

**Nomenclatural novelties in the endemic Lake Baikal genus *Draparnaldioides* (*Chlorophyta*, *Chaetophoraceae*)**

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The ancient Lake Baikal is well known as a hotspot of endemic organisms, especially invertebrates, diatoms and green algae. In particular, the families *Cladophoraceae* and *Chaetophoraceae* show a high degree of endemism even at the genus level. Originally described on the basis of a morphological species concept, Lake Baikal green algae are currently being revised using molecular phylogenetic approaches (e.g., Mincheva & al. 2013, Boedeker & al. 2018), which, in the case of cladophoralean algae, has already resulted in significant taxonomic and attendant nomenclatural changes. The endemic members of *Chaetophoraceae* need thorough revision. The largest endemic genus, “*Draparnaldioides*” K.I.Meyer & Skabitshevsky (in Skabitshevsky 1976: 114), contains 9 species and 9 formae (Meyer 1930, Izboldina 2007); however, the taxonomic status of some entities is an open question and requires further investigation.

Morphologically, species of *Draparnaldioides* are in sharp contrast with all other chaetophoralean algae. These have conspicuous, densely branched thalli that may reach 40 cm but generally are 10–15 cm in length. The axes consist of cylindrical or barrel-shaped cells with densely arranged, usually whorled, lateral fascicles. The rhizoids arise from basal cells of the lateral fascicles. When branched and intertwined, rhizoids produce a very dense covering along the axes, especially at basal part of the main axis. The chloroplast is distinctly reticulate and extends the entire cell length. The life history involves anisogamous reproduction (Jasnitsky 1934) and zoospore formation (Izboldina 1976). This particular set of features makes it impossible to support the hypothesis (e.g., Mandal & Maity 2019) that the Lake Baikal taxa are just an unusual expression of *Draparnaldia* Bory (Bory 1808: 400) species. Moreover, recent molecular phylogenetic studies conducted on “*Draparnaldioides simplex*” K.I.Meyer et Skabitshevsky confirmed *Draparnaldioides* as a sister genus to *Draparnaldia* (Mincheva & al. 2013).

The present note is intended as a precursor to a continuing revision of *Draparnaldioides* with the aim of validating the genus name and its subordinate taxa, since all are currently nomenclaturally invalid under the rules of *International Code of Nomenclature for algae, fungi, and plants* (ICN, Turland & al. 2018). The work is based on analysis of the protologues of *Draparnaldia* taxa introduced by Meyer (Meyer 1922a, b, 1924, 1925, 1926, Meyer & Reinhardt 1925; Table 1) and subsequent literature targeting their taxonomy and nomenclature (Meyer & Skabitshevsky 1970, Skabitshevsky 1976, Izboldina 1990, 2007).

Species of *Draparnaldioides* were originally described by Konstantin Ignat’evich Meyer (1881–1965) as species of *Draparnaldia* based on Lake Baikal collections 1914–1916 and 1925. In some cases, Meyer introduced new names with identical protologues in different publications (Table 1), which has created some confusion over the actual dates of their effective publication.

Meyer & Skabitshevsky (1970) transferred nine *Draparnaldia* species to their newly created genus *Draparnaldiella* K.I.Meyer & Skabitshevsky (Meyer & Skabitshevsky 1970: 38). Skabitshevsky later changed this genus name to *Draparnaldioides* as *Draparnaldiella* K.I.Meyer & Skabitshevsky was a later homonym of *Draparnaldiella* Gaillon (ICN Art. 53.1), a valid name but illegitimate as it was originally introduced as an unwarranted change of name for the genus *Draparnaldia* Bory. Unfortunately, Skabitshevsky’s new genus name is invalid as the publication pages of the replaced synonym were not cited exactly as required by ICN Art. 41.5; see note 1.

Skabitschevsky indicated the replaced synonym with reference to the entire pagination of the whole publication: “*Draparnaldiella* C. Meyer et Skabitsch., 1970, *Novit. syst. Plant. non vascular.* 6: 38–47”, however the name appeared on p. 38. Moreover, Skabitschevsky did not propose any combinations with the newly introduced genus name. His statement that “9 видов относятся к роду *Draparnaldioides*” [9 species belong to the genus *Draparnaldioides*] does not constitute valid publication of the respective combinations (ICN Arts 35.2 and 41.5). Skabitschevsky did not rectify these nomenclatural acts at a later date.

Izhboldina (1990) mentioned nine species and seven formae of Meyer’s *Draparnaldia* as having been transferred to the genus *Draparnaldioides*, being unaware that combinations had never been validly published. She was then obliged to associate the final epithets of *Draparnaldia* with *Draparnaldioides* and ascribed the authorship of the combinations to “C. Meyer et Skabitsch.”. However, the requirements of ICN Art. 41.5, were not met in any of her proposals in that the place of valid publication and the page and date of the original names were not cited. Additionally, she described two new formae within “*Draparnaldioides arenaria* C. Meyer et Skabitsch.”, “*D. arenaria* f. *elegans*” Izhboldina (Izhboldina 2007: 110) and “*D. arenaria* f. *pilosissima*” Izhboldina (Izhboldina 2007: 110). Both names were not validly published (ICN Art. 35.1). The requirements of ICN Arts 40 and 44 were also not met.

Consequently, there is a clear need for validation of *Draparnaldioides* and its subordinate names. Here, eight new combinations and one new name are proposed for taxa described at the rank of species. With regard to discussions on the number of species (Forest 1957, Meyer & Skabitschevsky 1970, Mincheva & al. 2013), Izhboldina (2007) is followed recognizing nine of Meyer’s species as reasonably well established in the light of her extensive morphological investigations. Additionally, the taxonomic rank of a single forma of *Draparnaldia goroschankinii* K.I.Meyer (Meyer 1922a: 14) is elevated here since it could be unambiguously separated from the nominate form. In case of the other formae, however, it is difficult to distinguish whether these are genuine, but closely related taxa or just unusual stages in life history of the previously described species. To avoid unwarranted nomenclatural novelties, I propose to consider the genus *Draparnaldioides* as consisting of 10 species as follows.

Draparnaldioides K.I.Meyer & Skabitschevsky ex Vishnyakov, *nom. nov.*

Replaced synonym: *Draparnaldiella* K.I.Meyer & Skabitschevsky 1970 (‘1969’), *Novosti sistematiki nizshikh rastenii* 6: 38, *nom. illeg., non Draparnaldiella* Gaillon 1833.

Generitype: ***Draparnaldioides baicalensis*** (K.I.Meyer) Vishnyakov, *comb. nov.*

Basionym: *Draparnaldia baicalensis* K.I.Meyer 1922, *Botanicheskie materialy Instituta Sporovykh Rastenii Glavnogo Botanicheskogo Sada R.S.F.S.R.* 1(1): 13.

Homotypic synonym: *Draparnaldiella baicalensis* (K.I.Meyer) K.I.Meyer & Skabitschevsky 1970 (‘1969’), *Novosti sistematiki nizshikh rastenii* 6: 46.

Draparnaldioides arenaria (K.I.Meyer) Vishnyakov, *comb. nov.*

Basionym: *Draparnaldia arenaria* K.I.Meyer 1922, *Botanicheskie materialy Instituta Sporovykh Rastenii Glavnogo Botanicheskogo Sada R.S.F.S.R.* 1(1): 14.

Homotypic synonym: *Draparnaldiella arenaria* (K.I.Meyer) K.I.Meyer & Skabitschevsky 1970 (‘1969’), *Novosti sistematiki nizshikh rastenii* 6: 46.

Draparnaldioides arnoldii (K.I.Meyer) Vishnyakov, *comb. nov.*

Basionym: *Draparnaldia arnoldii* K.I.Meyer 1924, *Botanicheskie materialy Instituta Sporovykh Rastenii Glavnogo Botanicheskogo Sada R.S.F.S.R.* 3(7): 107.

Homotypic synonym: *Draparnaldiella arnoldii* (K.I.Meyer) K.I.Meyer & Skabitschevsky 1970 ('1969'), *Novosti sistematiki nizshikh rastenii* 6: 46.

Draparnaldioides goroschankinii (K.I.Meyer) Vishnyakov, *comb. nov.*

Basionym: *Draparnaldia goroschankinii* K.I.Meyer 1922, *Botanicheskie materialy Instituta Sporovykh Rastenii Glavnogo Botanicheskogo Sada R.S.F.S.R.* 1(1): 14.

Homotypic synonym: *Draparnaldiella goroschankinii* (K.I.Meyer) K.I.Meyer & Skabitschevsky 1970 ('1969'), *Novosti sistematiki nizshikh rastenii* 6: 46.

Draparnaldioides lubrica Vishnyakov, *nom. nov.*

Replaced synonym: *Draparnaldia lubrica* K.I.Meyer 1924, *Botanicheskie materialy Instituta Sporovykh Rastenii Glavnogo Botanicheskogo Sada R.S.F.S.R.* 3(7): 107, *nom. illeg.* (ICN Art. 53.1)

Homotypic synonym: *Draparnaldiella lubrica* (K.I.Meyer) K.I.Meyer & Skabitschevsky 1970 ('1969'), *Novosti sistematiki nizshikh rastenii* 6: 46.

Note: *Draparnaldia lubrica* K.I.Meyer is a later homonym of *D. lubrica* (Dillwyn) P.L. Crouan & H.M. Crouan (Crouan & Crouan 1867: 128), a name based on a different type. However, there is no obstacle to re-use the final epithet of illegitimate name in *Draparnaldioides* (ICN Art. 58.1).

Draparnaldioides pilosa (K.I.Meyer) Vishnyakov, *comb. nov.*

Basionym: *Draparnaldia pilosa* K.I.Meyer 1926, *Berichte der Deutschen Botanischen Gesellschaft*, 44(7): 412, pl. 6: 1–3.

Homotypic synonym: *Draparnaldiella pilosa* (K.I.Meyer) K.I.Meyer & Skabitschevsky 1970 ('1969'), *Novosti sistematiki nizshikh rastenii* 6: 46.

Draparnaldioides plumosa (K.I.Meyer) Vishnyakov, *comb. & stat. nov.*

Basionym: *Draparnaldia goroschankinii* f. *plumosa* K.I.Meyer 1930, *Byulleten' Moskovskogo obshchestva ispytatelei prirody. Otdel biologicheskii* 39(3–4): 278.

Note: Meyer described *Draparnaldia goroschankinii* f. *plumosa* as having wider and more ramified lateral fascicles. Izhboldina (2007: 106, figs 30, 31), however, carefully circumscribed and illustrated this form. Because it is clearly morphologically distinct from *D. goroschankinii* f. *goroschankinii* (Figs 1–4), it is proposed here to raise it to species rank.

Draparnaldioides pumila (K.I.Meyer) Vishnyakov, *comb. nov.*

Basionym: *Draparnaldia pumila* K.I.Meyer 1926, *Berichte der Deutschen Botanischen Gesellschaft*, 44(7): 415, pl. 6: 7, 8.

Homotypic synonym: *Draparnaldiella pumila* (K.I.Meyer) K.I.Meyer & Skabitschevsky 1970 ('1969'), *Novosti sistematiki nizshikh rastenii* 6: 46.

Draparnaldioides simplex (K.I.Meyer) Vishnyakov, *comb. nov.*

Basionym: *Draparnaldia simplex* K.I.Meyer 1922, *Botanicheskie materialy Instituta Sporovykh Rastenii Glavnogo Botanicheskogo Sada R.S.F.S.R.* 1(1): 14.

Homotypic synonym: *Draparnaldiella simplex* (K.I.Meyer) K.I.Meyer & Skabitschevsky 1970 ('1969'), *Novosti sistematiki nizshikh rastenii* 6: 46.

Draparnaldioides villosa (K.I.Meyer) Vishnyakov, *comb. nov.*

Basionym: *Draparnaldia villosa* K.I.Meyer 1926, *Berichte der Deutschen Botanischen Gesellschaft*, 44(7): 413, pl. 6: 4–6.

Homotypic synonym: *Draparnaldiella villosa* (K.I.Meyer) K.I.Meyer & Skabitschevsky 1970 ('1969'), *Novosti sistematiki nizshikh rastenii* 6: 46.



A revision of the algal herbarium of the Komarov Botanical Institute RAS, St. Petersburg (**LE**), where the types were probably deposited (Meyer & Skabitshevsky 1970: 39), has not succeeded in discovering any original material. No material has been located at Lomonosov Moscow State University (**MW**), where Meyer was working (Chudaev, pers. comm.). It has been also determined that Izhboldina's collection, which is currently housed in Limnological Institute SB RAS in Irkutsk, does not contain precisely indicated specimens used for preparing the accounts of new formae in *Draparnaldioides arenaria*. Hence, type designation will be required, particularly for molecular studies.

This work is dedicated to the memory of Ludmila A. Izhboldina (1939–2020). The author was delighted to have an opportunity to discuss various problems of *Draparnaldioides* identification with her at Irkutsk. The algal specimens documented by micrographs were collected and studied in a collaboration with Limnological Institute SB RAS, Irkutsk. The author gratefully acknowledges Oleg A. Timoshkin and his laboratory team. Special thanks to two anonymous reviewers and to Michael D. Guiry for valuable comments and copyediting.

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Note: Titles of Russian periodicals below are given in accordance with the [BPH Online database](#).

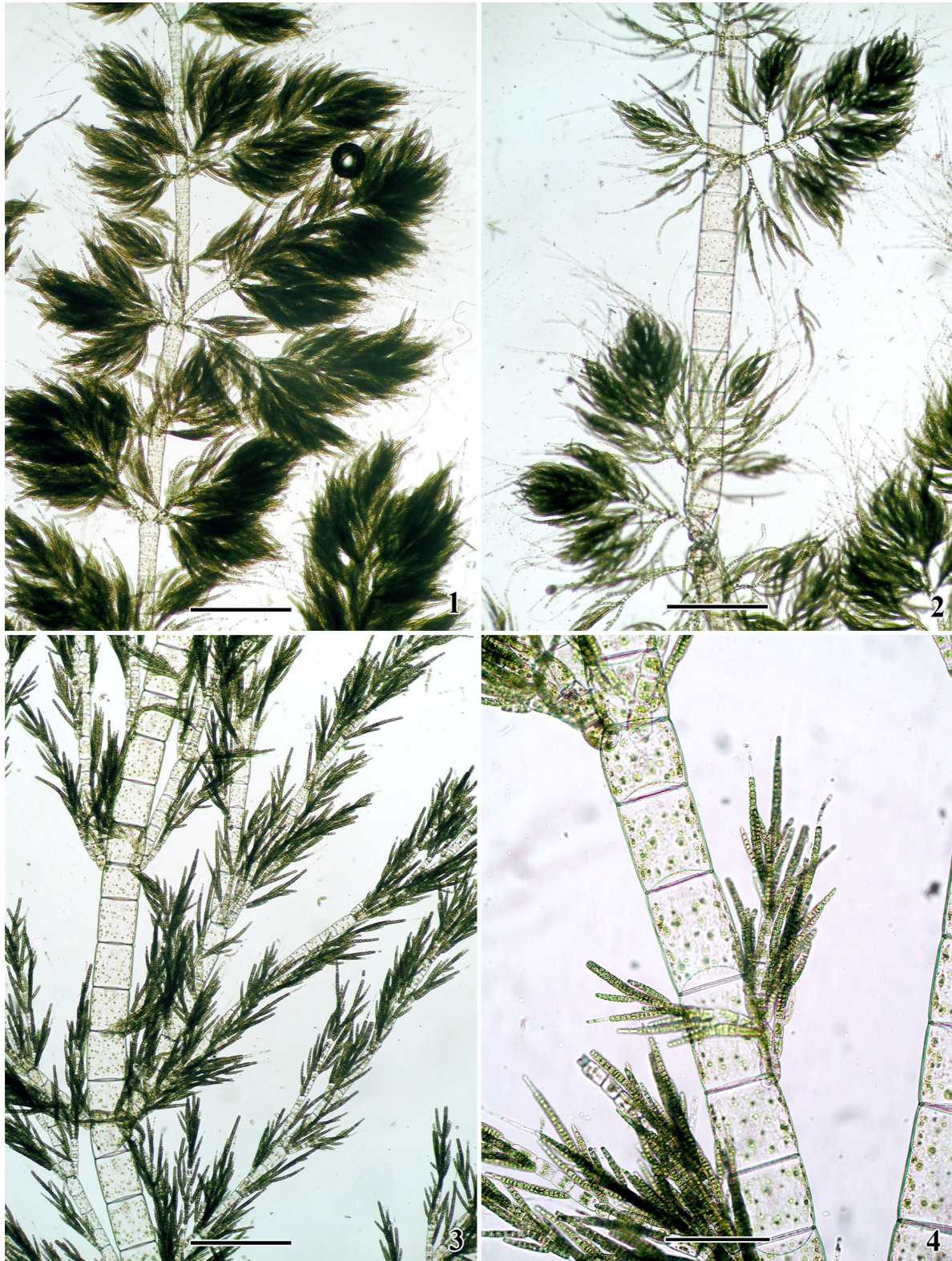
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- Bory de Saint-Vincent, J.B.G.M. (1808) Mémoire sur le genre *Draparnaldia*, de la famille des Conferves. *Annales du Muséum d'Histoire Naturelle* 12: 399–409, pl. 35.
- Crouan, P.L. & Crouan, H.M. (1867) *Florule du Finistère*. Paris & Brest. 262 pp.
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Table 1. New names in *Draparnalia* introduced by Meyer.

Names	Pages of descriptions, illustrations
1922, <i>Botanicheskie materialy Instituta Sporovykh Rastenii Glavnogo Botanicheskogo Sada R.S.F.S.R.</i> , 1(1)	
<i>Draparnaldia arenaria</i> K.I.Meyer	14
<i>Draparnaldia baicalensis</i> K.I.Meyer	13
<i>Draparnaldia goroschankinii</i> K.I.Meyer	14
<i>Draparnaldia simplex</i> K.I.Meyer	14
1922, <i>Zhurnal Moskovskogo otdeleniya Russkogo botanicheskogo obshchestva</i> , 1	
<i>Draparnaldia arenaria</i>	27, figs 8, 9
<i>Draparnaldia baicalensis</i>	26, figs 1–4
<i>Draparnaldia goroschankinii</i>	27, fig. 7
<i>Draparnaldia simplex</i>	27, figs 5, 6
1924, <i>Botanicheskie materialy Instituta Sporovykh Rastenii Glavnogo Botanicheskogo Sada R.S.F.S.R.</i> , 3(7)	
<i>Draparnaldia arnoldii</i> K.I.Meyer	107
<i>Draparnaldia arnoldii</i> f. <i>compacta</i> K.I.Meyer	107
<i>Draparnaldia arnoldii</i> f. <i>gracilis</i> K.I.Meyer	107
<i>Draparnaldia lubrica</i> K.I.Meyer	107
1925, <i>Byulleten' Moskovskogo obshchestva ispytatelei prirody. Otdel biologicheskii</i> , 33(3–4)	
<i>Draparnaldia arnoldii</i>	219
<i>Draparnaldia arnoldii</i> f. <i>compacta</i>	219
<i>Draparnaldia arnoldii</i> f. <i>gracilis</i>	219
<i>Draparnaldia lubrica</i>	219
1926 ('1925'), <i>Revue Algologique</i> , 3–4	
<i>Draparnaldia arnoldii</i>	257, fig. 9
<i>Draparnaldia arnoldii</i> f. <i>compacta</i>	257
<i>Draparnaldia arnoldii</i> f. <i>gracilis</i>	257
<i>Draparnaldia lubrica</i>	257, fig. 10
1926, <i>Berichte der Deutschen Botanischen Gesellschaft</i> , 44(7)	
<i>Draparnaldia pilosa</i> K.I.Meyer	412, pl. 6: 1–3
<i>Draparnaldia villosa</i> K.I.Meyer	413, pl. 6: 4–6
<i>Draparnaldia pumila</i> K.I.Meyer	415, pl. 6: 7, 8
1930, <i>Byulleten' Moskovskogo obshchestva ispytatelei prirody. Otdel biologicheskii</i> , 39(3–4)	
<i>Draparnaldia arenaria</i> f. <i>plumosa</i> K.I.Meyer	272
<i>Draparnaldia goroschankinii</i> f. <i>plumosa</i> K.I.Meyer	278
<i>Draparnaldia lubrica</i> f. <i>ramulifera</i> K.I.Meyer	285
<i>Draparnaldia simplex</i> f. <i>trifurca</i> K.I.Meyer	283
<i>Draparnaldia simplex</i> f. <i>pentafurca</i> K.I.Meyer	283



Figs 1–4. *Draparnaldioides plumosa* (Figs 1, 2) and *D. goroschankinii* (Figs 3, 4) from Southern Baikal, near Chernaya River mouth, 51°53'18.1"N 105°02'16.3"E. Specimens collected 23 June 2012. Note differences in breadth and ramification of lateral fascicles. Scale bars: 1–3 – 500 μ m, 4 – 200 μ m.