue Algologique, Nouvelle Série* 7(1): 58, pl. 2: figs 5–6, 1963.

Euastrum neosinuosum var. *biscrobiculatum* (Bourrelly) O.V.Anissimova & Guiry, *comb. nov.* (Figs 11-17)

Basionym: *Euastrum sinuosum* var. *biscrobiculatum* Bourrelly in Bourrelly & Leboime, *Biologisch Jaarboek, Dodonaea* 13: 91, pl. III: figs 37–40, 1946.

Euastrum neosinuosum var. *brasiliense* O.V.Anissimova & Guiry, *comb. nov.* (Fig 18)

Basionym: *Euastrum sinuosum* var. *brasiliense* A.M.Scott & Croasdale in Scott & al., *Acta Botanica Fennica* 69: 35, fig. 47, 1965.

Euastrum didelta var. *capitatum* (A.M.Scott & Prescott) O.V.Anissimova & Guiry, *comb. nov.* (Figs 19–22)

Basionym: *Euastrum sinuosum* var. *capitatum* A.M.Scott & Prescott, *Hydrobiologia* 17: 39, pl. 7: figs 8–9, 1961.

Notes: Scott & Prescott (1961: 39) observe: "Similar in size and shape to *sinuosum* var. *dideltoides* Willi Krieger, but the polar lobe is greatly enlarged, and instead there are only five out of six swellings." Referring to the original description of var. *dideltoides* Willi Krieger, significant similarities can be observed; however, both varieties can hardly be attributed to the species *E. neosinuosum*. The morphological characters described by the authors of the varieties bring them closer to *E. didelta* to a greater extent, the difference is the size. Further taxonomic investigation is clearly required.

Euastrum didelta* var. *dideltoides (Willi Krieger) O.V. Anissimova & Guiry, *comb. nov.* (Figs 23, 24)

Basionym: *Euastrum sinuosum* var. *dideltoides* Willi Krieger 1932: 214, pl. 22: fig. 2.

Note: *E. sinuosum* var. *dideltoides* resembles in outline *E. didelta* Ralfs (1848: 84) but is smaller. Also confusing is the presence of only one "central pore".

Euastrum neosinuosum* f. *elongatum (Grönblad) O.V. Anissimova & Guiry, *comb. nov.* (Figs 25, 26)

Basionym: *Euastrum sinuosum* f. *elongatum* Grönblad, *Acta Societatis pro Fauna et Flora Fennica* 47(4): 32, pl. VI: figs 26, 27, 1920.

Euastrum neosinuosum* var. *germanicum O.V. Anissimova & Guiry, *comb. nov.* (Figs 27-31)

Basionym: *Euastrum sinuosum* [var. *jenneri*] f. *germanicum* Raciborski ('*germanica*'), *Pamiętnik Akademii Umiejętności w Krakowie, Wydział Matematyczno* 17: 103, 1889.

Euastrum neosinuosum* var. *gemmaulosum (Maskell) O.V. Anissimova & Guiry *comb. nov.* (Figs 32-34)

Basionym: *Euastrum sinuosum* var. *gemmaulosum* Maskell, *Transactions and Proceedings of the New Zealand Institute* 21: 10, fig. 5, 1889.

Note: Referred to in the text as "*A. Forma major*, var. *gemmaulosum* var. *nov.*" In this instance, Maskell (1889: 10) is referring to "forms" as a general infraspecific category but clearly describes two varieties (see var. *simplex* under). ***Euastrum neosinuosum* var. *goyazense*** (Kurt Förster) O.V. Anissimova & Guiry *comb. nov.* (Figs 35-37)

Basionym: *Euastrum loefgrenii* var. *goyazense* Kurt Förster & Eckert in Förster, *Hydrobiologia* 359, pl. 8: fig. 1, 1964.

Euastrum neosinuosum* var. *hakalukiense (A.K. Islam & Haroon) O.V. Anissimova & Guiry, *comb. nov.* (Fig 38)

Basionym: *Euastrum sinuosum* var. *hakalukiense* A.K. Islam & Haroon, *Internationale Revue der gesamten Hydrobiologie* 65(4): 568, pl. 6: fig. 88, 1980.

Euastrum neosinuosum* var. *laticeps (Bourrelly) O.V. Anissimova & Guiry, *comb. nov.* (Fig. 39)

Basionym: *Euastrum sinuosum* var. *laticeps* Bourrelly, *Bulletin de l'Institut Fondamental d'Afrique Noire, Série A* 23: 357, pl. 15: figs 4-6, 1961.

Euastrum neosinuosum* var. *novemtuberculatum (Beck) O.V. Anissimova & Guiry *comb. nov.*

Basionym: *Euastrum sinuosum* var. *novemtuberculatum* Beck, *Beihefte zum Botanischen Centralblatt* 47(Abt. II): 272, 1931.

Euastrum neosinuosum* var. *parallelum (Willi Krieger) O.V. Anissimova & Guiry, *comb. nov.* (Fig 40)



Basionym: *Euastrum sinuosum* var. *parallelum* Willi Krieger, *Archiv für Hydrobiologie, Supplement* 11: 215, pl. XXII: fig. 7, 1932.

Euastrum neosinuosum* var. *parvum (Hinode) O.V.Anissimova & Guiry *comb. nov.* (Figs 41-42)

Basionym: *Euastrum sinuosum* var. *parvum* Hinode, *Hikobia* 6(1/2): 109, fig. V: 11, pl. IV: fig. 8, 1971.

Euastrum neosinuosum* var. *scrobiculatum (Lütkenmüller) O.V.Anissimova & Guiry, *comb. nov.* (Fig 43)

Basionym: *Euastrum sinuosum* [var. *falaisense*] *scrobiculatum* Lütkenmüller ('*scrobiculata*'), *Verhandlungen der Kaiserlich-Königlichen Zoologisch-Botanischen Gesellschaft Wien* 15: 74, pl. I: fig. 40, 1900.

Note: "*Euastrum sinuosum* var. *scrobiculatum*" Nordstedt ('*scrobiculata*'), *Lunds Universitets Årsskrift* 9 (Afh. II, 10): 9, is an invalid designation as no description or illustration was provided. The earliest validation of the name is that of Lütkenmüller (1900: 74, pl. I: fig. 40)

Euastrum neosinuosum* f. *africanum (Bourrelly) O.V.Anissimova & Guiry, *comb. nov.* (Figs 44-46)

Basionym: *Euastrum sinuosum* [var. *scrobiculatum*] f. *africanum* Bourrelly ('*africana*'), *Bulletin de l'Institut Fondamental d'Afrique Noire* 23: 335, 357, pl. 15: figs 1-3, 1961.

Euastrum neosinuosum* f. *oculus (A.M.Scott & Prescott) O.V.Anissimova & Guiry, *comb. nov.* (Fig 47)

Basionym: *Euastrum sinuosum* [var. *scrobiculatum*] f. *oculus* A.M.Scott & Prescott ('*oculum*'), *Records of the American-Australian Scientific Expedition to Arnhem Land 3 Botany and Plant Ecology* 3: 38, fig. 3: 5, 1958.

Note: The Latin noun "*oculus*" (an eye) is not declinable.

Euastrum neosinuosum* var. *simplex (Maskell) O.V.Anissimova & Guiry, *comb. nov.* (Fig 48)

Basionym: *Euastrum sinuosum* var. *simplex* Maskell, *Transactions and Proceedings of the New Zealand Institute* 21: 11, 1889.

Note: Referred to in the text as "*B. Forma minor, var simplex var. nov.*" In this instance, Maskell (1889: 11) is referring to "forms" as a general infraspecific category and clearly describes two varieties (see var. *gemmaulosum* above).

Euastrum neosinuosum* var. *subjenneri (West & G.S.West) O.V.Anissimova & Guiry, *comb. nov.* (Fig 49)

Basionym: *Euastrum sinuosum* var. *subjenneri* West & G.S.West, *Transactions of the Linnean Society of London* 6: 148, pl. 19: fig. 17, 1902.

Euastrum neosinuosum* f. *subgangense (Kurt Förster) O.V.Anissimova & Guiry, *comb. nov.* (Figs 50-53)

Basionym: *Euastrum sinuosum* var. *subgangense* Kurt Förster, *Amazoniana* 2(1/2): 36, pl. 17: figs 11, 12, 1969.

Note: While the original description lacks an explicit designation of type, a single gathering was indicated, which serves to validate the name (Art. 40.2).

Euastrum neosinuosum* f. *ellipticum (Kurt Förster) O.V.Anissimova & Guiry, *comb. nov.* (Figs 54-57)

Basionym: *Euastrum sinuosum* [var. *subgangense*] f. *ellipticum* Kurt Förster, *Amazoniana* 2(1/2): 36, pl. 7: figs 13, 14, 1969.

Note: While the original description lacks an explicit designation of type, a single gathering was indicated which serves to validate the name (Art. 40.2).

Euastrum neosinuosum* f. *dubium O.V. Anissimova & Guiry, *forma nov.* (Figs 58, 59)

Description: Distinguished from the nominal form by the presence of a single median mucilage pore, the basal lobes are also less pronounced. Each semicell inflations and apices of the lobes have a central mucilage pore.

Holotype: Fig. 122 B in Ducellier (1918).

Replaced designation: “*Euastrum sinuosum* f. *junius*” F. Ducellier (‘junior’), *Bulletin de la Société Botanique de Genève, Série II*, 10: 134, fig. 122 B, 1918, *nom. inval.*

Additional designation: “*Euastrum sinuosum* f. *mixta*” F. Ducellier, *Bulletin de la Société Botanique de Genève* 10: 134, fig. 122 D, 1918, *nom. inval.*

Note: Ducellier (1918: 134) did not provide a description for this form, and an illustration after 1908 (Art. 38.7) does not validate a name. Moreover, Ducellier’s (1918: fig. 122 D) f. *mixta* shows two unequal semicells, which may be the result of deformity or the underdevelopment of one of them. Art. 40.5 provides for a designation of an illustration of an alga as a type.

Euastrum neosinuosum* f. *robustum O.V. Anissimova & Guiry, *forma nov.* (Figs 60, 61)

Description: Cells 78–84 μ long, 42–46 μ wide and 28–35 μ thick, with an isthmus 12–15 μ wide (after Skuja 1976: 82).

Type: Figs 60, 61 herein. Add a comment on Art. 40.5, since an illustration cannot be, under normal circumstances, a type.

Type locality: New Zealand [“Eine Etikette fehlt; leider ist es mir nicht gelungen etwaige Angaben nachträglich zu bekommen” (see Skuja 1976: 14)].

Replaced designation: *Euastrum sinuosum* [var. *gangense*] f. *robustum* Skuja, *Nova Acta Regiae Societatis Scientiarum Upsaliensis, series 5: C2*: 82, pl. XIII: fig. 7, 1976, *nom. inval.*

Note: The original designation was invalid as no Latin description was provided (Art. 44.1) just a brief description in German and some expression of doubt.

The following names are those which we consider include some former taxa referred to *Euastrum sinuosum*.

Euastrum aboëense Elfving 1881: 7, pl. I: fig. 2 (Figs 62, 63)

Synonym: *Euastrum sinuosum* var. *stroemii* W. Krieger (‘Strömii’), *Dr. Rabenhorst's Kryptogamen-Flora von Deutschland, Österreich und der Schweiz. Conjugatae. Die Desmidiaceen*: 504, 1937.

Synonym: *Euastrum aboense* f. *simplex* Ström, 1926

Note: *Euastrum sinuosum* var. *stroemii* was introduced as a new name for *Euastrum aboense* f. *simplex* Ström, 1926, *nom. illeg.* (priority for *Euastrum sinuosum* var. *simplex* Maskell, 1889 within *Euastrum sinuosum*, as would be case within *Euastrum neosinuosum*). Růžička (1981: 421) later included *Euastrum sinuosum* var. *stroemii* W. Krieger in *Euastrum aboense* Elfving var. *aboense*.

Note: While Růžička (1981: 419) gives “*Euastrum aboëense*”, a diaeresis was not originally included by Elfving (1881: 7, pl. 1: fig. 2), but its use is optional (Art. 60.7).

Euastrum ansatum var. *pyxidatum* Delponte 1873: 91 [103], pl. VI: figs 32–34.

Synonym: *Euastrum sinuosum* [var. *dideltoides*] f. *glabrum* A.M. Scott & Prescott 1945: 244, pl. 5: fig.

Note: Comparing the illustrations of *E. sinuosum* [var. *dideltoides*] f. *glabrum* Prescott & A.M.Scott (Prescott & Scott 1945, pl. 5: 2) and *Euastrum ansatum* var. *pyxidatum* Prescott & A.M.Scott (Prescott & Scott 1945, pl. 3; fig. 3), it is clear that they represent the same taxon (Figs. 64-68).

Euastrum circulare Hassall ex Ralfs, 1848: 85, pl. XIV: fig 3 a.

Synonym: *Euastrum sinuosum* var. *ansatifforme* Cedergrén 1933: 35, pl. II [2]: fig. 16.

Notes: As Cedergrén (1933: 35) writes, “Diese Var. besitzt eine grosse Ähnlichkeit mit *E. ansatum* und könnte bei oberflächlicher Betrachtung leicht mit ihm verwechselt werden. Sie gehört doch offenbar unter *E. sinuosum* [This variety has a great resemblance to *E. ansatum* and could easily be confused with it on a superficial examination. It obviously belongs to *E. sinuosum*.] Indeed, in shape of the cell and structures, this variety is more reminiscent of *Euastrum circulare* Hassall ex Ralfs *sensu stricto* (Ralfs, 1848: pl. XIV: fig. 3 a).

Euastrum securiformiceps O.Borge 1903: 112, pl. 4: fig. 29.

Synonym: *Euastrum sinuosum* var. *securiformiceps* (O.Borge) Willi Krieger, 1937: 504

Note: According to the protologue for *Euastrum securiformiceps*, the cells do not have median inflations and scrobicles. In outline, a similarity with *E. neosinuosum* is not apparent, and we propose that species status be reinstated for this taxon pending further study (Figs 69-71).

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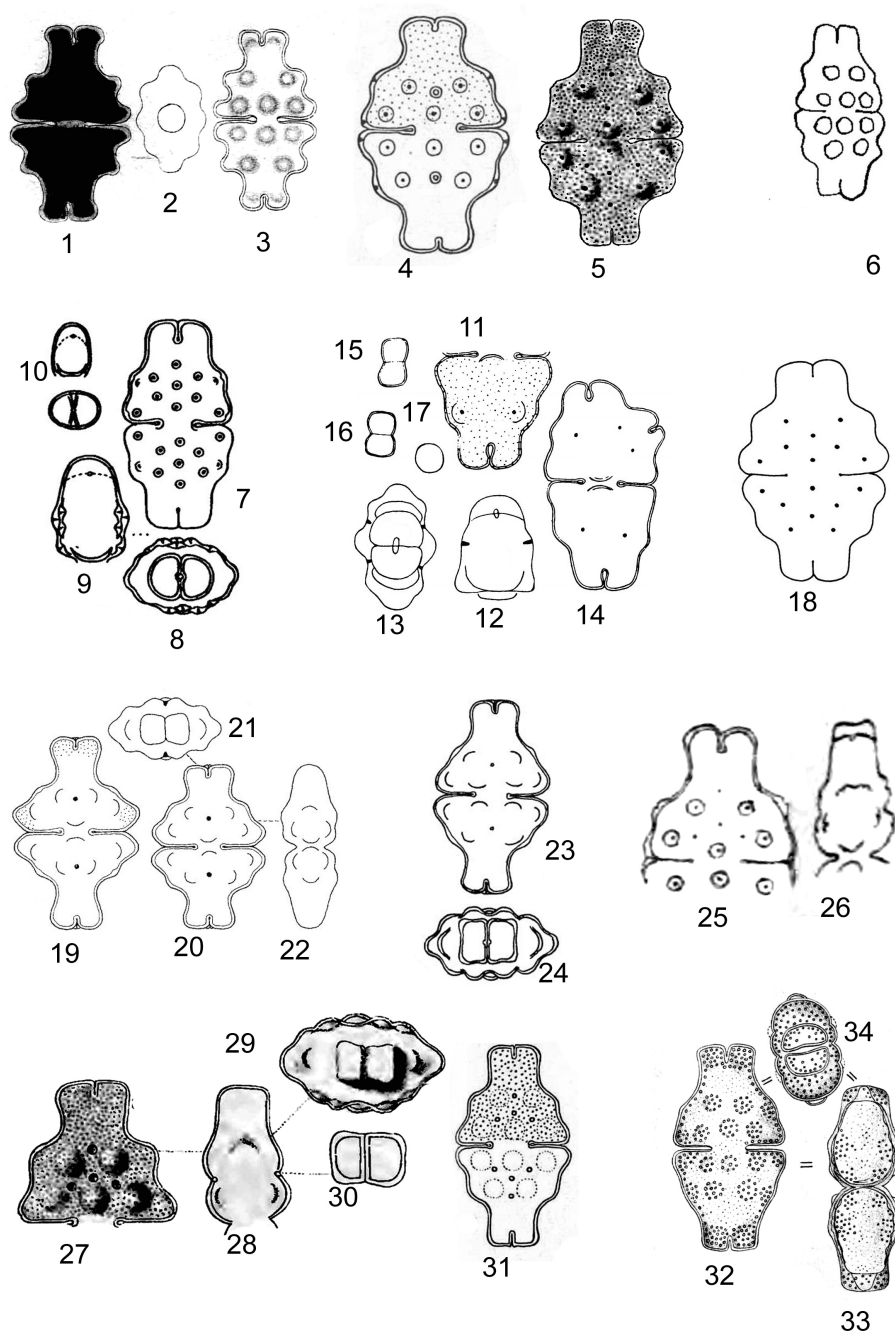
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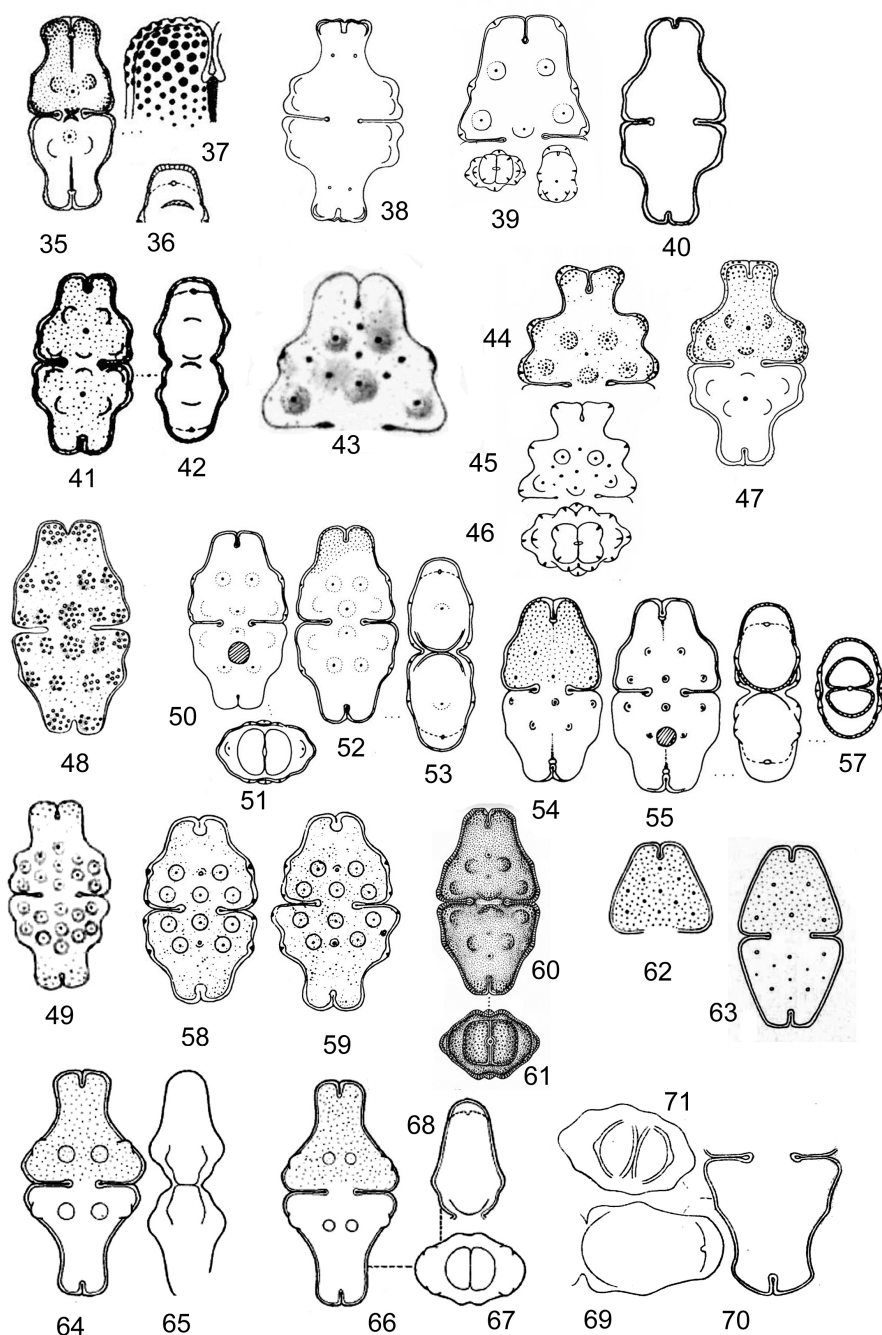


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Figs 1–34. Intraspecific taxa of various species of *Euastrum* associated with *E. neosinuosum*.

Figs 1–3. *E. neosinuosum* var. *neosinuosum* (after Brébisson 1856). **Fig. 4.** var. *neosinuosum* (after Krieger 1937). **Fig. 5.** *E. neosinuosum* var. *neosinuosum* (after Raciborski 1889). **Fig. 6.** *E. neosinuosum* var. *africanum* (after Woodhead & Tweed 1958). **Figs 7–10.** *E. neosinuosum* f. *angustius* (after Förster 1963, as *angustior*). **Figs 11–17.** *E. neosinuosum* var. *biscrobiculatum* (after Bourrelly & Leboime 1946). **Fig. 18.** *E. neosinuosum* var. *brasiliense*: (after Scott, Grönblad & Croasdale 1965). **Figs 19–22.** *E. didelta* var. *capitatum* (after Scott & Prescott 1961). **Figs 23–24.** *E. didelta* var. *dideltoides* (after Krieger 1932). **Figs 25–26.** *E. neosinuosum* f. *elongatum* (after Grönblad 1920). **Figs 25–26.** *E. neosinuosum* var. *germanicum* (after Raciborski 1889). **Fig. 31.** *E. neosinuosum* var. *germanicum* (after Krieger 1937). **Figs 32–34.** *E. neosinuosum* var. *gemmulosum* (after Maskell 1889).



Figs 35–71. Intraspecific taxa of various species of *Euastrum* associated with *E. neosinuosum*.

Figs 35–37. *E. neosinuosum* var. *goyazense* (after Förster 1964). **Fig. 38.** *E. neosinuosum* var. *hakalukiense* (after Islam & Haroon 1980). **Fig. 39.** *E. neosinuosum* var. *laticeps* (after Bourrelly 1961). **Fig. 40.** *E. neosinuosum* var. *parallelum* (after Krieger 1932). **Figs 41, 42.** *E. neosinuosum* var. *parvum* (after Hinode 1971). **Fig. 43.** *E. neosinuosum* var. *scrobiculatum* (after Lütkenmüller 1900). **Figs 44–46.** *E. neosinuosum* f. *africanum* (after Bourrelly 1961). **Fig. 47.** *E. neosinuosum* f. *oculus* (after Scott & Prescott 1958). **Fig. 48.** *E. neosinuosum* var. *simplex* (after Maskell 1889). **Fig. 49.** *E. neosinuosum* f. *subjenneri* (after West & G.S. West 1902). **Figs 50–53.** *E. neosinuosum* f. *subgangense* (after Förster 1969). **Figs 54–57.** *E. neosinuosum* f. *ellipticum* (after Förster 1969). **Figs 58, 59.** *E. neosinuosum* f. *dubium* (after Ducellier 1918). **Figs 60, 61.** *E. neosinuosum* f. *robustum* (after Skuja, 1976). **Fig. 62.** *E. aboense* (after Elfving 1881). **Fig. 63.** *E. aboense* (after Krieger 1937). **Figs 64, 65.** *E. ansatum* var. *pyxidatum* (after Prescott & Scott 1945, pl. 5: 2). **Figs 66–68.** *E. ansatum* var. *pyxidatum* (after Prescott & Scott 1945, pl. 3: 3). **Figs 69–71.** *Euastrum securiformiceps* (Borge 1903).