Phytotaxa 152 (1): 33–47 (2013)
www.mapress.com/phytotaxa/

Article

ISSN 1179-3155 (print edition)
PHYTOTAXA
ISSN 1179-3163 (online edition)

http://dx.doi.org/10.11646/phytotaxa.152.1.3

Notes on Early Land Plants Today. 44. Comments on sexuality in *Solenostoma* (Solenostomataceae, Marchantiophyta) and on some newly described taxa

JIŘÍ VÁŇA[1], LARS SÖDERSTRÖM[2], ANDERS HAGBORG[3] & MATT VON KONRAT[3]

[1]*Department of Botany, Charles University, Benátská 2, CZ-12801 Praha 2, Czech Republic; email: vana@natur.cuni.cz*
[2]*Department of Biology, Norwegian University of Science and Technology, N-7491 Trondheim, Norway; lars.soderstrom@bio.ntnu.no*
[3]*Science and Education, The Field Museum, 1400 South Lake Shore Drive, Chicago, IL 60605–2496, USA; hagborg@pobox.com, mvonkonrat@fieldmuseum.org*

Abstract

The sexuality of *Solenostoma* species is discussed and it is concluded that *Solenostoma sanguinolentum* is heteroicous. This and other morphological differences from *Solenostoma marcescens* are discussed and they are considered to belong to the same species. Heteroicity probably also occurs in *Solenostoma micranthum* and possibly in other *Solenostoma* species. *Solenostoma rossicum* and *Solenostoma pyriflorum* subsp. *purpureum* are new synonyms to *Solenostoma sphaerocarpum*. *Solenostoma ochotense* is a new synonym to *Solenostoma hokkaidense. Solenostoma costaricanum* is a new synonym to *Solenostoma amoenum. Plectocolea subbalfourii* is a new synonym to *Solenostoma balfourii. Solenostoma rubrum* var. *underwoodii* is a new synonym to *Solenostoma rubrum. Plectocolea yunnanensis* is a new synonym to *Solenostoma sikkimense. Solenostoma inundatum* var. *grandirete* is a new synonym to *Solenostoma orbiculatum. Solenostoma kurilense* and *Solenostoma ovalifolia* are new combinations and *Solenostoma philippinense* a new species.

Bakalin & Vilnet (2012) described two new species and made one new combination in *Solenostoma* and two new combinations in *Plectocolea.* Bakalin (2013) described four more taxa in *Solenostoma* and two in *Plectocolea* based on specimens in NY. Recent molecular studies (e.g. Feldberg *et al*. 2009) have shown that the two genera, as traditionally defined, can not be separated which is also shown by the phylogenetic tree in Vilnet & Bakalin (2012). Some of their *Plectocolea* species are therefore transferred to *Solenostoma*.

In their papers describing new taxa within *Solenostoma* and *Plectocolea,* Bakalin & Vilnet (2012) and Bakalin (2013) made two oversights. Firstly, they compared several of their new taxa with species that are not closely related. Secondly, they overlooked to mention taxa that, based on previously published descriptions, morphologically would be the closest relatives. The differences from their apparently closest relatives are most often so small that they fall within the variation of the species. The present paper addresses these issues.

The format of this note follows that which is outlined in Söderström *et al*. (2012) except that the Melbourne code of nomenclature (ICN; McNeill *et al.* 2012) is followed instead of the Vienna code (ICBN; McNeill *et al*. 2006). All corresponding specimens in NY have been seen by the first author.

The distinction between Solenostoma sanguinolentum and Solenostoma marcescens, and some notes on sexuality in Solenostoma

Bakalin (2013: 139) re-established *Jungermannia marcescens* Mitten (1861: 91) as a good species, *Solenostoma marcescens* (Mitt.) Bakalin (2013: 139), which Váňa (1973: 68) placed in synonymy of *Solenostoma sanguinolentum* (Griffith 1849: 302) Stephani (1901: 489). The experience with relatively copious material by the senior author allows the following comments on the proposed differences between *Solenostoma sanguinolentum* and *Solenostoma marcescens.*

Accepted by Christine Cargill: 29 Oct. 2013; published: 11 Dec. 2013

Solenostoma orbiculatum (Colenso) R.M.Schust., *Beih. Nova Hedwigia* 119: 380, 2002 (Schuster 2002). Basionym: *Gymnomitrion orbiculatum* Colenso, *Trans. & Proc. New Zealand Inst.* 18: 236, 1886 (Colenso 1886). Type: NEW ZEALAND. Waipawa Co.: Mangatawhainui river, near Norsewood, 10.1884 *Colenso* (lectotype: WELT!, isotypes BM!, JE!, Herb. Hodgson 13674!, 13691!)

= *Solenostoma inundatum* var. *grandirete* Bakalin, *Polish Bot. J.* 58: 135, 2013 (Bakalin 2013) ***syn. nov.*** Type: NEW ZEALAND: Great Barrier Island, s.d. *Hutton 3* (holotype NY-1717891!).

Acknowledgements

The Early Land Plants Today project (ELPT) has been generously supported in part by the Global Biological Information Facility (GBIF) Seed Money Award No.2007-41, activities facilitated in part by funding from the Biodiversity Synthesis Center of the Encyclopedia of Life (BioSynC), partial funding from the National Science Foundation (Award No's 0749762, 1115002), the Warwick Foundation, and the Negaunee Foundation.

References

Amakawa, T. (1956) Notes on Japanese Hepaticae (2). *Journal of Japanese Botany* 31: 47–50.

Amakawa, T. (1957) Notes on Japanese Hepaticae (3). *Journal of Japanese Botany* 32: 34–41.

Amakawa, T. (1959) Notes on Japanese Hepaticae (9). *Journal of Japanese Botany* 34: 111–116.

Amakawa, T. (1960) Family Jungermanniaceae of Japan II. *Journal of the Hattori Botanical Laboratory* 22: 1–90.

Amakawa, T. (1966) New or little known Asiatic species of the family Jungermanniaceae. II. *Journal of the Hattori Botanical Laboratory* 29: 253–266.

Amakawa, T. (1967) New or little known Asiatic species of the family Jungermanniaceae. III. *Journal of the Hattori Botanical Laboratory* 30: 181–198.

Amakawa, T. (1968) New or little known Asiatic species of the family Jungermanniaceae. IV. *Journal of the Hattori Botanical Laboratory* 31: 101–112.

Amakawa, T. (1970) New or little known Asiatic species of the family Jungermanniaceae. VI. *Jungermannia comata* Nees and its allies. *Journal of the Hattori Botanical Laboratory* 33: 153–160.

Bakalin, V.A. (2005) *Monografičeskaâ obrabotka roda* Lophozia *(Dumort.) Dumort. s. str.* 240 pp., Nauka, Moscow.

Bakalin, V.A. (2009a "2008") New liverwort records from Sakhalin Province. 3 [Novye nahodki pečënočnikov v Sahalinskoj oblasti. 3]. *Arctoa* 17: 226–230.

Bakalin, V. A. (2009b "2008") On taxonomy of some hepatics from Primorsky Territory (Russian Far East), with the list of taxa of the territory [O taksonomii nekotoryh pečenonikov Primorskogo kraâ (Rossijskij Dal'nij Vostok) so spiskom taksonov, izvestnyh v krae]. *Arctoa* 17: 101–108.

Bakalin, V.A. (2013) New taxa of *Solenostoma* and *Plectocolea* and other taxonomic novelties based on study of collections in the New York Botanical Garden herbarium. *Polish Botanical Journal* 58: 127–142. http://dx.doi.org/10.2478/pbj-2013-0014

Bakalin, V.A., Cherdantseva, V.Y., Ignatov, M.S., Ignatova, E.A. & Nyushko, T.I. (2010 "2009") Bryophyte flora of the South Kuril Islands (East Asia). *Arctoa* 18: 69–114.

Bakalin, V.A. & Vilnet, A.A. (2010 "2009") Two new species of Jungermanniaceae from Asiatic Russia [Dva novyh vida Jungermanniaceae iz aziatskoj časti Rossii]. *Arctoa* 18: 151–162.

Bakalin, V.A. & Vilnet, A.A. (2012) New combinations and new species of *Solenostoma* and *Plectocolea* (Solenostomataceae) from the Russian Far East. *Bryologist* 115: 566–584. http://dx.doi.org/10.1639/0007-2745-115.4.566

Buch, H. (1936) *Suomen Maksasammalet*. Otava, Helsinki, 117 pp.

Colenso, W. (1886) A description of some newly-discovered cryptogamic plants. *Transactions and Proceedings of the New Zealand Institute* 18: 219–255.

Damsholt, K. (2002) *Illustrated flora of Nordic liverworts and Hornworts.* Nordic Bryological Society, Lund, 837 pp.

Damsholt, K. (2011) Liverworts collected during the Norwegian east Greenland expeditions 1929–1933. *Lindbergia* 33: 92–113.

De Notaris, G. (1859) Appunti per un nuovo censimento delle epatiche italiane. *Memorie della reale accademia delle scienze di Torino, ser. 2* 18: 457–498.

Dickson, J. (1793) *Fasciculus tertius Plantarum Cryptogamicarum Britanniae*. G. Nichol, London, 24 pp.
Engel, J.J. (2007) Studies of New Zealand Hepaticae. 20–38. A miscellanea of new taxa and combinations. *Novon* 17: 310–314.
http://dx.doi.org/10.3417/1055-3177(2007)17[310:SONZHA]2.0.CO;2
Feldberg, K., Hentschel, J., Bombosch, A., Long, D.G., Váňa, J. & Heinrichs, J. (2009) Transfer of *Gottschelia grollei, G. patoniae* and *Scaphophyllum speciosum* to *Solenostoma* based on chloroplast DNA rbcL sequences. *Plant Systematics and Evolution* 280: 243–250.
http://dx.doi.org/10.1007/s00606-009-0187-3
Frye, T.C. & Clark, L. (1943) *Hepaticae of North America. Part II.* University of Washington Press, Seattle, pp. 163–334.
Gambaryan, S.K. (1992) [*Hornworts and liverworts of South Primorie*]. Akademia Nauk, Vladivostok, 175 pp.
Gottsche, C.M. (1890) Die Lebermoose Süd-Georgiens. *In*: Neumayer, G.B. (Ed), *Die Internationale Polarforschung 1882–83. Die Deutsche Expeditionen und ihre Ergebnisse. II Beschreibende Naturwissenschaften*. A. Asher & Co.: Berlin, pp. 449–454.
Gottsche, C.M., Lindenberg, J.B.G. & Nees von Esenbeck, S.G. (1847) *Synopsis Hepaticarum, fasc. 5*. Meissner, Hamburg, pp. 625–834.
Gray, S.F. (1821) *Natural arrangement of British Plants, according to their relation to each other*. London, 824 pp.
Griffith, W. (1849) *Notulae ad Plantae Asiaticas. Part II. On the higher cryptogamous plants*. Bishop's college Press, Calcutta, pp. 257–628.
Hattori, S. (1944) Contributio ad Floram Hepaticarum Austro-Kiushiuensem. *Bulletin of the Tokyo Science Museum* 11: 1–203.
Hattori, S. (1950 "1948") Contributio ad Floram Hepaticarum Yakusimensem. III. *Journal of the Hattori Botanical Laboratory* 3: 1–35.
Heeg, M. (1893) Die Lebermoose Niederösterreichs. *Verhandlungen der Kaiserlich-Königlichen Zoologisch-Botanischen Gesellschaft in Wien* 43: 63–148.
Hentschel, J., Paton, J.A., Schneider, H. & Heinrichs, J. (2007) Acceptance of *Liochlaena* Nees and *Solenostoma* Mitt., the systematic position of *Eremonotus* Pearson and notes on *Jungermannia* L. s. l. (Jungermanniidae) based on chloroplast DNA sequence data. *Plant Systematics and Evolution* 268: 147–157.
http://dx.doi.org/10.1007/s00606-007-0549-7
Hooker, W.J. (1813) *British* Jungermanniae*: being a history and description, with figures, of each species of the genus, and microscopical analysis of the parts, vol. 9–15*. Longmans, London, pp. 33–60.
Hooker, W.J. (1814) *British* Jungermanniae*: being a history and description, with figures, of each species of the genus, and microscopical analysis of the parts, vol. 16–17*. Longmans, London, pp. 61–68.
Hooker, W.J. (1815) *British* Jungermanniae*: being a history and description, with figures, of each species of the genus, and microscopical analysis of the parts, vol. 18–19*. Longmans, London, pp. 69–76.
Hooker, J.D. & Taylor, T. (1844): Hepaticae Novae Zelandiae et Tasmaniae; being characters and brief descriptions of the Hepaticae discovered in the Islands of New Zealand and Van Diemen's Land, during the Voyage of H. M. Discovery ships *Erebus* and *Terror*, together with those collected by R. C. Gunn and W. Colenso Esqrs. *London Journal of Botany* 3: 556–582.
Horikawa, Y. (1934) Monographia Hepaticarum Australi-Japonicarum. *Journal of Science of the Hiroshima University: Series B, Division 2 (Botany)* 2: 101–325.
Jensen, C.E.O. (1912) *Aplozia pusilla*, nov. sp. *Revue Bryologique* 39: 92–94.
Konstantinova, N.A., Potemkin, A.D. & Šlâkov, R.N. (1992) Checklist of the Hepaticae and Anthocerotae of the former USSR. *Arctoa* 1: 87–127.
Konstantinova, N.A. & Vilnet, A.A. (2010 "2009") New taxa and new combinations in Jungermanniales (Hepaticae). *Arctoa* 18: 65–67.
Lindberg, S.O. (1867) Förteckning öfver mossor, insamlade under de svenska expeditionerna till Spitsbergen 1858 och 1861. *Öfversigt af Kongl. Vetenskaps-Akademiens Förhandlingar* 23: 535–561.
Lindberg, S.O. (1874) Manipulus muscorum secundus. *Notiser ur Sällskapets pro Fauna et Flora Fennica Förhandlingar* 13: 351–417.
Massalongo, C.B. (1903) *Le epatiche dell'erbario crittogamico italiano: revisione critica*. G. Bresciani, Ferrara, 20 pp.
McNeill, J., Barrie, F.R., Buck, W.R., Demoulin, V., Greuter, W., Hawksworth, D.L., Herendeen, P.S., Knapp, S., Marhold, K., Prado, J., Prud'homme van Reine, W.F., Smith, G.F., Wiersema, J.H. & Turland, N.J. (2012) International Code of Nomenclature for algae, fungi and plants (Melbourne Code) adopted by the Eighteenth International Botanical Congress Melbourne, Australia, July 2011. *Regnum Vegetabile* 154: 1–240.
McNeill, J., Barrie, F.R., Burdet, H.M., Demoulin, V., Hawksworth, D.L., Marhold, K., Nicolson, D.H., Prado, J., Silva, P.C., Skog, J.E., Wiersema, J.H. & Turland, N.J. (2006) International Code of Botanical Nomenclature (Vienna Code) adopted by the Seventeenth International Botanical Congress Vienna, Austria, July 2005. *Regnum Vegetabile*

146: 1–260.
Mitten, W. (1861) Hepaticae Indiae Orientalis: An enumeration of the Hepaticae of the East Indies. *Journal of the Proceedings of the Linnean Society. Botany* 5: 89–128.
Mitten, W. (1865): The "Bryologia" of the survey of the 49th parallel of latitude. *Journal of the Linnean Society of London* 8: 12–55.
Mitten, W. (1870) Hepaticae. *In*: Godman, F. (Ed), *Natural History of the Azores, or Western Islands*. Van Voorst: London, pp. 316–328.
Mitten, W. (1873 "1871") *Jungermanniae* and *Marchantiae*. *In*: Seemann, B. (Ed), *Flora vitiensis*. Reeve: London, pp. 325–453.
Mitten, W. (1891) An enumeration of all species of Musci and Hepaticae recorded from Japan. *Transactions of the Linnean Society of London. Botany* 3: 153–206.
Müller, K. (1947) Morphologische Untersuchungen zur Aufklärung einiger europäischer Lebermoose. *Beiträge zur Kryptogamenflora der Schweiz* 10(2): 1–55.
Nees von Esenbeck, C.G. (1830) *Enumeratio plantarum cryptogamicarum Javae et insularum adiacentium, quas a Blumio et Reinwardtio collectas describi edique curavit Christ. Godofr. Nees ab Esenbeck professor vratislaviensis. Fasciculus prior, hepaticas complectens, ab editore illustratas*. Grass, Barth & Co., Breslau, 86 pp.
Nees von Esenbeck, C.G. (1833) *Naturgeschichte der Europäischen Lebermoose mit besonderer Beziehung auf Schlesien und die Oertlichkeiten des Riesengebirgs, vol. 1*. August Rücker, Berlin, 348 pp.
Nees von Esenbeck, C.G. & Montagne, J.F.C. (1836) Jungermanniearum Herbarii Montagneani species. *Annales des Sciences Naturelles; Botanique, sér. 2* 5: 52–72.
Paton, J.A. (1999) *The liverwort flora of the British Isles.* 626 pp., Harley Books, Colchester.
Pearson, W.H. (1892) *Lejeuneae* Madagascariensis. *Forhandlinger i Videnskabs-Selskabet i Kristiania* 1892(8): 3–9.
Potemkin A.D. & Sofronova E.V. (2009) *Pečënočniki i antocerotovye Rossii* 1. Russian Academy of Sciences, Komarov Botanical Institute, Saint Petersburg & Jakutsk, 367 pp.
Schiffner, V. (1909) Hepaticae (*In*: Handel-Mazzetti H.M. (Ed.), Ergebnisse einer botanische Reise in das Pontische Randgebirge im Sandschak Trapezunt). *Annalen des K. K. Naturhistorischen Hofmuseums* 23: 133–141.
Schiffner, V. (1910) Kritische Bemerkungen über die europäischen Lebermoose mit Bezug auf die Exemplare des Exsiccatenwerkes: Hepaticae europaeae exsiccatae VIII (363–376). *Lotos. Zeitschrift für Naturwissenschaften* 58: 314–333.
Schuster, R.M. (1953) Boreal Hepaticae. A manual of the liverworts of Minnesota and adjacent regions. *American Midland Naturalist* 49(2): 257–684.
http://dx.doi.org/10.2307/2422089
Schuster, R.M. (1969) *The Hepaticae and Anthocerotae of North America east of the Hundredth Meridian.* Vol. 2. Columbia University Press, New York & London, 1060 pp.
Schuster, R.M. (2002) Austral Hepaticae. Part II. *Beihefte zur Nova Hedwigia* 119: 1–606.
Schuster, R.M. & Damsholt, K. (1974) The Hepaticae of West Greenland from ca. 66°N to 72°N. *Meddelelser om Grønland* 199(1): 1–373, 80 map.
Schljakov, R.N. (1980) Novye interesnye nahodki pečenočnikov iz severnyh rajonov SSSR [De hepaticis in regionibus borealibus URSS inventis novis et curiosis notula]. *Novosti Sistematiki Nizših Rastenij* 17: 235–241.
Smith, J.E. & Sowerby, J. (1811) *English Botany, vol. 32*. J. Davis, London, pp. 2233–2304.
Söderström, L., Hagborg, A. & von Konrat, M. (2012) Notes on Early Land Plants Today. *Phytotaxa* 65: 41–42.
Stephani, F. (1897) Hepaticae Japonicarum. *Bulletin de l'Herbier Boissier* 5: 76–108.
Stephani, F. (1901) Species Hepaticarum 2. *Bulletin de l'Herbier Boissier, série 2* 1: 477–521.
Stephani, F. (1902) Species Hepaticarum 2. *Bulletin de l'Herbier Boissier, série 2* 2: 35–48.
Stephani, F. (1917a) *Species Hepaticarum 6*. George & Cie, Genève & Bale, pp. 1–128.
Stephani, F. (1917b) *Species Hepaticarum 5*. George & Cie, Genève & Bale, pp. 1009–1044.
Underwood, L.M. (1888) Some undescribed hepaticae from California. *Botanical Gazette* 13(5): 112–114.
http://dx.doi.org/10.1086/326267
Váňa (1970) *Jungermannia caucasica* sp. n. (Hepaticae). *Preslia* 42: 96.
Váňa, J. (1972) Miscellaneous notes on the Asiatic Jungermannioideae. *Journal of the Hattori Botanical Laboratory* 35: 312–318.
Váňa, J. (1973 "1972") Miscellaneous notes on the Asiatic Jungermannioideae II. *Journal of the Hattori Botanical Laboratory* 36: 57–74.
Váňa, J. (1974a) Studien über die Jungermannioideae (Hepaticae). 4. *Jungermannia* subg. *Plectocolea* und subg. *Solenostoma*: Allgemeines, süd- und mittelamerikanische Arten. *Folia Geobotanica et Phytotaxonomica* 9: 179–208.
Váňa, J. (1974b) Studien über die Jungermannioideae (Hepaticae). 5. *Jungermannia* subg. *Plectocolea* und subg. *Solenostoma*: Afrikanische Arten. *Folia Geobotanica et Phytotaxonomica* 9: 277–312.

Váňa, J. (1974c) Studien über die Jungermannioideae (Hepaticae). 6. *Jungermannia* subg. *Solenostoma*: Europäische und nordamerikanische Arten. *Folia Geobotanica Phytotaxonomica* 9: 369–423.
Váňa, J. (1975) Studien über die Jungermannioideae (Hepaticae). 7. *Jungermannia* subg. *Plectocolea*: Europäische und nordamerikanische Arten. *Folia Geobotanica Phytotaxonomica* 10: 67–99.
Váňa, J. (1976) Studien über die Jungermannioideae (Hepaticae). 10. *Nardia*. *Folia Geobotanica et Phytotaxonomica* 11: 367–425.
Váňa, J. & Engel, J.J. (2013) The liverworts and hornworts of the Tristan da Cunha group of islands in the south Atlantic Ocean. *Memoirs of the New York Botanical Garden* 105: 1–138.
Váňa, J., Hentschel, J. & Heinrichs, J. (2010) New combinations in Jungermanniales: transfer of 32 taxa to *Solenostoma* Mitt. *Cryptogamie, Bryologie* 31: 135–139.
Váňa, J. & Engel, J. J. (2013) The liverworts and Hornworts of the Tristan da Cunha group of Islands in the South Atlantic Ocean. *Memoirs of The New York Bot. Garden* 105: i–x, 1–138, figs. 1–11.
Váňa, J., Hentschel, J. & Heinrichs, J. (2010) New combinations in Jungermanniales: transfer of 32 taxa to *Solenostoma* Mitt. *Cryptogamie, Bryologie* 31(2): 135–139.
Váňa, J. & Ignatov, M.S. (1995): Bryophytes of Altai Mountains. V. Preliminary list of the Altaian hepatics. *Arctoa* 5: 1–13.
Váňa, J. & Inoue, H. (1983) Studies in Taiwan Hepaticae. V. Jungermanniaceae. *Bulletin of the National Science Museum, Tokyo. Series B, Botany* 9: 125–142.
Váňa, J. & Long, D.G. (2009) Jungermanniaceae of the Sino-Himalayan region. *Nova Hedwigia* 89: 485–517. http://dx.doi.org/10.1127/0029-5035/2009/0089-0485
Váňa, J., Söderström, L., Hagborg, A. & von Konrat, M. (2012) Notes on Early Land Plants Today. 2. Two new combinations in *Solenostoma*. *Phytotaxa* 65: 44.
Vilnet, A.A., Konstantinova, N.A. & Troitsky, V.A. (2008) Phylogeny and systematics of the genus *Lophozia* s. str. (Dumort.) Dumort. (Hepaticae) and related taxa from nuclear ITS1–2 and chloroplast trnL-F sequences. *Molecular Phylogenetics and Evolution* 47: 403–418. http://dx.doi.org/10.1016/j.ympev.2007.12.013
Vilnet, A.A., Milyutina, I.A., Konstantinova, N.A., Ignatov, M.S. & Troitsky, V.A. (2007) Phylogeny of the Genus *Lophozia* (Dumort.) Dumort. s. str. inferred from nuclear and chloroplast sequences ITS1-2 and TRNL-F. *Russian Journal of Genetics* 43: 1556–1564. http://dx.doi.org/10.1134/S1022795407110142
Withering, W. (1796) *An arrangement of British Plants, ed. 3*. London, pp. 513–920.