Nomenclatural reappraisal of the *Macroptilium gracile* (Leguminosae) species complex

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Summary. The controversy regarding the status of the *Macroptilium gracile* species complex has been elucidated by the authors of this paper; nevertheless, some nomenclatural issues regarding the naming of the newly established variety have been found. In the present contribution, we discuss some nomenclatural aspects concerning the valid publication of the name *Macroptilium gracile* var. *subcoriaceum* (Benth.) Berlingeri, M.B.Crespo & Calles. After considering different nomenclatural evidence, the latter varietal name is to be considered superfluous and therefore, we establish a new combination (i.e., *Macroptilium gracile* var. *longepedunculatum*).

Key Words. Fabaceae, Papilionoideae, *Phaseolus gracilis*, the Americas.

Introduction

Macroptilium gracile (Poepp. ex Benth.) Urb. is distributed in Central and South America, and is an extremely variable species. Ever since Bentham (1837) described its basionym *Phaseolus gracilis* Poepp. ex Benth., the species has been the subject of controversy. This situation has created confusion among botanists and non-botanists working with this important forage species (Cook *et al.* 2020).

On the basis of morphological, molecular and biogeographic data (which included revision of vouchers from the herbaria ABH, HERZU, IRBR, K, M, MY, NY, PORT, S, UOJ, VEN and W; acronyms according to Thiers 2021, continuously updated), Berlingeri *et al.* (2020) concluded that there is enough evidence to separate the *Macroptilium gracile* species complex into two distinct species: *M. gracile* and *M. campestre* (Mart. ex Benth.) Berlingeri, M.B.Crespo & Calles (= *Phaseolus scoleocarpus* Piper). The former is widely distributed in Central and South America, and exhibits broad morphological variation. For this reason, Berlingeri *et al.* (2020) described one infraspecific taxon based on the earliest legitimate name at the same rank (i.e. *Phaseolus longepedunculatus* var. *subcoriaceus* Benth.) as sanctioned by the International Code of Nomenclature for algae, fungi, and plants (hereinafter referred to as the Code) (Art. 11.4, Turland *et al.* 2018). This also generated an autonym (i.e., *Macroptilium gracile* var. *gracile*) as sanctioned by the Code (Art. 26.1, Turland *et al.* 2018). Unfortunately, this solution is in conflict with the Code because according to Article 11.6 (Turland *et al.* 2018) “an

autonym is treated as having priority over the name or names of the same date and rank that established it”.

In the present contribution, we discuss nomenclatural issues concerning the *Macroptilium gracile* species complex and explore ways to overcome shortcomings of the publication Berlingeri *et al.* (2020). As a result, a new combination is established.

Historical Background

Bentham (1837) described the species *Phaseolus longepedunculatus* Mart. ex Benth. and three new varieties: a) var. *latifolius* Benth. *nom. nud.* (associated with: in sylvis Catingas ad Joazeiro provinciae Bahia, Martius s.n. [M-0174112!]); b) var. *angustifolius* Benth. *nom. nud.* (associated with: in pascuis herbidis planitierum provinciae Piauhí, Martius s.n. [M-0174109!, M-01741010! & M-01741011!]); and c) var. *subcoriaceus* Benth. (type: ad Ribeirão Catinga, Pohl s.n. [K-000189691!]). The varieties *latifolius* and *angustifolius* do not have any description or diagnosis, and neither was accompanied by reference to any previous one; therefore, they were not validly published and must be considered *nomina nuda*. However, the varietal name *subcoriaceus* was validly published because it was accompanied by a description (Art. 38.1, Turland *et al.* 2018), and it is a legitimate name since it was established in accordance with the Code rules (Art. 6.5, Turland *et al.* 2018). Furthermore, *Phaseolus longepedunculatus* vars *latifolius* and *angustifolius* do not appear in the database of the International Plant Name Index (IPNI — <https://www.ipni.org/>), whereas var. *subcoriaceus* does. Addi-

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tionally, the detailed Latin description placed just below that name in the protologue matches the characteristics of the voucher *Pohl* s.n. deposited at the Royal Botanic Gardens (K-000189691!); which is original material used by Benth. (1837) and was designated as lectotype of the taxon in question by Berlingeri *et al.* (2020).

Nomenclatural Treatment

Berlingeri *et al.* (2020) have already clarified the status of the so-called *Macroptilium gracile* species complex; therefore, we will only address the nomenclatural issue regarding the correct name of the infraspecific taxa of *M. gracile* established by Berlingeri *et al.* (2020).

Benth. (1837) validly published the name *Phaseolus longepedunculatus* var. *subcoriaceus*, which automatically established the corresponding autonym (i.e., *P. longepedunculatus* var. *longepedunculatus*). Additionally, Benth. (1837) published two new varieties (i.e., var. *latifolius* and var. *angustifolius*) but these are considered *nomina nuda* because they do not have any description or diagnosis, and were not accompanied by reference to any previous one (Art. 38; Turland *et al.* 2018).

Piper (1926) was the first to consider *Phaseolus gracilis* and *P. longepedunculatus* as extreme forms of a single species, based on the existence of abundant intermediate individuals. Consequently, he selected *P. gracilis* as the accepted name and synonymised *P. longepedunculatus*. After Piper's (1926) treatment, some authors considered *Macroptilium gracile* ($\equiv$ *Phaseolus gracilis*) and *M. longepedunculatum* (Mart. ex Benth.) Urb. ($\equiv$ *Phaseolus longepedunculatus*) as distinct species (e.g., Urban 1928a; Verdcourt 1970; Maréchal *et al.* 1978), while other authors (e.g., Barbosa-Ferevereiro 1987; Espert *et al.* 2007) agreed with Piper (1926).

After using multiple lines of evidence, Berlingeri *et al.* (2020) agreed with Piper (1926) that *Macroptilium gracile* and *M. longepedunculatum* are conspecific; however, they concluded that there was enough evidence to maintain two varieties. Unfortunately, they selected the infraspecific epithet *subcoriaceum*, in conflict with Article 11.6 (Turland *et al.* 2018). According to the Article 11.6 (Turland *et al.* 2018) “an autonym is treated as having priority over the name or names of the same date and rank that established it”; therefore, the correct infraspecific epithet of the taxon in question should be *longepedunculatum*.

Macroptilium gracile (Poepp. ex Benth.) Urb., *Symb. Antill.* 9 (4): 457 (Urban 1928a) $\equiv$ *Phaseolus gracilis* Poepp. ex Benth., *Comm. Legum. Gen.*: 77 (Benth. 1837). Lectotype (designated as “holotype” by Barbosa-Ferevereiro 1987 and corrected to lectotype by Berlingeri *et al.* 2020): Cuba, *Poeppig* s.n. (W0045836!).

Macroptilium gracile var. **gracile**

- = *Phaseolus longepedunculatus* var. *angustifolius* Benth., *Comm. Legum. Gen.*: 77 (Benth. 1837), **nom. nud.** Associated with: Brasil, In pascuis herbidis planitierum provinciae Piauiensis, Maio, *Martius* s.n. [M0174109 (photograph!); M0174110 (photograph!); M0174111 (photograph!)].
- = *Phaseolus savannarum* Britton & P. Wilson, *Mem. Torrey Bot. Club* 16 (2): 70 – 71 (in Britton 1920). Holotype: Cuba, Pinar del Rio, Herradura, *Earle* 632 [NY (photograph!)].
- = *Phaseolus longepedunculatus* var. *linearifoliolatus* Hassl., *Candollea* 1: 453 (Hassler 1923). Syntypes: Guatemala, *Türkheim* 3573 (Herb. Delessert, G — not seen); Costa Rica, *Shannon* 6022 (G — not seen).
- = *Phaseolus longepedunculatus* f. *boliviensis* Hassl., *Candollea* 1: 453 (Hassler 1923). Holotype: Bolivia, Santa Cruz, *Steinbach* 2046 (possibly at BAF, BREM, MVM; not seen).
- = *Phaseolus unilobatus* Pittier, *Bol. Técn. Minist. Agric.* 5: 55 (Pittier 1944). Holotype: Venezuela, Monagas, Maturín, *Pittier* 14352 (VEN48769!).

Macroptilium gracile var. **longepedunculatum** (Mart. ex Benth.) Berlingeri, M.B. Crespo & Calles **comb. nov.**

<http://www.ipni.org/urn:lsid:ipni.org:names:77234368-1>

- $\equiv$ *Phaseolus longepedunculatus* Mart. ex Benth., *Comm. Legum. Gen.*: 77 (Benth. 1837) $\equiv$ *Macroptilium longepedunculatum* (Mart. ex Benth.) Urb., *Symb. Antill.* 9 (4): 457 (Urban 1928a). Lectotype (**designated here**): Brazil. Ad Ribeirão Catinga, *Pohl* s.n. (K-000189691!); isoelectotypes: W-0045835 (photograph!), NY (not seen).
- = *Phaseolus longepedunculatus* var. *latifolius* Benth., *Comm. Legum. Gen.*: 77 (Benth. 1837), **nom. nud.** Associated with: Brazil. In sylvis Catingas ad Joazeiro provinciae Bahia, *Martius* s.n. [M-0174112 (photograph!)].
- = *Macroptilium gracile* var. *subcoriaceum* (Benth.) Berlingeri, M.B. Crespo & Calles, *Bot. J. Linn. Soc.* 194 (1): 132 (2020), **nom. superfl.** [Art. 52.4] $\equiv$ *Phaseolus longepedunculatus* var. *subcoriaceus* Benth., *Comm. Legum. Gen.*: 77 (Benth. 1837). Lectotype (designated by Berlingeri *et al.* 2020: 132): Brazil. Ad Ribeirão Catinga, *Pohl* s.n. (K-000189691!); isoelectotypes: W-0045835 (photograph!), NY (not seen).
- = *Phaseolus longepedunculatus* f. *typicus* Hassl., *Candollea* 1: 452 (Hassler 1923), **nom. invalid.** pro parte (excl. ‘Colombia: Santa Marta, *Smith* 287’).
- = *Phaseolus longepedunculatus* f. *glabratus* Hassl., *Candollea* 1: 452 (Hassler 1923). Lectotype (designated by Torres Colín 2006): Paraguay. Paraguay, *Hassler* 6197 (K!).

- = *Macroptilium domingense* Urb., *Ark. Bot.* 22A (8): 51 – 52 (Urban 1928b). Holotype: Haiti. Haiti, *Ekman H-9401* [S-R-9483 (photograph)!].
- = *Phaseolus diversifolius* Pittier, *Bol. Técn. Minist. Agric.* 5: 56 (Pittier 1944), **nom. illegit.**, non Pers., *Syn. Pl.* 2 (2): 296 (Persoon 1807). Holotype: Venezuela. Anzoátegui, Guaraguara, near Santamé, *Pittier 14302* (VEN-198640!).

Nomenclatural Note

The name *Phaseolus longepedunculatus* was published by Benth (1837) and he made reference to three specimens (i.e., two collected by Carl von Martius and another collected by Johann Pohl), which should be treated as syntypes (Art. 9.6, Turland *et al.* 2018). We have designated Pohl's specimen deposited at K (K-000189691) as lectotype of *Macroptilium gracile* var. *longepedunculatum* based on Article 9.12 (Turland *et al.* 2018) and because it is the one fixing the application of Benth's description.

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References

- Barbosa-Feverireiro, V. P. (1987). *Macroptilium* (Benth.) Urban do Brasil (Leguminosae-Faboideae-Phaseoleae-Phaseolinae). *Arq. Jard. Bot. Rio de Janeiro* 28: 109 – 180.
- Benth, G. (1837). *Commentationes de Leguminosarum Generibus*. J. P. Sollinger, Wien.
- Berlinger, C. A., Crespo, M. B. & Calles, T. (2020). The *Macroptilium gracile* species complex (Fabaceae, Papilionoideae): an integrative taxonomic study based on morphological, molecular and ecological data. *Bot. J. Linn. Soc.* 194 (1): 118 – 139. <https://doi.org/10.1093/botlinnean/boaa036>
- Britton, N. L. (1920). Descriptions of Cuban plants new to science. *Mem. Torrey Bot. Club* 16: 57 – 118.
- Cook, B. G., Pengelly, B. C., Schultze-Kraft, R., Taylor, M., Burkart, S., Cardoso Arango, J. A., González Guzmán, J. J., Cox, K., Jones, C. & Peters, M. (2020). *Tropical Forages: An interactive selection tool*. Second and revised edition. International Center for Tropical Agriculture (CIAT), Cali and International Livestock Research Institute (ILRI), Nairobi.
- Espert, S. M., Drewes, S. I. & Burghardt, A. D. (2007). Phylogeny of *Macroptilium* (Leguminosae): Morphological, biochemical and molecular evidence. *Cladistics* 23: 119 – 129. <https://doi.org/10.1111/j.1096-0031.2006.00140.x>
- Hassler, E. (1923). Revisio specierum austro-americanum generis *Phaseoli* L. *Candollea* 1: 417 – 472.
- Maréchal, R., Mascherpa, J. & Stainier, F. (1978). Etude taxonomique d'un groupe complexe d'espèces des genres *Phaseolus* et *Vigna* (Papilionaceae) sur la base de données morphologiques et polliniques, traitées par l'analyse informatique. *Boissiera* 28: 1 – 273.
- Persoon, C. H. (1807). *Synopsis Plantarum* 2 (2). apud Bibliopolas Treuttel et Würtz.
- Pittier, H. (1944). *Leguminosae de Venezuela, I: Papilionaceae*. Boletín Técnico No. 5. Ministerio de Agricultura y Cría (MAC), Caracas.
- Piper, C. V. (1926). Studies in American Phaseolinae. *Contr. U.S. Natl. Herb.* 22 (9): 663 – 701.
- Thiers, B. (2021, continuously updated). *Index Herbariorum: A global directory of public herbaria and associated staff*. New York Botanical Garden's Virtual Herbarium. Available from: <http://sweetgum.nybg.org/ih/> [Accessed: 4 Jan. 2021].
- Torres Colín, M. L. (2006). Revisión taxonómica del género *Macroptilium* (Benth.) Urb. (Leguminosae) en México y Centroamérica. Tesis de Maestría en Ciencias (Biología). Universidad Nacional Autónoma de México, Ciudad de México. Available at: <http://132.248.9.195/pd2007/0609824/Index.html>
- 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. (eds) (2018). International code of nomenclature for algae, fungi, and plants (Shenzhen Code). Adopted by the Nineteenth International Botanical Congress, Shenzhen, China, July 2017. *Regnum Veg.* 159. Koeltz Botanical Books, Glashütten. <https://doi.org/10.12705/Code.2018>
- Urban, I. (1928a). *Plantae cubensis novae vel rariores a clo. Er. L. Ekman lectae. Symb. Antill. [Urban]* 9 (4): 433 – 458.
- (1928b). *Plantae Haitienses et Domingenses novae vel rariores V. a cl. E. L. Ekman 1924 – 27 lectae. Ark. Bot.* 22A (8): 1 – 98, t. 1 – 4.
- Verdcourt, B. (1970). Studies in the Leguminosae-Papilionoideae for the Flora of the Tropical East Africa: IV. *Kew Bull.* 24: 507 – 569.

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