



Notes on Early Land Plants Today. 55. New taxa and synonyms in Adelanthaceae (Marchantiophyta)

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Abstract

Recent molecular and morphological studies have solved many taxonomical questions in Adelanthaceae, but several taxa have not been studied recently. Based on studies of type material and additional specimens we synonymize i) *Syzygiella riclefii* with *Syzygiella campanulata*, *Syzygiella grollei* with *Syzygiella concreta*, *Syzygiella virescens* and *Syzygiella integerrima* with *Syzygiella contigua*, ii) *Syzygiella subundulata* and *Syzygiella colombiana* with *Syzygiella manca*, iii) *Syzygiella inouei* with *Syzygiella setulosa*, iv) *Syzygiella kerguelensis* with *Syzygiella tasmanica* and v) *Syzygiella liberata* with *Syzygiella trigonifolia*. New lectotypes are designated for *Syzygiella manca*, *Syzygiella plagiochiloides* and neotypes for *Syzygiella contigua* and *Syzygiella virescens*. The subfamily Adelanthoideae is validated.

Introduction

Feldberg *et al.* (2010a) showed that Adelanthaceae Grolle (1972: 327) consist of two well separated clades assigned to subfamilies Jamesonielloideae Inoue (1966: 178) and Adelanthoideae. Since autonyms do not exist above the level of genus, the latter subfamily is not automatically established and we cannot find any validating description of it. We therefore validate it here to be used for the forthcoming world checklist of liverworts and hornworts (Söderström *et al.*, *in prep.*).

The monograph of the genus *Syzygiella* Spruce (1876: 234) by Inoue (1966), which is based on morphological evidence, did not clarify all problems in the genus. Feldberg *et al.* (2010a, 2011) solved many taxonomical questions within the genus using evidence from DNA sequence data, in addition to morphology. However, not all described species have so far been included in molecular phylogenies, to a large extent as a consequence of a lack of vouchers suitable for DNA extraction. The present study tries to solve the status of some taxa whose type material was not revised by Inoue (1966), as well as several taxa which were described subsequent to Inoue's monograph (Robinson 1967, Grolle 1968, Inoue 1974, So & Grolle 2003, Pócs 2005). The study is based on the examination of type specimens and other herbarium materials over many years.

Syzygiella campanulata

Syzygiella riclefii Pócs (2005: 42) was based on a single specimen collected in the Parque Nacional de Sierra Nevada, Venezuela, and considered to be an endemic of the Venezuelan and Colombian Andes. It was separated from *Syzygiella campanulata* Herzog (1939: 9) by its less robust stature, strongly fragile leaves without revolute margin, smooth to slightly plicate perianths with a short tubular beak, hyaline leaf cell walls, and dark pigmented leaf cell content (Pócs 2005). These differences fall within the variability of *Syzygiella campanulata*; we therefore treat *Syzygiella riclefii* as a synonym of this species.

Syzygiella concreta

The isotype material of *Syzygiella grollei* Inoue (1974: 303) from JE consists of robust plants with broadly ovate leaves that are regularly spreading, even when dry. Ventrally, the leaves are broadly adnate (ca. 3-5 cells). Some shoots are provided with rudimentary underleaves either in the form of unbranched, 3-6 cells long, uniseriate filaments or lanceolate, appendages which are 2-3 cells wide at their base and up to 9 cells long. The perianth is ovate and the bracts are entire. In all these features *Syzygiella grollei* resembles large forms of *Syzygiella concreta* (Gottsche 1863: 82) Spruce (1876: 234), especially in the presence of ventrally broadly connate leaves and rudimentary underleaves.

Syzygiella contigua

The original material (Nova Granada, Lindig) of *Jungermannia contigua* Gottsche (1864: 118), *nom. illeg.*, non *Jungermannia contigua* Nees (1833: 360), was housed in B and destroyed during World War II. We were not able to locate any duplicate of this collection. Stephani (1902a) replaced the name *Jungermannia contigua* Gottsche with *Syzygiella contigua* Stephani (1902a: 470) and cited the above Lindig specimen from Nova Granada as well as material from Brazil collected by Ule. Only the latter collection is available from several herbaria; Munich material of this collection from the Stephani herbarium was already cited by the monographer of the genus, Inoue (1966: 210). We designate this specimen as neotype of *Syzygiella contigua*. The neotype agrees perfectly with the description and type material of *Syzygiella integerrima* Stephani (1917: 117) and the latter is therefore placed in the synonymy of *Syzygiella contigua*.

The type collection of *Syzygiella virescens* Stephani (1902a: 469) from Brazil (leg. Puiggari) was not found in any herbarium (incl. BM, G, W) and is probably lost or destroyed. Thus, a neotype is here designated from additional Brazilian collections in the Stephani herbarium (G), which Stephani also assigned to *S. virescens*. Both Brazilian specimens in G agree well with the original description. Inoue (1966: 210) already indicated that *Syzygiella virescens* “seems to be very similar to *Syzygiella integerrima*”. We agree with this statement and place *Syzygiella virescens* in the synonymy of *Syzygiella contigua* (= *Syzygiella integerrima*, see above).

Syzygiella manca

Recently Gradstein (2013) placed *Syzygiella geminifolia* (Mitten 1864a: 164) Stephani (1902a: 467) in the synonymy of *Syzygiella manca* (Montagne 1856:63) Jack & Stephani (1892: 14). His opinion was based on a single specimen collected in Ecuador (*Nöske 163*, GOET) which he had assigned to *Syzygiella manca*. This specimen was resolved in a clade with African accessions of *Syzygiella geminifolia* by Feldberg *et al.* (2010a), who noted that (l.c., p. 302) “An Ecuadorian accession is nested in the *Syzygiella geminifolia* clade and morphologically inseparable from the African accessions”.

Syzygiella geminifolia and *Syzygiella manca* were separated by assumed differences in stem cross section, undulation of leaves, and cell surface (Inoue 1966). However, our study of a larger series of specimens from the African mountains and South American material collected in the Andes (Peru to Venezuela) and on Mt. Roraima (Guayanan/Brazilian border), shows that *Syzygiella manca* is highly variable in terms of gametophyte size, stem cross section, dimensions and also shape and undulation of leaves, and cell size. The South American taxa placed in the synonymy of *Syzygiella manca* [*Syzygiella quelchii* Stephani (1901a: 96), *Syzygiella subundulata* Inoue (1966: 188) and *Syzygiella colombiana* Robinson (1967: 322)] are possibly habitat modifications caused by somewhat different growth conditions; as are African populations [*Syzygiella geminifolia*, *Syzygiella ruwenzorensis* Stephani (1911: 117)]. Large, well developed plants have a 2-3 layers thick stem cortex [*Syzygiella manca*, *Syzygiella colombiana* Robinson (1967: 322)], smaller and younger plants only +/- one, often ill-defined layer of cortical cells (*Syzygiella geminifolia*, *Syzygiella subundulata*). Some phenotypes have leaves with an undulate, reflexed ventral margin (*Syzygiella subundulata*, *Syzygiella colombiana* and the isolectotype, but not the lectotype of *Syzygiella quelchii*). The cell surface is usually smooth; trigones are large and nodulose. According to the key to the species of *Syzygiella* sect. *Anomalae* of Inoue (1966: 183), *Syzygiella manca* should have a smooth cell surface (cuticle) and *Syzygiella subundulata* a verrucose cell surface. However, in the original description of *Syzygiella subundulata* the cell surface is described as “cuticula laevi” (Inoue, l.c. p.188) or “cuticle smooth” (p. 190). Inoue (1966) was not able to examine the type of *Syzygiella quelchii*. He wrote that “according to the original description, this species seems to belong to sect. *Anomalae* and is very close to *Syzygiella manca* and *Syzygiella anomala*” (Inoue 1966: 210). Grolle (*in sched.* 2002 and in So & Grolle 2003), after revising the “holotype” of *Syzygiella quelchii* (BM; must be regarded as lectotype instead), confirmed the

conspecificity of *Syzygiella quelchii* and *Syzygiella manca*. The type of *Syzygiella quelchii* was collected in the same locality as the type of *Syzygiella subundulata*. Robinson (1967) apparently did not study the types of *Syzygiella quelchii* and *Syzygiella subundulata*. According to his description and determination key, plants of *Syzygiella colombiana* have larger leaves (3.5–4.0 mm long vs. 2.2–3.0 mm long) and a broadly auriculate ventral leaf base. He considered the leaf base of *Syzygiella subundulata* not auriculate, in contrast to that of *Syzygiella colombiana*. In fact, plants from Mt. Roraima identified as *Syzygiella quelchii* are somewhat smaller than the Colombian ones (also additional specimens from Colombia). Colombian and Guyanan plants are linked by a Venezuelan specimen (Venezuela, Amazonas, Dept. Rio Negro, Cerro de Neblina, 1985, *Halling 4355*, F, NY) assigned to *Syzygiella quelchii* which is intermediate in size. All examined specimens, incl. the type of *Syzygiella subundulata*, have auriculate ventral leaf bases (cf. Inoue 1966: 190, who described ventral bases of leaves as “ampliate”). The only existing difference between Mt. Roraima specimens assigned to *Syzygiella quelchii* or *Syzygiella subundulata* and Colombian plants of *Syzygiella colombiana* is the size of the gametophytes, a character which is possibly influenced by environmental conditions and not suitable to separate taxa. A large variation in size was already demonstrated for *Syzygiella concreta* (Feldberg *et al.* 2011). In the absence of comprehensive molecular data we accept a wide species concept for *Syzygiella manca*.

Syzygiella setulosa

Syzygiella setulosa Stephani (1902a: 469) is a very common species, especially in the Bolivian Andes. The species is morphologically quite variable and includes several morphological extremes. Already Stephani (1916) described four binomials from Bolivia which are considered to be synonyms of *Syzygiella setulosa*, i.e. *Jamesoniella rotundifolia* Stephani (1916: 185), *Plagiochila connatistipula* Stephani (1916: 194), *Plagiochila hariotii* Stephani (1916: 200) and *Plagiochila purpurea* Stephani (1916: 208) (Inoue 1966). According to our revision, *Syzygiella inouei* Grolle (1968: 354) represents an extreme, intensively reddish modification of *Syzygiella setulosa* with large papillae on the cell surface. Morphologically similar populations are known from high altitudes of Bolivia, Peru and Ecuador. Intense red color as well as dense and sometimes high papillae on the cell surface correspond with extreme ecological conditions (water, light) above the timberline. These populations resemble *Syzygiella rubricaulis* (Nees 1833: 344) Stephani (1902a: 468) but differ in oppositely inserted, dorsally connate, orbiculate leaves.

Syzygiella tasmanica

Syzygiella kerguelensis So & Grolle (2003: 358), known only in sterile condition, is morphologically identical with *Syzygiella tasmanica* (Hook.f. et Taylor in Hooker 1846:274) Feldberg *et al.* (2010b:144). The plants of the latter taxon are only slightly smaller and lack underleaves. These differences are obviously of minor importance since already Grolle (1971: 58) noted that the amphigastria of *Jamesoniella tasmanica* (Hook.f. et Taylor) Stephani (1901b: 1037) are sometimes lacking in sterile shoot sectors. We also need to consider that the Kerguelen plants were found between rhizomes of *Lomaria alpina*, and were thus likely not optimally developed.

Syzygiella trigonifolia

The combination *Syzygiella trigonifolia* (Stephani 1902b: 863) Herzog (1934: 87) was made without citing the basionym. Inoue (1966) interpreted the possible basionym to be *Plagiochila trigonifolia* Steph. but his opinion was probably influenced by the fact that he was an expert on the genus *Plagiochila* (Dumortier 1831: 42) Dumortier (1835: 14). However, Herzog (1934) wrote “Diese Art vermittelt zwischen *Jamesoniella* und *Syzygiella*, steht aber letzterer näher, so daß eine Versetzung in diese Gattung berechtigt erscheint“ (“This species is intermediate between *Jamesoniella* and *Syzygiella*, but is more closely to the latter, therefore a transfer to this genus seems justified”). In contrast to Inoue’s (1966) opinion, Grolle (1971) accepted *Syzygiella trigonifolia* as a synonym of *Jamesoniella trigonifolia* Stephani (1916: 185) which corresponds to Herzog’s description. *Jamesoniella trigonifolia* was synonymized by Grolle (1971) with *Plagiochila fuscolutea* Taylor (1846: 263), and already Herzog (in sched.) had noted “ob nicht Form von *Pl. fuscolutea*”. Heinrichs (2002) excluded *Jamesoniella trigonifolia* from the synonymy of *Plagiochila fuscolutea* and placed it in the synonymy of *Syzygiella anomala* (Lindenb. et Gottsche in Gottsche *et al.* 1847: 646) Stephani (1902a: 471), accepting forms with subopposite as well as opposite leaves in this taxon and noting that “a specimen from Tablas (*Herzog 2915*) was accepted as *Syzygiella anomala* by the monographer of the genus (Inoue 1966)”. Reconsidering molecular and morphological evidence (Feldberg *et al.* 2010a), we find that the above forms belong to different species, namely *Syzygiella anomala* and *Syzygiella liberata* Inoue (1974: 301). *Syzygiella liberata* differs

from *Syzygiella anomala* in having broadly triangular rather than elongate triangular leaves with a recurved dorsal leaf margin, and, most importantly, laterally compressed, dorsally subopposite leaves, while *Syzygiella anomala* has leaves which are regularly spreading and adnate dorsally and ventrally. *Syzygiella liberata* also shows a stronger tendency to produce rhizoids at the ventral leaf bases. The latter species was not treated in Inoue (1966), hence his determination key leads to *Syzygiella anomala*. The type material of *Jamesoniella trigonifolia* matches the morphology of *Syzygiella liberata*; hence, we place *Syzygiella liberata* in the synonymy of the older taxon, *Syzygiella trigonifolia*.

Formal treatment

The format of this note follows Söderström *et al.* (2012).

Adelanthoideae K.Feldberg, Heinrichs & Vána subfam. nov.

Based on:—trib. Adelantheae Jørg., *Bergens Mus. Skr. (n. ser.)* 16: 257, 1934 (Jørgensen 1934) excl. *Odontoschisma* (Dumortier 1831: 68) Dumortier (1835: 19). Type:—*Adelanthus* Mitt., *J. Proc. Linn. Soc. Bot.* 7: 243, 1864 (Mitten 1864b) *nom. cons.*

≡ Adelanthoideae Grolle, *J. Bryol.* 7: 231, 1972 (Grolle 1972), *nom. inval.* (Art. 38.1(a); no description) ≡ Adelanthoideae Feldberg *et al.*, *Molec. Phylogen. Evol.* 55: 298, 2010 (Feldberg *et al.* 2010a), *nom. inval.* (Art. 38.1(a); no description).

Diagnosis:—Leafy liverworts with lateral and ventral branching, succubously inserted, incurved leaves and generative structures (androecia, gynoecia) on short, basal branchlets.

Syzygiella campanulata Herzog, *Rev. Bryol. Lichénol.* 11: 9, 1939 (Herzog 1939). Type:—COSTA RICA. Southern slope of the Volcán de Turrialba, *Standley 35157* (holotype JE-04007067!).

= *Syzygiella riclefii* Pócs, *Cryptog. Bryol.* 26: 42, 2005 (Pócs 2005), *syn. nov.* Type:—VENEZUELA., Municipio Libertador: Parque Nacional de Sierra Nevada, Estación la Aguada, T. & S. Pócs, Y. León, R. Rico, C. Tirado 9702/BQA (holotype EGR, isotypes G-00115773, GOET!, MERC).

Syzygiella concreta (Gottsche) Spruce, *J. Bot.* 14: 234, 1876 (Spruce 1876). Basionym:—*Jungermannia concreta* Gottsche, *Mexik. Leverm.* 82, 1863 (Gottsche 1863). Type:—VENEZUELA. Valencia: *Fendler s.n.* (lectotype Y! [designated by Inoue 1966: 205], isolectotype FH-Sullivan!).

= *Syzygiella grollei* Inoue, *Bull. Natl. Sci. Mus. Tokyo* 17: 303, 1974 (Inoue 1974), *syn. nov.* Type:—COLOMBIA. Environs d'Alban, *Schaeck 72-AM-51* (holotype TNS, isotype JE-04007026!).

For further synonymy see Inoue (1966: 203) and Feldberg *et al.* (2011: 691).

Syzygiella contigua Steph., *Bull. Herb. Boissier (ser. 2)* 2: 470 [*Sp. Hepat. (Stephani)* 2: 189], 1902 (Stephani 1902) *Nom. nov. pro.*:—*Jungermannia contigua* Gottsche, *Ann. Sci. Nat., Bot. (sér. 5)* 1: 118, 1864 (Gottsche 1864), *nom. illeg.*, (ICN Art. 53.1, hom. illeg. [non *Jungermannia contigua* Nees 1833: 360]). Type:—BRAZIL. *Ule 428* (neotype **designated here** M-0082574!, isoneotypes FH!, G!).

= *Syzygiella virescens* Steph., *Bull. Herb. Boissier (ser. 2)*, 5: 469 [*Sp. Hepat. (Stephani)* 2: 188], 1902 (Stephani 1902), *syn. nov.* Type:—BRAZIL. Serra do Itatiaya, in silva, March 1894, *Ule 442* (neotype, **designated here**, G!, isoneotype FH!), the same locality, *Ule 443* (FH!, G!).

= *Syzygiella integerrima* Steph., *Sp. Hepat. (Stephani)* 6: 117, 1917 (Stephani 1917), *syn. nov.* Type:—GUADELOUPE. *Duss 1053* (lectotype designated by Inoue 1966: 199, G-00042024!).

Syzygiella manca (Mont.) J. B. Jack & Steph., *Hedwigia* 31 (1): 14, 1892 (Jack & Stephani 1892). Basionym:—*Chiloscyphus mancus* Mont., *Syll. Gen. Sp. Crypt.*: 63, 1856 (Montagne 1856). Type:—ECUADOR. Quito, *Jameson [herb. Delessert]* (lectotype, **designated here**, PC, isolectotypes G-00042049!, NY!).

= *Syzygiella geminifolia* (Mitt.) Steph., *Bull. Herb. Boissier (ser. 2)* 5: 467 [*Sp. Hepat. (Stephani)* 2: 186], 1902 (Stephani 1902) Basionym:—*Jungermannia geminifolia* Mitt., *J. Proc. Linn. Soc., Bot.* 7: 164, 1864 [1863] (Mitten 1864a) [syn. cf. Gradstein 2013]. Type:—SÃO TOMÉ E PRINCIPE. 1861, *Mann* (lectotype designated by Inoue 1966: 203, NY!, isolectotype G-00042023!).

= *Syzygiella plagiochiloides* Spruce, *J. Bot.* 14: 234, 1876 (Spruce 1876), *nom. inval.* (ICN Art. 38.1(a); no description); *Trans. & Proc. Bot. Soc. Edinburgh* 15: 500, 1885 (Spruce 1885) [syn. cf. Jack & Stephani 1892]. Type:—ECUADOR. Andes Quitenses, in monte Pichincha, *Spruce* (lectotype, **designated here**, MANCH!, isolectotype NY!).

- = *Syzygiella quelchii* Steph., *Trans. Linn. Soc. London, Bot.* 6: 96, 1901 (Stephani 1901a) [syn. cf. So & Grolle 2003]. Type:—GUAYANA. Mt. Roraima, *McConell & Quelch 334/14 in part* (lectotype [designated by So & Grolle 2003, as holotype] BM!; isotype G-0006922!).
- = *Plagiochila ruwenzorensis* Steph. in *Mildbraed, Wiss. Ergebn. Deut. Zent.-Afr. Exped. (1907-1908), Bot.* 2: 117, 1911 [1910] (Stephani 1911) ≡ *Syzygiella ruwenzorensis* (Steph.) Steph., *Sp. Hepat. (Stephani)* 6: 118, 1917 (Stephani 1917) [synonym of *Syzygiella geminifolia* in Váňa *et al.* 1979]. Type:—CONGO. Ruwenzori, Butagu-Tal, *Mildbraed 2607* (lectotype [designated by Váňa 1985] G-00042063!).
- = *Syzygiella subundulata* Inoue, *J. Hattori Bot. Lab.* 29: 188, 1966 (Inoue 1966), *syn. nov.* Type:—BRAZIL. Amazon: “in anteren Wolde” [error for “im unterem Walde”], *Ule 639* (lectotype M [designated by Inoue 1966]), “Brasilia, Roraima, *Ule 639, Syzygiella purpurata* Steph. in sched.” (isolectotype G!).
- = *Syzygiella colombiana* H. Rob., *Bryologist* 70 (3): 322, 1967 (Robinson 1967), *syn. nov.* Type:—COLOMBIA. Dept. Valle: W of Darien, finca “El Bosque”, *Core 261* (holotype US!).

***Syzygiella setulosa* Steph.**, *Bull. Herb. Boissier (ser. 2)*, 5: 469 [*Sp. Hepat. (Stephani)* 2: 188], 1902 (Stephani 1902). Type:—GUADELOUPE. *Duss 240* (lectotype designated by Inoue 1966: 208, G-00042064!).

= *Syzygiella inouei* Grolle, *Bryologist* 71: 354, 1968 (Grolle 1968), *syn. nov.* Type:—BOLIVIA. Hochtal Viloco, *Herzog 3162* (holotype S, isotypes JE!, TNS).

For the other synonymy see Inoue (1966: 208).

***Syzygiella tasmanica* (Hook. f. et Taylor) K.Feldberg, Váňa, Hentschel et Heinrichs**, *Cryptog. Bryol.* 31: 144, 2010 (Feldberg *et al.* 2010b) Basionym:—*Jungermannia tasmanica* Hook. f. et Taylor, *London J. Bot.* 5: 274, 1846 (Taylor 1846). Type:—AUSTRALIA. Tasmania: [Van Diemens Land], *Gunn* (lectotype [designated by Grolle 1971] BM!, isolectotypes FH!, NY, S!, W [Lindenb. Hep. 2386, 2387]) ≡ *Mesophylla tasmanica* (Hook. f. et Taylor) Trevis., *Mem. Reale Ist. Lombardo Sci., Ser. 3, C. Sci. Mat.* 4(13): 398, 1877 (Trevisan de Saint-Léon 1877) ≡ *Jamesoniella tasmanica* (Hook. f. et Taylor) Steph., *Bull. Herb. Boissier (ser. 2)* 1: 1037 (*Sp. Hepat. (Stephani)* 2: 100), 1901 (Stephani 1901b).

= *Syzygiella kerguelensis* M.L.So et Grolle, *Nova Hedwigia* 77: 358, 2003 (So & Grolle 2003), *syn. nov.* Type:—KERGUELEN. Île Foch, Baie Rhode, 1969, *Hébrard K6/c4* (holotype JE-04007076!).

For further synonymy see Grolle (1971: 55).

***Syzygiella trigonifolia* (Steph.) Herzog**, *Hedwigia* 74: 87, 1934 (Herzog 1934). Basionym:—*Jamesoniella trigonifolia* Steph. in Herzog, *Biblioth. Bot.* 87: 185, 1916 (Stephani 1916). Type:—BOLIVIA. Waldgrenze über Tablas, May 1911, *Herzog 2932* (lectotype [designated by Grolle 1971] M!, isolectotypes B!, G-00280419!, JE!, L, O, S!, W, Y); BOLIVIA, Rio Sanjana, 33000 m, 1911, *Herzog 3234* (paralectotype JE!).

= *Syzygiella liberata* Inoue, *Bull. Natl. Sci. Mus. Tokyo (n. ser.)* 17 (4): 301, 1974 (Inoue 1974), *syn. nov.* Type:—COLOMBIA. Cerro Nevado del Sumapaz, Quebrada El Buque, *Cleef 7789a* (holotype TNS, isotype U!).

Acknowledgement

We thank the herbaria B, C, EGR, F, G, GOET, HIRO, JE, M, MANCH, MO, NY, STR, S, U, and YA for the loan of specimens including types. Parts of this study were supported by the Deutsche Forschungsgemeinschaft (grant HE 3584/4). 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.

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