

**NOTES ON EARLY LAND PLANTS TODAY* 90.
SOME TECHNICAL LECTOTYPIFICATIONS IN LIVERWORTS
(MARCHANTIOPHYTA)**

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Abstract: Twenty-two names of liverwort and hornwort taxa described from Central America are lectotypified. Most of the taxa have been identified as types earlier but not formally selected. Two taxa are supplementarily lectotypified as the original lectotypification could be applied on more than one specimen.

Keywords: typification, Hepatics, Central America

INTRODUCTION

During the work with a catalogue of liverworts and hornworts of Central America it became obvious that many taxa are not properly defined, i.e. not typified. Many taxa were described by Herzog and type material is deposited in JE. They are dealt with by Söderström and Hentschel (2023). Some additional names are lectotypified here.

The typification practices, both past and current, are dealt with by Renner (2021) and Söderström and Hentschel (2023). As a summary and conclusion of these discussions a strict view is taken here by not accepting any holotype unless mentioned as such in the protologue. Inadvertent lectotypifications prior to 1 January 2001 are accepted if a term like “type” or “holotype” is present. The typifications by Bonner (1962, 1963, 1965, 1966) are controversial (see Engel and Smith Merrill 2019 and Renner 2021). We accept

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Bonner's types as inadvertent lectotypifications, but whenever possible, a supporting (or contradicting) typification is mentioned.

If a typification is clear, but it is unknown if there exists more than one gathering in a single herbarium (cf. ICN2018 Art. 8.1; Turland *et al.* 2018) it is here expressed as "Lectotype, or possibly holotype" or similar following the "best practice" recommendation by McNeill (2014). In all cases below, the original citation in the protologue is repeated verbatim in addition to any selected lectotype.

In a few cases, earlier lectotypifications selected one of the possible syntypes, but there exists more than one duplicate. In those cases, we select one of the duplicates as a second-step lectotypification. Sixteen taxa are here lectotypified and six taxa are second-step lectotypified.

Formal treatment

Aneura tripinnata Steph., Primit. fl. costar.: 111, 1893 (Stephani 1893).

Original citation: [Costa Rica] Forêts du Barba (Pitt. no. 6075).

Lectotype (here designated): Costa Rica, Heredia, Forêts du Barba, 6 Feb 1890, Pittier & Durand 6075 (G00282017 <http://www.ville-ge.ch/musinfo/bd/cjb/chg/adetail.php?id=209259&lang=en>, isolectotype PC0101733).

Note: There exists type material in at least G and PC (digitized and online). It is probable that Stephani did see both specimens, but he must certainly have seen the one in G, and probably based his description on that, so it seems appropriate to designate it as lectotype.

Currently accepted name: *Riccardia glaziovii* (Spruce) Meenks (cf. Stephani 1899).

Bazzania portoricensis (Hampe et Gottsche) Steph. var.

pycnodictyon Herzog, Rev. Bryol. Lichénol. 11(1): 19, 1939 (Herzog 1938).

Original citation: Costa Rica: El Muñeco, on the Rio Navarro, Prov. Cartago, 1400–1500 m, on tree ([Standley] n. 51.338, 50.887); Alto de La Estrella, Prov. Cartago, on tree ([Standley] n. 39.106, 39.117); La Estrella, Prov. Cartago ([Standley] n. 39.403).

Lectotype (Fulford 1963: 133 as "type"): El Muñeco, *Standley 51338, 50887*, US. Second-step lectotypification (here designated): *Standley & Torres 50887* (US04665905 <http://n2t.net/ark:/65665/m3abe4f0a5-007c-4d20-84bc-f01a24b0ea2d>); isolectotype JE04005948, <https://je.jacq.org/JE04005948>; syn-type: *Standley & Torres 51338* (US 04665907 <http://n2t.net/ark:/65665/m3951d11f7-b09f-4560-b6fd-a8b88ac1720b>).

Note: Fulford annotated the selected lectotype as *Bazzania breuteliana* and the syntype as including both *Bazzania breuteliana* (Lindenb. et Gottsche) Trevis. and *Bazzania asperistipula* (Steph.) Herzog. Thus, we select the specimen that she stated only includes one *Bazzania* species.

Currently accepted name: *Bazzania hookeri* (Lindenb.) Trevis. var. *hookeri* (cf. Fulford 1963 as syn. with *Bazzania breuteliana* (Lindenb. et Gottsche) Trevis. and Gradstein 2017).

Chiloscyphus nigrescens Lindenb. et Hampe, *Linnaea* 24 (3): 640, 1851 (Hampe 1851).

Original citation: Hab. in Costa Rica ad crateris Reventado aquas stagnates.

Lectotype (Grolle 1960): Costarica: Reventado, 10000' alt., im Kratersee Reventado, oja de Pascado, leg. Oersted ex hb. Lehmann in hb. S. Second-step lectotypification (here designated): S-B22184 (<https://herbarium.nrm.se/specimens/B22184>).

Note: There exist three specimens in S fitting Grolle's lectotypification. The selected specimen is the richest of the three and annotated as "type" by J.J. Engel in 1978.

Currently accepted name: *Clasmatocolea vermicularis* (Lehm.) Grolle (cf. Grolle 1960).

Hygrolejeunea tonduzana Steph., *Hedwigia* 35 (3): 105, 1896 (Stephani 1896).

Original citation: Hab. Costarica. Rio Naranjo (Tonduz No. 3077a).

Lectotype (Bonner 1966): Costa Rica, Rio Naranjo, 200–250 m., March 1893, *Tonduz s. n., Vetter 3077a, Stephani herb. no. G-11832*. Second-step lectotypification (here designated): G00280785 (<http://www.ville-ge.ch/musinfo/bd/cjb/chg/adetail.php?id=318288&lang=en>).

Note: There are two specimens in G (G00280785 and G00046957 <http://www.ville-ge.ch/musinfo/bd/cjb/chg/adetail.php?id=114721&lang=en>) with the same collection information (incl. Stephani herb. no.). The former is annotated "holotype" by M.E. Reiner-Drehwald in 2007 (and including also *Lejeunea adpressa* Nees). Thus, the former is here designated as lectotype.

Currently accepted name: *Lejeunea tonduzana* (Steph.) M.E.Reiner

Lepidozia karstenii Steph. var. *standleyi* Herzog, *Rev. Bryol. Lichénol.* 11: 22, 1939 (Herzog 1938).

Original citation: Costa Rica: Las Nubes, Prov. S. José, 1500–1600 m, on tree ([Standley] n. 38.735, 38.466); Alto de La Estrella, Prov. Cartago, on tree ([Standley] n. 39.061); Zurqui, Prov. S. José, 2000–2500 m, on tree ([Standley] n. 48.173, 48.194/a, forma *angustisecta*); Cerro de Las Caricias, Prov. de Heredia, 2000–2400 m., on tree ([Standley] n. 52.001, f. *angustisecta*); Cerros de Zurqui, Prov. de Heredia, 2000–2400 m, on tree ([Standley] n. 50.512, 50.518, f. *angustisecta*); Cerro de Las Lajas, Prov. de Heredia, 2000–2400 m, on tree ([Standley] n. 51.432); La Palma, Prov. S. José, 1600 m, wet bank, in large soft cushions ([Standley] n. 32.968, f. *angustisecta*); Cerro de Las Lajas ([Standley] n. 51.540, f. *brevifissa*); Cerros de Zurqui, Prov. de Heredia, 2000–

2400 m, on tree [Standley] n. 50.696; f. *brevifissa*); Zurqui, Prov. S. José, 2000–2500 m ([Standley] n. 48.214, f. *brevifissa*). – Cerro Galito, 2000 m (Valerio n. 13); La Palma (Valerio n. 20).

Lectotype (Fulford 1966: 201): Costa Rica, San José: Las Nubes, 1500–1600 m, *Standley 38735*, *Verdoorn*, *Hep. Select. & Crit. 375* (isolectotypes BR, C, F). **Second-step lectotypification (here designated)**: BR5040110401156 (<https://www.botanicalcollections.be/specimen/BR5040110401156>).

Note: Fulford selected one of the 12 original gatherings but cited duplicate specimens held by three herbaria. We here supplement her lectotypification and select the specimen in BR as lectotype. The exsiccatae, and thus isolectotypes, exist in several more herbaria not mentioned by Fulford, e.g. US, MICH, GOET, JE, G, PC, NY. Fulford cited *Standley 38735* and *Hep. Select. et Crit. 375* as they were the same. However, the localities seem not to be the same and we think Verdoorn did have the specimen from “Cerro Galito, Valerio 18” for which he severely misspelled the locality and assumed Valerio was a locality, not the collector.

Currently accepted name: *Lepidozia armata* Steph. (cf. Fulford 1966).

Megaceros guatemalensis Steph., *Sp. Hepat. (Stephani)* 5: 948, 1916 (Stephani 1916).

Original citation: Hab. *Guatemala*.

Lectotype (here designated): Guatemala, Alta Verapaz, 1650 m, Türcckheim, Jan. 1908, herb. Levier 6078 (G00061198 <http://www.ville-ge.ch/musinfo/bd/cjb/chg/adetail.php?id=121330&lang=en>, isolectotypes NY00231432, NY00231433).

Note: Type material of *Megaceros guatemalensis* exists in both G and NY, the former published as “holotype” and the latter as “isotype” by Villarreal & Renner (2014). This is too late to be interpreted as a lectotypification. We are not aware of any earlier formal lectotypification of the name.

Currently accepted name: *Nothoceros vincentianus* (Lehm. et Lindenb.) J.C. Villarreal (cf. Villarreal and Renner 2014).

Plagiochila biapiculata Steph., *Bull. Herb. Boissier (sér. 2)* 5 (9): 891 (= *Sp. Hepat. [Stephani]* 2: 557), 1905 (Stephani 1905b).

Original citation: Hab. *Costarica*, Pittier et Durand.

Lectotype (here designated, or possibly holotype): *Costarica*, Pittier & Durand (G00064113; <http://www.ville-ge.ch/musinfo/bd/cjb/chg/adetail.php?id=125096&lang=en>).

Note: Only one possible type specimen has been traced, but there may also be material in other herbaria.

Plagiochila bradeana Steph., *Sp. Hepat. (Stephani)* 6: 133, 1918 (Stephani 1918).

Original citation: Hab. *Costarica*. (Brade legit.).

Lectotype (here designated, cf. Heinrichs 2002 as “holotype”, or possibly holotype): *Costa Rica*, 1903, *Brade s.n.* (G025136 [=G00264683, <http://www.ville-ge.ch/musinfo/bd/cjb/chg/adetail.php?id=241817&lang=en>]).

Note: Heinrichs (2002) referred to the current specimen as “holotype” but that was too late to be taken as a lectotype and thus we here formally select it as a lectotype although we have not found any further possible type material, but can not rule out that it exists.

Currently accepted name: *Plagiochila superba* (Nees ex Spreng.) Mont. et Nees (cf. Heinrichs 2002).

Plagiochila bonplandii Gottsche, *Ann. Sci. Nat. Bot.* (sér. 4) 8: 332, 1857 (Gottsche 1857).

Original citation: Habitat in America aequatoriali, lecta a cel. A. Bonpland. (Herb. Mus. Paris., n° 3).

Lectotype (here designated): Herbar de l’Amerique équatoriale, donné par M. A. Bonpland (PC0098175 <https://science.mnhn.fr/institution/mnhn/collection/pc/item/pc0098175?listIndex=1&listCount=2>, isolectotype G00282668 <https://www.ville-ge.ch/musinfo/bd/cjb/chg/adetail.php?id=270768&lang=en>).

Note: The lectotype in PC is annotated by M. Sauer in 2003 as lectotype and the isolectotype in G as isolectotype. Both specimens are identified by him as *Plagiochila laetevirens*. Neither the typification, nor the synonymy seems to have been published.

Currently accepted name: *Plagiochila laetevirens* Lindenb., **syn. nov.**

Plagiochila excisa Steph., *Sp. Hepat. (Stephani)* 6: 153, 1918 (Stephani 1918).

Original citation: Hab. *Costarica*. (Tonduz legit.).

Lectotype (here designated): Costa Rica, Talamanca, Apr. 1895, legit A. Tonduz (G00061387 <http://www.ville-ge.ch/musinfo/bd/cjb/chg/adetail.php?id=127443&base=img&lang=en>; isolectotypes G00061386 <http://www.ville-ge.ch/musinfo/bd/cjb/chg/adetail.php?id=127447&lang=en>; G00061388 <http://www.ville-ge.ch/musinfo/bd/cjb/chg/adetail.php?id=127441&lang=en>).

Note: There are three specimens in G, possibly from the same gathering. One specimen is marked as lectotype in the database without any annotation. No formal lectotypification has been found and the specimen marked as lectotype on G’s website is selected here.

Plagiochila fallax Lindenb. et Hampe, *Linnaea* 24: 300, 1851 (Hampe 1851).

Original citation: Hab. in *Costae ricae* mont. 5–8000’.

Lectotype (here designated): Costa Rica, Oersted s.n. ex herb. Karl Müller, Halensis (G 00282693 <http://www.ville-ge.ch/musinfo/bd/cjb/chg/adetail.php?id=270160&lang=en>; isolectotypes S, G and possible elsewhere).

Note: The selected lectotype is the specimen cited as “isotype” by Gradstein (2015) when synonymizing the taxon with *Plagiochila patula*. By selecting this as lectotype, the name will be fixed in the sense of Gradstein in case the many isolectotypes include several elements.

Currently accepted name: *Plagiochila patula* (Sw.) Lindenb. (cf. Gradstein 2015).

Plagiochila pinnata Steph., *Bull. Herb. Boissier (sér. 2)* 5: 749 (=Sp. *Hepat. [Stephani]* 2: 548), 1905 (Stephani 1905a), *hom. illeg.* (ICN Art. 53.1; non Spruce 1885).

Original citation: Hab. *Costarica*, Montana de Poas (Pittier).

Lectotype (here designated, or possibly holotype): Costa Rica, Alajuela, Montana de Poás, 2400 m, 1888, H. Pittier ex hb. Bescherelle, G00061461 (<http://www.ville-ge.ch/musinfo/bd/cjb/chg/adetail.php?id=126749&lang=en>).

Note: There is only one specimen in G and we have not been able to find duplicates in other herbaria although we believe they may exist.

Currently accepted name: *Plagiochila costariensis* Horik. (cf. Horikawa 1943).

Plagiochila secundidens Steph. ex Dugas, *Contrib. Étude Plagiochila*. 1928: 155, 188, 1928 (Dugas 1928).

Original citation: Échantillon étudié: Guatemala, 1892; ♂.

Lectotype (here designated): E viciniis urbis Guatemala, 1892, s. coll. (PC0103036 (<https://science.mnhn.fr/institution/mnhn/collection/pc/item/pc0103036>); isolectotype G00115860 <http://www.ville-ge.ch/musinfo/bd/cjb/chg/adetail.php?id=286225&lang=en>).

Note: Dugas must have seen the PC material, but not necessarily the G material, so it is best to select PC as lectotype.

Currently accepted name: *Plagiochila adianthoides* (Sw.) Lindenb. (cf. Heinrichs 2002).

Plagiochila tonduzana Steph., *Sp. Hepat. (Stephani)* 6: 227, 1921 (Stephani 1921).

Original citation: Hab. *Costarica* (Tonduz legit).

Lectotype (here designated): Costa Rica, Cartago, Rio Naranjo, 200–250 m, Mar 1893, *Tonduz*, Stephani det. Octobre 1894, Flora Costaricensis 2069 (G00121258, <http://www.ville-ge.ch/musinfo/bd/cjb/chg/adetail.php?id=170190&lang=en>; G00121234 <https://www.ville-ge.ch/musinfo/bd/cjb/chg/adetail.php?id=170191&lang=en>).

Note: There are three possible lectotypes from two localities in G. The selected lectotype is the richest specimen, while the other two only consist of a few shoots.

Radula laxiramea Steph., *Sp. Hepat.* 4: 178, 1910 (Stephani 1910).

Original citation: Hab. *Panama*. Chirique.

Lectotype (Castle 1959: 45 but see note): Panama, Chiriquí, Helion 412, herb. Lacouture (G00112206, <http://www.ville-ge.ch/musinfo/bd/cjb/chg/adetail.php?id=131244&lang=en>), isolectotype YU, BM, PC.

Note: Castle (1959) only cited YU and BM as “type” but in the subsequent discussion he stated that Stephani’s *Icones* and description are based on the material in G. Yamada (1991) referred to the G specimen as “holotype”. Thus, this can be taken as a lectotype. Otherwise, the G specimen is here designated as lectotype.

Riccia oerstediana Lindenb. et Hampe, *Linnaea* 24: 304, 1851
(Hampe 1851).

Original citation: Hab. Costa Rica. 5–8000'.

Lectotype (Jovet-Ast 1993: 243): Costa Rica, *Oersted* (G). Second-step lectotypification (here designated): G00281751 <http://www.ville-ge.ch/musinfo/bd/cjb/chg/adetail.php?id=341810&lang=en>, isolectotypes G, S.

Note: There are two specimens in G corresponding to Jovet-Ast's lectotypification. The one chosen here is annotated "original" by Stephani.

Syzygiella longifolia Steph., *Sp. Hepat.* 6: 118, 1917 (Stephani 1917).

Original citation: Hab. *Costarica*. (Tonduz legit.)

Lectotype (Inoue 1966: 202): Costa Rica, Alto del Pito, March 1873, leg. Tonduz s. n., (G, Y, M). Second-step lectotypification (here designated): G00069926 <http://www.ville-ge.ch/musinfo/bd/cjb/chg/adetail.php?id=132565&lang=en>.

Note: The lectotype was annotated as "holotypus" by J. Váňa in 1995.

Currently accepted name: *Syzygiella concreta* (Gottsche) Spruce (cf. Feldberg *et al.* 2011).

Taxilejeunea maxima Steph., *Sp. Hepat. (Stephani)* 5: 473, 1914
(Stephani 1914).

Original citation: Hab. *Guatemala*.

Lectotype (here designated), or possibly holotype: Guatemala, Alta Verapaz, near Cobán 1600 m, Mar 1908, Türkheim (G00047593, <http://www.ville-ge.ch/musinfo/bd/cjb/chg/adetail.php?id=146432&lang=en>).

Note: Only one possible type has been located, but it is still possible that more type material exists.

Taxilejeunea mucronata Steph., *Sp. Hepat. (Stephani)* 5: 473, 1914
(Stephani 1914).

Original citation: Hab. *Guatemala*.

Lectotype (here designated), or possibly holotype): Guatemala, s.loc., Türkheim, hb. Levier 5072 (G00113327, <http://www.ville-ge.ch/musinfo/bd/cjb/chg/adetail.php?id=147592&lang=en>).

Note: Only one possible type has been located, but it is still possible that more type material exists.

Taxilejeunea parvibracteata Steph., *Hedwigia* 35: 136, 1896
(Stephani 1896).

Original citation: Hab. *Costarica*, Rio Naranjo (Tonduz 3077F).

Lectotype (here designated): Costa Rica, Cartago, Turrialba, Río Naranjo, 200–250 m, 1893, Tonduz 3077/F (G00124031 <https://www.ville-ge.ch/musinfo/bd/cjb/chg/adetail.php?id=147577&lang=en>, isolectotypes G00124029

<https://www.ville-ge.ch/musinfo/bd/cjb/chg/adetail.php?id=147571&lang=en>, G00124030 <https://www.ville-ge.ch/musinfo/bd/cjb/chg/adetail.php?id=147580&lang=en>).

Note: There are three packages with the same collection data in G, but with different Geneva barcode numbers. They are probably part of the same gathering.

***Taxilejeunea tonduzana* Steph., *Sp. Hepat. (Stephani)* 5: 498, 1914 (Stephani 1914).**

Original citation: Hab. *Costarica*.

Lectotype (here designated): Costa Rica, forêts du Rio Naranjo, mars 1893, leg. A. Tonduz 15614 (G00113325 <http://www.ville-ge.ch/musinfo/bd/cjb/chg/adetail.php?id=147603&lang=en>; isolectotype NY1059616 (<http://sweetgum.nybg.org/science/vh/specimen-details/?irn=1199910>).

Note: Gradstein (2021) stated that it is based on two different Tonduz collections (15612 =G00047600, 15614 =G00113325) from the same locality but it also exists in NY01059616. G00113325 is annotated "holotype" by R. Grolle in 1974 and is here designated as lectotype.

Currently accepted name: *Lejeunea tonduzana* (Steph.) M.E.Reiner (cf. Gradstein 2021).

***Taxilejeunea umbonata* Steph., *Sp. Hepat. (Stephani)* 5: 481, 1914 (Stephani 1914).**

Original citation: Hab. *Guatemala*.

Lectotype (here designated, or possibly holotype): Guatemala, Alta Verapaz, in silva primaeva prope Cobán, 1600 m, March 1908, *H. v. Türckheim*, Bryotheca Levier 5827 (G00047596, <http://www.ville-ge.ch/musinfo/bd/cjb/chg/adetail.php?id=146435&lang=en>).

Note: Only one possible type has been located, but it is still possible that more type material exists.

***Trichocolea inaequalis* Steph., *Sp. Hepat. (Stephani)* 4: 59, 1909 (Stephani 1909b).**

Original citation: Hab. *Guatemala*.

Type: Lectotype (here designated, cf. Katagiri 2019, or possibly holotype): Guatemala, s.coll. (G-00113470).

Currently accepted name: *Leiomitra flaccida* Spruce (cf. Hatcher 1957).

Note: Katagiri (2019) referred to it as "lectotype" without indicating that it was selected there. We are not aware of any earlier lectotypification or any further possible type material.

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