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Pterolepis haplostemona (Melastomataceae): a new serpentine endemic from Goiás, Brazil

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Abstract

Pterolepis haplostemona from ultramafic outcrops in Goiás, Brazil is described, illustrated, and compared with presumed relatives, all of which are also endemic to Brazil. It is distinguished by its annual habit, simple hypanthial trichomes and intercalycine emergences, haplostemonous flowers, rostrate antesepalous stamens, short pedoconnective, linear-lanceolate cauline leaf blades, calyx lobes tipped with a rigid unbranched trichome, and 3–4-locular ovary. This species and *Microlicia macedoi* appear to be the only known Melastomataceae that are endemic to serpentine substrates in Brazil. A conservation assessment based on IUCN criteria is also provided.

Resumo

Pterolepis haplostemona, de afloramentos rochosos ultramáficos em Goiás, Brasil é descrita, ilustrada e comparada com espécies supostamente relacionadas, todas também endêmicas no Brasil. É distinta por seu hábito anual, tricomas do hipanto e emergências intercalicinais lisos, flores haplostêmones, estames antessépalos rostrados, pedoconectivos curtos, lâminas das folhas caulinares linear-lanceoladas, lacínias do cálice terminadas por tricoma liso rígido e ovário 3–4 locular. Esta espécie e *Microlicia macedoi* parecem ser as únicas Melastomataceae conhecidas endêmicas em substratos de serpentina no Brasil. É também fornecida uma avaliação de conservação baseada em critérios da IUCN.

Key words: haplostemony, Melastomeae, neotropics, new species, ultramafic outcrops

Introduction

The affinity of vascular plant species for ultramafic rocks and the serpentine soils derived from them has commanded the attention of plant and soil scientists for many decades. The adaptation of closely related plant species to serpentine and non-serpentine soils is phylogenetically and geographically widespread but patchily distributed (Brady *et al.* 2005). In tropical America, serpentine sites that are defined, in part, by the presence of many endemic species occur mainly in Cuba, Puerto Rico, and Brazil (Brooks 1987). The most extensive ultramafic outcrops in the latter country occur in Goiás state (Jenny 1980; Brooks 1987). The serpentine flora of Cuba, one of the richest of its kind in the world, is also one of the best studied. Among the largest and most diverse families of flowering plants in Cuba (Asteraceae, Euphorbiaceae, Melastomataceae, Myrtaceae, and Rubiaceae) 56–65% of the species are either serpentine-obligate (SO) or serpentine-facultative (SF) with the SO species typically outnumbering the SF species (Borhidi 1992; Reeves *et al.* 1999). In contrast, the serpentine flora of Brazil has long been neglected. In many ways it is still a work in progress but recent efforts have done much to remedy this deficiency in Goiás state where mining for the economically important minerals associated with ultramafic geology has intensified over the last three to four decades (Brooks *et al.* 1990; Reeves *et al.* 1999).

The new species of *Pterolepis* (Candolle 1828: 140) Miquel (1840: 72) described here was collected during the initial expeditions focused on the serpentine flora and soil chemical factors that influence plant distributions on the

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All collections of *P. haplostemona* have flowers that are haplostemonous. Evolutionary loss of fertile stamens is rare in neotropical species of the tribe Melastomeae. Among Melastomataceae generally, haplostemony is a characteristic feature of the Cyphostyleae, a tribe of three genera and 20 species that has capsular fruits derived from inferior ovaries (Michelangeli *et al.* 2011), and the recently described monotypic genus *Quipuanthus* (Michelangeli & Ulloa 2014: 533) that appears to have its closest affinities with the Cyphostyleae (Michelangeli *et al.* 2014). Among neotropical genera with capsular fruits and superior ovaries, haplostemony is a consistent character state for five of the 15 species of *Siphanthera*, one species of *Cambessedesia* (Candolle 1828: 110), one species of *Monochaetum* (DC. 1828: 138) Naudin (1845: 48–49), one species of *Poteranthera* (Bongard 1838: 137) and various species in a few genera of the paleotropical Dissochaeteae and Sonerileae (Bakhuizen 1943; Wickens 1975; Hansen 1982; Martins 1984; Hansen 1988; Cellinese & Renner 1997; Alvear 2010; Almeda & Robinson 2011; Kriebel 2012). Among berry-fruited neotropical genera, only *Blakea* (P. Browne 1756: 323) appears to have a few haplostemonous species, all of which are restricted to southern Central America (Almeda 2000; Penneys & Judd 2013).

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Literature Cited

Almeda, F. (2000) The hexandrous species of *Topobea* (Melastomataceae). [ser. 4.] *Proceedings of the California Academy of Sciences* 52: 97–109.

Almeda, F. & Robinson, O.R. (2011) Systematics and phylogeny of *Siphanthera* (Melastomataceae). *Systematic Botany Monographs* 93: 1–101.

Alvear, M. (2010) *Systematics of the genus Monochaetum (Melastomataceae) in Colombia.* M.Sc. thesis in Biology: Ecology and Systematics. San Francisco State University, San Francisco, CA, USA, 296 pp.

Bachman, S., Moat, J., Hill, A.W., de la Torre, J., & Scott, B. (2011) Supporting Red List threat assessments with GeoCAT: geospatial conservation assessment tool. *In:* Smith, V. & Penev, L., (Eds.) e-Infrastructures for Data Publishing in Biodiversity Science. *ZooKeys* 150: 117–126. [Version BETA]

Reinier Cornelis Bakhuizen, B. van den (1943) A contribution to the knowledge of the Melastomataceae occurring in the Malay Archipelago, especially in the Netherlands East Indies. *Recueil Travaux Botaniques Néerlandais* 40: 1–391.

Bongard, H.G. (1838) Genera duo Melastomacearum ordine nova. *Mémoires de l'académie Impériale des Sciences de Saint-Pétersbourg. Sér. 6, Sciences Naturelles* 4(2): 137–142.

Borhidi, A. (1992) The serpentine flora and vegetation of Cuba. *In:* Baker, A.J.M., Proctor, J. & Reeves, R.D. (Eds.) *The vegetation of ultramafic (serpentine) soils*. Intercept Ltd., Andover, U.K., pp. 83–95

Brady, K.U., Kruckeberg, A.R., & Bradshaw, H.D. (2005) Evolutionary ecology of plant adaptation to serpentine soils. *Annual Review of Ecology, Evolution and Systematics* 36: 243–66.
http://dx.doi.org/10.1146/annurev.ecolsys.35.021103.105730

Brooks, R.R. (1987) *Serpentine and its vegetation*. Dioscorides Press, Portland.

Brooks, R.R., Reeves, R.D., Baker, A.J.M., Rizzo, J.A. & Dias Ferreira, H. (1990) The Brazilian Serpentine Plant Expedition (BRASPEX), 1988. *National Geographic Research* 6(2): 205–219.

Browne, P. (1756) *The civil and natural history of Jamaica in three parts*. London.

Candolle, A.P. de (1828) Melastomaceae. *In: Prodromus systematis naturalis regni vegetabilis* 3. Treuttel & Würtz, Paris, pp. 99–202.

Cellinese, N. & Renner, S.S. (1997) New species and new combinations in *Sonerila* and *Phyllagathis* (Melastomataceae) from Thailand. *Novon* 7(2): 106–112.
http://dx.doi.org/10.2307/3392181

Cogniaux, C.A. (1885) Melastomaceae: Tibouchineae. *In:* Martius, C.F.P. & Eichler, A.G. (Eds.) *Flora brasiliensis* 14(3): 205–484. pl. 49–108.

Gleason, H.A. (1935) Certain Melastomataceae of Surinam. *Recueil des Travaux Botaniques Néerlandais* 32: 203–214.

Hansen, C. (1982) A revision of *Blastus* Lour. (Melastomataceae). *Bulletin Museum National d'histoire naturelle, B, Adansonia* 1–2: 43–77.

Hansen, C. (1988) *Kerriothyrsus*, a new genus of Melastomataceae. *Willdenowia* 17: 153–157.

IUCN (2001) *IUCN Red List Categories and Criteria.* Version 3.1. Species Survival Commission, IUCN, Gland and Cambridge, 33 pp.

IUCN (2014) *Guidelines for using the IUCN Red List Categories and Criteria.* Version 11. Prepared by the Standards and Petitions Subcommittee, 87 pp. Available from: http://www.iucnredlist.org/documents/RedListGuidelines.pdf (accessed 19 June 2014).

Jenny, H. (1980) The soil resource: origin and behavior. *Ecological Studies* 37: 256–59.

Kriebel, R. (2012) A synopsis of the genus *Poteranthera* (Melastomeae: Melastomataceae) with the decription of a new apparently pollinator deceiving species. *Brittonia* 64: 6–14.

Martins, A.B. (1984) *Revisão do gênero Cambessedesia DC. (Melastomataceae).* M.Sc.thesis, Universidade Estadual de Campinas, Campinas, Brazil, 191 pp.

Michelangeli, F.A., Nicolas, A., Morales-P., M.E., & David, H. (2011) Phylogenetic relationships of *Allomaieta, Alloneuron, Cyphostyla, and Wurdastom* (Melastomataceae) and the resurrection of the tribe Cyphostyleae. *International Journal of Plant Sciences* 172(9): 1165–1178.

Michelangeli, F.A., Guimarães, P.J.F., Penneys, D.S., Almeda, F., & Kriebel, R. (2013) Phylogenetic relationships and distribution of New World Melastomeae (Melastomataceae). *Botanical Journal of the Linnean Society* 171: 38–60.

Michelangeli, F.A., Ulloa Ulloa, C., & Sosa, K. (2014) *Quipuanthus,* a new genus of Melastomataceae from the foothills of the Andes in Ecuador and Peru. *Systematic Botany* 39(2): 533–540.
http://dx.doi.org/10.1600/036364414X680924

Miquel, F.A.W. (1840) *Commentarii phytographici*. Fasc. 2: 31–92, "*Observationes de Piperaceis et Melastomataceis."* S. & J. Luchtmans, Leiden.

Naudin, C. (1844) Additions á la flore du Brésil méridional. [Sér. 3.] *Annales de Sciences Naturelles: Botanique* 2: 140–156.

Naudin, C. (1845) Additions á la flore du Brésil méridional. [Sér. 3.] *Annales de Sciences Naturelles: Botanique* 4: 48–57.

Naudin, C. (1850) Melastomacearum. Quae in Museo Parisiensis continentus Monographica descriptionis. [Sér. 3.] *Annales de Sciences Naturelles: Botanique* 13(1): 25–39.

Penneys, D.S. & Judd, W.S. (2013) A revised circumscription for the Blakeeae (Melastomataceae) with associated nomenclatural adjustments. *PhytoKeys* 20: 17–32.

Reeves, R.D., Baker, A.J.M., Borhidi, A. & Berazaín, R. (1999) Nickel hyperaccumulation in the serpentine flora of Cuba. *Annals of Botany* 83: 29–38. Available from: http://www.idealibrary.com.

Reeves, R.D., Baker, A.J.M., Becquer, T., Echevarria, G., & Miranda, Z.J.G. (2007) The flora and biogeochemistry of the ultramafic soils of Goiás state, Brazil. *Plant Soil* 293: 107–119.
http://dx.doi.org/10.1007/s11104-007-9192-x

Renner, S.S. (1994) A revision of *Pterolepis* (Melastomataceae: Melastomeae). *Nordic Journal of Botany* 14: 73–104.
http://dx.doi.org/10.1111/j.1756-1051.1994.tb00575.x

Smith, L.B. (1955) Notes on Brazilian phanerogams. *Journal of the Washington Academy of Sciences* 45: 197–200.

Triana, J.J. (1871) Les Melastomacées. *Transactions of the Linnean Society of London* 28: 1–188.
http://dx.doi.org/10.1111/j.1096-3642.1871.tb00222.x

Wickens, G.E. (1975) Melastomataceae. *In:* Polhill, R.M. (Ed.) *Flora of Tropical Africa*.