



Three new species of *Markea* (Solanaceae, Juanulloae) from Colombia

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Abstract

Three new species of *Markea* from Colombia are described and their morphological affinities and conservation status are discussed. *Markea hunzikeri* is different from other species of *Markea* because it presents a 3-lobed calyx and 3-lobed stigma. *Markea huilensis* shows affinity with *Markea lopezii* and *Markea epifita*, from which it differs by its exerted anthers, tubular-campanulate corolla and fruit with leathery, black, non-translucent exocarp when dry. *Markea purpurea* is clearly differentiated from other species in this genus by its very reduced, extra-axillary, short-pedunculate inflorescence, generally bearing one short-pedicellate or sessile flower with corolla dark purple or black inside. For new species illustrations, photographs of live plants and distribution maps are presented. As a tool for species identification of *Markea*, this paper is accompanied by a key to all species currently recognized in the genus. Additionally, photographs of live plants for most of the species of the genus are included.

Key words: Colombia, *Hawkesiophyton*, Juanulloae, *Markea*, Solanaceae, taxonomy

Resumen

Se describen tres especies nuevas de *Markea* para Colombia y se discuten sus afinidades morfológicas y estado de conservación. *Markea hunzikeri* se distingue fácilmente de otras especies de *Markea* por su cáliz y estigma 3-lobulados. *Markea huilensis* es semejante a *Markea lopezii* y *Markea epifita*, de las que se diferencia por sus anteras exertas, corola tubular-campanulada y fruto con exocarpo coriáceo, negro y no translúcido en material de herbario. *Markea purpurea* se diferencia fácilmente de otras especies del género por su inflorescencia muy reducida, corto pedunculada, de posición extra-axilar, generalmente con una flor cortamente pedicelada o sésil, de corola púrpura en su interior. Para las nuevas especies se presentan ilustraciones, fotografías en vivo y mapas de distribución. Como herramienta para la identificación de las especies de *Markea*, este artículo va acompañado de una clave para todas las especies reconocidas actualmente en el género. Adicionalmente, se incluyen fotos en vivo para muchas de las especies del género.

Palabras clave: Colombia, *Hawkesiophyton*, Juanulloae, *Markea*, Solanaceae

Introduction

Markea Richard (1792: 107) (Solanaceae) is a neotropical genus of the subfamily Solanoideae and belongs to the tribe Juanulloae Hunz. (Hunziker 1977, 1979, 1997; Knapp *et al.* 1997; Knapp 1998). The species of *Markea* are epiphytic or hemi-epiphytic vines or shrubs, distributed from Panama to Bolivia and Southern Brazil (Hunziker 1997, 2001; Knapp *et al.* 1997). Most of its species grow in primary forests from sea level to 3000 m. The highest diversity is found in the Colombian and Ecuadorian Andes (Hunziker 1997, 2001) while the highest concentration of species is present in Colombia with 13 of the 20 species currently recognized in the genus, including the three new species described in this paper.

In a most recent phylogenetic study for Solanaceae, Olmstead *et al.* (2008) recognize tribe Juanulloae as a natural group. However, the circumscription of this tribe has been historically controversial, specifically regarding the inclusion of the genus *Solandra* Swartz (1787: 300), and more recently, *Schultesianthus* Hunziker (1977: 35) (Knapp *et al.* 1997; Hunziker 2001; Olmstead *et al.* 2008). Additionally, different concepts have been formulated on the status

- Calyx length usually less than the midpoint of the corolla length in flower anthesis. Apex of the calyx lobes acuminate to largely acuminate..... 14
- 11. Leaf blades coriaceous, margin revolute. Indument with abundant branched trichomes. Ovary 4-locular. Southern Ecuador *M. fosbergii* (Fig. 4D)
- Leaf blades membranaceous, margin flat. Indument with simple trichomes. Ovary 2-locular 12
- 12. Inflorescence glabrous, usually 1-flowered, the bracts absent. Ecuador (Western Cordillera)..... *M. spruceana*
- Inflorescence hairy, usually 4 or more flowered, the bracts stipule-like and conspicuous. 13
- 13. Indument densely pilose on the whole plant. Southwestern Colombia and northwestern Ecuador. *M. pilosa* (Fig. 4G)
- Indument sparsely present to glabrescent. Colombia (Western Cordillera) *M. antioquiensis* (Fig. 4A)
- 14. Flowers sessile or sub-sessile 15
- Flowers pedicellate 16
- 15. Leaf blades coriaceous, dark brown when dry in herbarium material, margin revolute. Axillary inflorescence. Brazil, Guyana, Surinam, Venezuela *M. sessiliflora* (Fig. 4I)
- Leaf blades membranaceous, light brown when dry in herbarium material, margin flat. Extra-axillary inflorescence. Southwestern Colombia (Western Cordillera) *M. purpurea* (Fig. 8, 9)
- 16. Inflorescence with 1 to 5 flowers 17
- Inflorescence with 8 to 20 flowers 19
- 17. Corolla campanulate. Filaments adnate at ca. 10 mm from the base of the corolla tube. Eastern Brazil *M. atlantica*
- Corolla infundibuliform. Filaments adnate at 25–40 mm from the base of the corolla tube 18
- 18. Indument with simple trichomes; margin of leaf blade ciliate. Apexes of the corolla lobes obtuse or rounded. Colombia, Brazil, Peru (Amazon basin) *M. formicarum* (Fig. 4C)
- Indument with branched trichomes; margin of leaf blade non-ciliate. Apexes of the corolla lobes acute. Eastern and Southeastern Colombia (Eastern Cordillera, low slopes and Amazon low lands) *M. plowmanii* (Fig. 4H)
- 19. Calyx lobes shortly acuminate. Narrow part of the corolla tube protruding from the calyx in flower anthesis. Bracts absent or inconspicuous. Lesser Antilles, Northern Brazil, French Guiana, Guyana and Venezuela *M. longiflora* (4E)
- Calyx lobes largely acuminate. Narrow part of the corolla tube included in the calyx in flower anthesis. Bracts linear and conspicuous. Southern Colombia and Northern Ecuador (low slopes and Amazon low lands) *M. harlingiana*

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References

- Anton A.M. & Barboza, G.E. (2007) Armando Theodoro Hunziker (29 August 1919–12 December 2001). In: Spooner, D. M., Bohs, L., Giovannoni, J., Olmstead, R. G. & Shibata, D. (editors) *Solanaceae VI: Genomics meets biodiversity. Acta Horticulturae* (ISHS) 745: 551–564.
- Cuatrecasas, J. (1959) New chiropterophilous Solanaceae from Colombia. *Journal of the Washington Academy of Sciences* 49: 269–271.
- D’Arcy, W.G. (1973) [1974] Solanaceae. In: Woodson, R. E. & Schery, R. W. Jr. (editors) *Flora of Panama. Annals of Missouri Botanical Garden* 60: 573–780.
<http://dx.doi.org/10.2307/2395139>
- Donnell Smith, J. (1897) Undescribed plants from Guatemala and other Central American republics XVII. *Botanical Gazette* 23: 1–14.

<http://dx.doi.org/10.1086/327456>

- Ducke, A. (1915) Plantes nouvelles ou peu connues de la région amazonienne. Solanaceae. *Archivos (Arquivos) do Jardim Botânico do Rio de Janeiro* 1: 54–57.
- Hunziker, A.T. (1977) Estudios sobre Solanaceae VIII. Novidades varias sobre tribus, géneros, secciones y especies de Sud América. *Kurtziana* 10: 7–50.
- Hunziker, A.T. (1979) South American Solanaceae: A synoptic survey. In: J. G. Hawkes, R. N. Lester & A. D. Skelding (editors) *The Biology and Taxonomy of the Solanaceae*. Academic Press, London, pp. 49–85.
- Hunziker, A.T. (1985) Estudios sobre Solanaceae XX. *Markea lopezii*, nueva especie de Colombia. *Lorentzia* 5: 9–12.
- Hunziker, A.T. (1997) Estudios sobre Solanaceae LIII: Revisión de las especies de *Markea*. *Kurtziana* 25: 67–113.
- Hunziker, A.T. (2001) *Genera Solanacearum*. A.R.G. Gantner Verlag K.-G., Ruggell, 500 pp.
- IUCN (2012). IUCN Red List Categories and Criteria: Version 3.1. Second edition. Gland, Switzerland and Cambridge, UK: IUCN. iv + 32 pp.
- Knapp, S. (1998) New Species and Notes on the Natural History of *Markea* (Solanaceae) from Colombia and Ecuador. *Novon* 8: 152–161.
<http://dx.doi.org/10.2307/3391987>
- Knapp, S., Persson, V. & Blackmore, S. (1997) A phylogenetic conspectus of the Juanulloeae (Solanaceae). *Annals of the Missouri Botanical Garden* 84: 67–89.
<http://dx.doi.org/10.2307/2399954>
- Linden, J.J. (1853) *Trianaea*. In: *Prix-courant* 8: 4.
- Miers, J. (1849) XXI. Contributions to the Botany of South America. On the genus *Ectozoma*. *Annals and Magazine of Natural History, including Zoology, Botany, and Geology*, ser. 2, 4: 185–193.
- Miers, J. (1849) XXVIII. Contributions to the Botany of South America. On the genus *Dyssochroma*. *Annals and Magazine of Natural History, including Zoology, Botany, and Geology*, ser. 2, 4: 250–251.
- Nee, M. (2011) Familia Solanaceae. In: Idárraga, A., Ortiz, R., Callejas R. & Merello, M. (eds.) *Flora de Antioquia: Catálogo de las plantas vasculares. vol. II. Listado de las plantas vasculares del departamento de Antioquia*. Editorial D' Vinni, Bogotá, pp. 882–897.
- Olmstead, R.G., Bohs, L., Migid, H.A., Santiago-Valentin, E., Collier, S.M. & García, V.F. (2008) A molecular phylogeny of the Solanaceae. *Taxon* 57: 1159–1181. Available from: http://depts.washington.edu/phylo/OlmsteadPubs/Olmstead_et_al_2008.pdf (accessed 8 May 2014)
- Persson, V., Knapp, S. & Blackmore, S. (1994) Pollen morphology and systematics of tribe Juanulloeae A.T. Hunziker (Solanaceae). *Review of Palaeobotany and Palynology* 83: 1–30.
[http://dx.doi.org/10.1016/0034-6667\(94\)90054-x](http://dx.doi.org/10.1016/0034-6667(94)90054-x)
- Richard, L.C.M. (1792) Catalogus plantarum, ad societatem, ineunte anno 1792, e *Cayenna missarum* a domino Le Blond. *Actes de la Société d'Histoire Naturelle de Paris* 1: 105–114.
- Rodríguez, R.E.F. (2006) Una nueva especie de *Markea* (Solanaceae: Juanulloeae) para el Perú. *Arnaldoa* 13: 306–313.
- Ruiz, L.H. & Pavon, J.A. (1794). *Florae Peruvianae, et Chilensis Prodrum, sive novorum generum plantarum peruvianum, et chilensium descriptiones et icones*. Madrid, 153 pp.
<http://dx.doi.org/10.5962/bhl.title.11759>
- Särkinen, T., Bohs, L., Olmstead, R. & Knapp, S. (2013) A phylogenetic framework for evolutionary study of the nightshades (Solanaceae): a dated 1000-tip tree. *BMC Evolutionary Biology* 13: 214.
<http://dx.doi.org/10.1186/1471-2148-13-214>
- Stehmann, J.R. & Giacomini, L.L. (2012) *Markea atlantica* (Solanaceae): a new species of tribe Juanulloeae disjunct from its core distribution. *Systematic Botany* 37: 1035–1042.
<http://dx.doi.org/10.1600/036364412x656581>
- Swartz, O. (1787) *Solandra*, et nitt Ört-flågte från Vesf-Indien. *Kongl. Vetenskaps Academiens Nya Handlingar* 8: 300–306.