
***Delicatophycus* gen. nov.: a validation of “*Delicata* Krammer” inval. (Gomphonemataceae, Bacillariophyta)**

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In accordance with Art. 20.2 of the ICN (Shenzhen Code; Turland *et al.* 2018), “*Delicata* Krammer,” proposed as a generic name by Krammer (2003: 110), is invalid because it is a technical term, similar examples of which are given by ICN Art. 20.2, Ex. 4 (‘*lanceolatus*’ and ‘*lobata*’). As the generic designation is invalid, all designations at the species and infraspecific levels are also invalid. I here propose to replace “*Delicata* Krammer” inval. with a new genus name and to propose new names for invalid designations at the species and infraspecific levels.

Delicatophycus M.J.Wynne, *gen. nov.*

Replaced name: “*Delicata* Krammer,” *Diatoms of Europe* Vol. 4: 110, 164, 2003, *inval.*

Description: *Diatoms of Europe* Vol. 4: 110 (English), 164 (Latin), 2003.

Type: ***Delicatophycus delicatulus*** (Kützing) M.J.Wynne *comb. nov.* Basionym: *Cymbella*

delicatula Kützing, *Sp. Alg.*: 59, 1849. Invalid designation: “*Delicata delicatula* Krammer,” *inval.*, *Diatoms of Europe* 4: 113, figs 129: 1-30; 130: 1-4, 6-8; 131: 1-6; 136: 6-12.

Note: names ending in *-phycus* (φύκος, phykos), which ought to be neuter, are treated as masculine in accordance with tradition [ICN Art. 62.2(c)].

Additional species assigned to *Delicatophycus*:

Delicatophycus aequistriatus M.J.Wynne, *sp. nov.* Replaced designation: “*Cymbopleura aequistriata* Krammer & Lange-Bertalot” *inval.*, in Moser, Lange-Bertalot & Metzeltin *Bibliotheca Diatomologica* 38: 112; pl. 44: figs 5-8, 1998. “*Delicata aequistriata* Krammer & Lange-Bertalot” *inval.* in Krammer, *Diatoms of Europe* 4: 117, 165, pl. 135: figs 1-4. 2003. Description and figures: *Diatoms of Europe* 4: 117, 165, pl. 135: figs 1-4. 2003.

Delicatophycus alpestris M.J.Wynne *sp. nov.* Replaced designations: “*Delicata delicatula* var. *alpestris* Krammer,” *inval.* *Diatoms of Europe* 4: 114, 164, pl. 132: fig. 11, pl. 133: figs 1-10, 30; pl. 134, figs. 1-10. 2003. “*Delicata alpestris* Bahls,” *inval.*, *Diatoms from western North America 1*: 17, figs 73-84, 2017. Description and figures: *Diatoms of Europe* 4: 114, 164, pl. 132: fig. 11, pl. 133: figs 1-10, 30; pl. 134, figs. 1-10. 2003.

Delicatophycus apiculatus M.J.Wynne *sp. nov.* Replaced designation: “*Delicata apiculata* Krammer,” *inval.*, *Diatoms of Europe* 4: 115, 165, pl. 133: figs 11-19. 2003. Description and figures: *Diatoms of Europe* 4: 115, 165, pl. 133: figs 11-19. 2003.

Delicatophycus canadensis M.J.Wynne *sp. nov.* Replaced designation: “*Delicata canadensis* Bahls,” *inval.*, *Diatoms of Western North America 1*: 18, figs 97-108, 2017. Description and figures: *Diatoms of Western North America 1*: 18, figs 97-108, 2017.

Delicatophycus capitatus M.J.Wynne *sp. nov.* Replaced designation: “*Delicata capitata* Krammer,” *inval.* *Diatoms of Europe* 4: 115, 165, pl. 133: figs 20-26. 2003. Description and figures: *Diatoms of Europe* 4: 115, 165, pl. 133: figs 20-26. 2003.

Delicatophycus chongquingensis M.J.Wynne *sp. nov.* Replaced designation: “*Delicata chongquingensis* Wei Zhang, S.Q.Yang & S.Blanco” *inval.* in Yang *et al.* *Phytotaxa* 393(1): 59, figs 2-25. 2019. Description and figures: *Phytotaxa* 393(1): 59, figs 2-25. 2019.

Delicatophycus costei (Lange-Bertalot & Moser) M.J.Wynne *comb. nov.* Basionym: *Cymbella delicatula* var. *costei* Lange-Bertalot & Moser in Moser *et al.*, *Biblioth. Diatomol.* 32: 68, pl. 22: figs. 9-14, 1995. Latin diagnosis in Maillard 1978, p. 159 (as “*Cymbella costei* Maillard” 1978, *inval.*). Invalid designation: “*Cymbopleura costei* Krammer & Lange-Bertalot” 1998, *inval.* “*Delicata costei* Krammer & Lange-Bertalot,” *inval.* in Krammer *Diatoms of Europe*: 118; pl. 135, figs 6, 7, 2003.

- Delicatophycus couseranensis*** M.J.Wynne *sp. nov.* Replaced designation: “*Delicata couseranensis* Le Cohu & Lange-Bertalot,” *inval.* in Le Cohu & Azémar, *Cryptogam. Algol.* 32: 133, figs 1-19. 2011. Description and figures: *Cryptogam. Algol.* 32: 133, figs 1-19. 2011.
- Delicatophycus cubanus*** M.J.Wynne *sp. nov.* Replaced designation: “*Delicata cubana* D.Metzeltin & Lange-Bertalot,” *inval.* *Iconogr. Diatomol.* 18: 70, pl. 207: figs. 13-24; pl. 208: figs 1-3 [miscited 1-5], 2007. Description and figures: *Iconogr. Diatomol.* 18: 70, pl. 207: figs. 13-24; pl. 208: figs 1-3 [miscited 1-5], 2007.
- Delicatophycus delicatulus* var. *angustus*** M.J.Wynne *var. nov.* Replaced designations: “*Delicata delicatula* var. *angusta* Krammer” *inval.* *Diatoms of Europe* 4: 114, 164; pl. 130: fig. 5, pl. 131: figs. 7-8, pl. 132: figs. 1-10, 12-14. 2003. Description and figures: *Diatoms of Europe* 4: 114, 164; pl. 130: fig. 5, pl. 131: figs. 7-8, pl. 132: figs. 1-10, 12-14. 2003.
- Delicatophycus gadjianus*** (R.Maillard ex Lange-Bertalot & G.Moser) M.J.Wynne *comb. nov.* Basionym: *Cymbella gadjana* R.Maillard ex Lange-Bertalot & G. Moser in Moser *et al. Biblioth. Diatomol.* 32: 72, pl. 21: figs. 9-16. 1995. Invalid designation: “*Delicata gadjana* Krammer” *inval.*, *Diatoms of Europe*, Vol. 4: 119. 2003.
- Delicatophycus gerloffii*** (Van Landingham) M.J.Wynne *comb. nov.* Basionym: *Cymbella gerloffii* Van Landingham, *Int. J. Speleology* 2: 134, fig. 1. 1966. Invalid designation: “*Delicata gerloffii* Krammer” *inval.*, *Diatoms of Europe*, Vol. 4: 120, pl. 135: fig. 17, 2003.
- Delicatophycus judaicus*** (Lange-Bertalot & Krammer) M.J.Wynne *comb. nov.* Basionym: *Cymbopleura delicatula* subsp. *judaica* Lange-Bertalot & Krammer in Nevo & Wasser: 242, pl. 18: figs. 130-133. 2000. Invalid designation: “*Delicata judaica* Krammer & Lange-Bertalot,” *inval.*, in Krammer, *Diatoms of Europe* Vol. 4: 120, pl. 136: figs 1-5, 2003.
- Delicatophycus krammeri*** M.J.Wynne *sp. nov.* Replaced designation: “*Delicata krammeri* Metzeltin, Lange-Bertalot & García-Rodríguez” *inval.*, *Iconogr. Diatomol.* 15: 40, pl. 122: figs. 12-14. 2005. Description and figures: *Iconogr. Diatomol.* 15: 40, pl. 122: figs 12-14. 2005.
- Delicatophycus minutus*** M.J.Wynne *sp. nov.* Replaced designation: *Delicata minuta* Krammer, *inval.* *Diatoms of Europe* 4: 116, 165; pl. 134, fig. 11-33; pl. 137, fig. 16. 2003. Description and figures: *Diatoms of Europe* 4: 116, 165; pl. 134, fig. 11-33; pl. 137, fig. 16. 2003.
- Delicatophycus montana*** M.J.Wynne *sp. nov.* Replaced designation: “*Delicata montana* Bahls,” *inval.* *Diatoms Western N. America*: 19, figs 85-90, 109-124. 2017. Description and figures: *Diatoms Western N. America*: 19, figs 85-90, 109-124. 2017. Note: Epithet is indeclinable as it was intended as nominative noun in apposition to represent the state of Montana.
- Delicatophycus neocaledonicus*** M.J.Wynne *sp. nov.* Replaced designation: “*Delicata neocaledonica* Krammer,” *inval.* *Diatoms of Europe* 4: 116, 165; pl. 134, figs 34-42. 2003. Description and figures: *Diatoms of Europe* 4: 116, 165; pl. 134, figs 34-42. 2003.
- Delicatophycus nepouianus*** M.J.Wynne *sp. nov.* Replaced designation: “*Delicata nepouiana* Krammer,” *inval.* *Diatoms of Europe* 4: 119, 166; pl. 135, fig. 10-12. 2003. Description and figures: *Diatoms of Europe* 4: 119, 166; pl. 135, fig. 10-12. 2003.
- Delicatophycus sinensis*** M.J.Wynne *sp. nov.* Replaced designation: “*Delicata sinensis* Krammer & Metzeltin” *inval.* in Krammer, *Diatoms of Europe* 4: 121, 166, pl. 136: figs 13-20. 2003. Description and figures: *Diatoms of Europe* 4: 121, 166, pl. 136: figs 13-20. 2003.
- Delicatophycus sparsistriatus*** M.J.Wynne *sp. nov.* Replaced designation: “*Delicata sparsistriata* Krammer,” *inval.* *Diatoms of Europe* 4: 121, 166; pl. 132: figs 15-20. 2003. Description and figures: *Diatoms of Europe* 4: 121, 166; pl. 132: figs 15-20. 2003.
- Delicatophycus sparsistriatus* var. *parvus*** M.J.Wynne *var. nov.* Replaced designation: “*Delicata sparsistriata* var. *parva* Krammer” *inval.* *Diatoms of Europe* 4: 122, 166, pl. 132, figs 21-33. Description and figures: *Diatoms of Europe* 4: 122, 166, pl. 132, figs 21-33.
- Delicatophycus spitsbergensis*** M.J.Wynne *sp. nov.* Replaced designation: “*Delicata spitsbergensis* Krammer,” *inval.* *Diatoms of Europe* 4: 117, 165; pl. 134, figs 43-45. 2003. Description and figures: *Diatoms of Europe* 4: 117, 165; pl. 134, figs 43-45. 2003.

- Delicatophycus verena*** M.J.Wynne *sp. nov.* Replaced designation: “*Delicata verena* Lange-Bertalot & Krammer,” *inval.*, in Krammer, *Diatoms of Europe* 4: 120, 166, pl. 137: figs 1-9, 2003. Description and figures: *Diatoms of Europe* 4: 120, 166, pl. 137: figs 1-9, 2003.
- Delicatophycus verena* var. *sandrae*** M.J.Wynne *var. nov.* Replaced designation: “*Delicata verena* var. *sandrae* Lange-Bertalot & Krammer” *inval.* *Diatoms of Europe* 4: 121, 166, pl. 137: figs. 10-15, 2003. Description and figures: *Diatoms of Europe* 4: 121, 166, pl. 137: figs. 10-15, 2003.
- Delicatophycus williamsii*** M.J.Wynne *sp. nov.* Replaced designation: “*Delicata williamsii* B.Liu & S.Blanco,” *inval.*, in Liu *et al.* *Fottea* 18: 31, figs 18-47, 2018. Description and figures: *Fottea* 18: 31, figs 18-47, 2018.

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- Bahls, L.L. (2017). *Diatoms from western North America 1. Some new and notable biraphid species*. pp. [1]-52, 288 figs. Helena, Montana: edited and published by the author.
- Krammer, K. (2003). *Cymbopleura, Delicata, Navicymbula, Gomphocymbellopsis, Afrocybella*. In: *Diatoms of Europe, Diatoms of the European Inland waters and comparable habitats*. (Lange-Bertalot, H., Ed.) Vol. 4, pp. 1-529. Rugell: A.R.G. Gantner Verlag K.G.
- Kützing, F.T. (1849). *Species algarum*. pp. [i]-vi, [1]-922. Lipsiae [Leipzig]: F.A. Brockhaus.
- Le Cohu, R. & Azémar, F. 2011. Étude morphologique de quelques Cymbellaceae des Pyrénées françaises incluant la description d’une espèce nouvelle: *Delicata couseranensis* *sp. nov.* *Cryptogamie, Algologie* 32: 131-155.
- Liu, B., Blanco, S. & Lan, Q.-Y. (2018). Ultrastructure of *Delicata sinensis* Krammer et Metzeltin and *D. williamsii* *sp. nov.* (Bacillariophyta) from China. *Fottea* 18(1): 30-36, 47 figs, 1 table.
- Maillard, R. (1979 '1978'). Contribution à la connaissance des diatomées d'eau douce de la Nouvelle-Calédonie (Océanie). *Cahiers O.R.S.T.O.M., Série Hydrobiologie* 12: 143-172, incl. VIII pls.
- Metzeltin, D. & Lange-Bertalot, H. (2007). Tropical diatoms of South America. II. Special remarks on biogeographic disjunction. *Iconogr. Diatomol.* 18: [v] + 877 pp., incl. 296 pls.
- Moser, G., Lange-Bertalot, H. & Metzeltin, D. (1998). Insel der Endemiten Geobotanisches Phänomen Neukaledonien (Island of endemics New Caledonia - a geobotanical phenomenon). *Bibliotheca Diatomologica* 38: 1-464.
- Moser, G., Steindorf, A. & Lange-Bertalot, H. (1995). Neukaledonien Diatomeenflora einer Tropeninsel. Revision der Collection Maillard und Untersuchungen neuen Materials. *Bibliotheca Diatomologica* 32: 1-340, 80 pls.
- Nevo, E., & Wasser, S.P., editors (2000.) *Biodiversity of Cyanoprokaryotes, Algae and Fungi of Israel, Cyanoprokaryotes and algae of continental Israel*. pp. [2]. i-v, 6-629, incl. pls I-XLII., Ruggell: A.R.A. Gantner Verlag K.-G.
- 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 Landingham, S.L. (1966). Three new species of *Cymbella* from Mammoth Cave, Kentucky. *International Journal of Speleology* 2: 133-136, 3 text figs.
- Yang, S.-Q., Zhang, W., Blanco, S., Jüttner & Wu, Z.-X. (2019). *Delicata chongqingensis* *sp. nov.*, a new cymbelloid diatom species (Bacillariophyceae) from Daning River, Chongqing, China. *Phytotaxa* 393(1): 057-066, 25 figs. [DOI: <http://dx.doi.org/10.11646/phytotaxa.393.1.5>]