



Synonymy of three South American genera in Apocynaceae, and new combinations in *Oxypetalum* and *Tassadia*

SIGRID LIEDE-SCHUMANN & ULRICH MEVE

Department of Plant Systematics, University of Bayreuth, Universitätsstraße 30, 95440 Bayreuth, Germany
e-mail: sigrid.liede@uni-bayreuth.de

Abstract

Three small South American genera of Apocynaceae-Asclepiadoideae are included in a phylogeny of South American Apocynaceae-Asclepiadoideae using the *trnT-L* and *trnL-F* intergenic spacers and the *trnL* and *rps16* introns. Two genera, *Widgrenia* and *Rhyssostelma*, are nested in the large genus *Oxypetalum*. One, *Stenomeria*, is congeneric with *Tassadia*. The correspondent and necessary new combinations, *Oxypetalum nigricans* and *O. corymbosum*, and *Tassadia decalepis*, *T. fosteri* and *T. pentalepis* are made. The new combination *Tassadia guanchezii* is proposed for a hitherto insufficiently known species of white sand savannas of Colombia and Venezuela. *Lorostelma struthianthus*, a synonym of *Tassadia decalepis*, is lectotypified. This manuscript proposes taxonomic changes that reflect advances in Oxypetalinae and Tassadiinae, and it emends the description of *Tassadia guanchezii*.

Keywords: Asclepiadoideae, Asclepiadeae, Molecular Phylogeny, *Metastelma*, Neotropics, *Rhyssostelma*, *Stenomeria*, Taxonomy, *Widgrenia*

Introduction

Since the first molecular study focusing on Apocynaceae (Sennblad 1996), the circumscription and interrelationships of the constituent genera has been increasingly well understood and the framework of subfamilies, tribes and subtribes has been refined accordingly (compare Endress & Bruyns 2000, Endress *et al.* 2007, Endress *et al.* 2014) to form a stable scaffold to ask and answer evolutionary questions (e.g., Livshultz *et al.* 2011). In subfamily Asclepiadoideae, the traditional tribal structure defined by pollinaria characters (e.g., Swarupanandan *et al.* 1996) was confirmed, so that only 20 of the total of 168 genera that have not yet been sequenced were assigned to one of the tribes according to pollinia orientation and structure. However, below tribal level prediction of relationships in the subfamily is difficult, because other sets of morphological characters, in particular the widely used corona characters, are notoriously unreliable (e.g., Hechem *et al.* 2011, Liede-Schumann *et al.* 2014). In Asclepiadeae, characterized by pendulous pollinia, the position of twelve genera has not yet been ascertained by molecular analysis. In the Old World, these are *Adelostemma* Hooker (1883: 20), *Mahawoa* Schlechter (1916: 2; type material lost), *Merrillanthus* Chun & Tsiang (1941: 105), *Pentastelma* Tsiang & P.T.Li (1974: 577), and *Sichuania* M.G.Gilbert & P.T.Li in Gilbert *et al.* (1995: 12), all from Asia. In the New World, the position of *Hypolobus* Fournier (1885: 311), *Pherotrichis* Decaisne (1838: 322), *Rhyssostelma* Decaisne (1844: 590), *Rojasia* Malme (1905: 10), *Stelmagonum* Baillon (1890: 287), *Stenomeria* Turczaninow (1852: 312), and *Widgrenia* Malme (1900: 7) has not yet been ascertained by molecular analysis. The position of *Hypolobus* will have to remain obscure, because it is believed to be extinct (Fontella-Pereira & Konno 1999). The present paper aims to clarify the position of *Rhyssostelma*, *Stenomeria*, and *Widgrenia*, of which sequenceable material could be obtained.

Rhyssostelma comprises a single species, *R. nigricans* Decaisne (1844: 590), endemic to Uruguay. Even though “Buenos Ayres” is listed as one locality on the type specimen (*Commerson s.n.*), there are no confirmed records from Argentina, and the newest online edition of Flora Argentina (Anonymous 2013) does not list the genus as extant. The decumbent plants are densely hispid with long (ca. 0.5 to 1 mm) white trichomes and bear sessile, ovate leaves. Their reddish-brown flowers, that are large for an Asclepiad (ca. 1 cm diam.) are borne in few-flowered, long-stalked inflorescences and are likewise hispid on the outside and ciliate. From the dark reddish-brown corona, the gynostegium with yellow anthers and a shortly elongated, white style-head emerges. The species had been known only from the

the herbaria COAH, COL, HUA and JAUM for the possibility to study their holdings. Francisco Morales (University of Bayreuth) had the sharp eye to discover *Tassadia guanchezii* in the field. Angelika Täuber and Margit Gebauer (University of Bayreuth) conducted the lab work for sequencing.

References

- Anonymous (2013) *Flora Argentina*. The Andrew Mellon Foundation. Available from: <http://www.floraargentina.edu.ar/> (accessed 9 September 2014).
- Anonymous (2014) *Catalogue of the Vascular Plants of Bolivia*. Missouri Botanical Garden, Saint Louis. Available from: <http://www.tropicos.org/Name/2600806?projectid=13> (accessed 9 September 2014).
- Baillon, H.E. (1890) XCII Asclépiadacées. In: Baillon H.E. (Ed.) *Histoire des Plantes*. Hachette, Paris, pp. 221–304.
- Brown, R. (1810) *On the Asclepiadeae*. R. Brown, London.
- Brown, R. (1822) *Brachystelma tuberosa*. *Curtis's Botanical Magazine* 49: t. 2343.
- Chun, W.Y. & Tsiang, Y. (1941) *Merrillanthus*, a new genus of Asclepiadaceae from Hainan. *Sunyatsenia* 6: 105–108.
- Decaisne, M.J. (1838) Études sur quelques genres de la famille des Asclépiadacées. [Sér. 2] *Annales des Sciences Naturelles, Botanique* 9: 257–279, 321–349.
- Decaisne, M.J. (1844) Asclepiadaceae. In: De Candolle, A.P. (Ed.) *Prodromus Systematis Naturalis Regni Vegetabilis*, vol. 8. Treuttel & Würtz, Paris, pp. 490–684.
- Endress, M.E. & Bruyns, P.V. (2000) A revised classification in the Apocynaceae s.l. *The Botanical Review* 66: 1–56. <http://dx.doi.org/10.1007/BF02857781>
- Endress, M.E., Liede-Schumann, S. & Meve, U. (2007) Advances in Apocynaceae: The enlightenment, an introduction. *Annals of the Missouri Botanical Garden* 94: 259–267. [http://dx.doi.org/10.3417/0026-6493\(2007\)94\[259:AIATEA\]2.0.CO;2](http://dx.doi.org/10.3417/0026-6493(2007)94[259:AIATEA]2.0.CO;2)
- Endress M.E., Liede-Schumann, S. & Meve, U. (2014) An updated classification for Apocynaceae. *Phytotaxa* 159(3): 175–194. <http://dx.doi.org/10.11646/phytotaxa.159.3.2>
- Farinaccio, M.A. (2007) Sistemática molecular de *Oxypetalum* R.Br. (Apocynaceae, Asclepiadoideae). PhD thesis, Instituto de Biociências, Universidade de São Paulo, São Paulo.
- Fontana, J.L. (1990) *Melinia iberae*, nueva especie de Asclepiadaceae. *Folia Botanica et Geobotanica Correntesiana* 1–7.
- Fontella-Pereira, J. (1977) Revisão taxonômica do gênero *Tassadia* Decaisne (Asclepiadaceae). *Arquivos do Jardim Botânico do Rio de Janeiro* 21: 235–392.
- Fontella-Pereira J. & Konno T.U.P. (1999) Contribuição ao estudo das Asclepiadaceae Brasileiras, XXXI. *Hypolobus* E.Fourn., um gênero extinto? *Bradea* 7: 139–144.
- Fontella-Pereira, J. & Schwarz, E.A. (1982) Estudos in Asclepiadaceae, XVI. Sobre a indentidade do gênero *Lorostelma* Fournier. *Cadernos de Pesquisa, Universidade Federal do Piauí. 2, Série Botânica* 1: 61–69.
- Fontella-Pereira, J., Farinaccio, M.A. & Schwarz, E.A. (1997) Contribuição ao estudo das Asclepiadaceae Brasileiras, XXIX. Novas combinações e sinônimas. *Bradea* 8: 66–68.
- Fournier, E.P.N. (1885) Asclepiadaceae. In: Martius, C.F.P. von & Eichler, A.W. (Eds.) *Flora brasiliensis*. Typographia Regia, Monachii, pp. 189–332, tabs. 150–198.
- Gilbert, M.G., Stevens, W.D. & Li, P.T. (1995) Notes on the Asclepiadaceae of China. *Novon* 5: 1–16. <http://dx.doi.org/10.2307/3391820>
- González, A. (2010) Fotos de Flora nativa y adventicias de Uruguay. Available from <http://floranativadeuruguay.blogspot.de/> (accessed 6 June 2014).
- Grisebach, A.H.R. (1874) Plantae Lorentzianae. *Abhandlungen der Königlich Gesellschaft der Wissenschaften zu Göttingen* 19: 49–279.
- Hechem, V., Calviño, C.I. & Ezcurra, C. (2011) Molecular phylogeny of *Diplolepis* (Apocynaceae-Asclepiadoideae) and allied genera, and taxonomic implications. *Taxon* 60: 638–648.
- Hooker, W.J. & Arnott, G.A.W. (1834) Contributions towards a flora of South America and the Islands of the Pacific. *Hooker's Journal of Botany and Kew Garden Miscellany* 1: 276–296.
- Hooker, J.D. (1883) Asclepiadaceae to Amaranthaceae. In: Hooker, J.D. (Ed.) *The Flora of British India* 4. L. Reeve, London, pp. 1–78.
- IUCN (2014) *Guidelines for Using the IUCN Red List, Categories and Criteria*, version 11. IUCN Red List Unit, Cambridge U.K. Available from: <http://www.iucnredlist.org/documents/RedListGuidelines.pdf> (accessed 5 May 2014).
- Koch, I., Rapini, A., Kinoshita, L.S., Simões, A.O. & Spina, A.P. (2014) *Apocynaceae* in *Lista de Espécies da Flora do Brasil*. Jardim Botânico do Rio de Janeiro. Available from: <http://floradobrasil.jbrj.gov.br/jabot/floradobrasil/FB4876> (accessed 9 September 2014).

2014).

- Kuntze, O. (1891) Asclepiadaceae. In: Kuntze, O. (Ed.) *Revisio generum plantarum*. Felix, Leipzig, pp. 417–425.
- Lessert, B. de (1846) Apocynaceae, Asclepiadaceae. In: Lessert, B. de (Ed.) *Icones Selectae Plantarum vol. 5*. Fortin, Masson et Soc., Paris, pp. 20–38, pl. 45–91.
- Liede, S. (1997) Subtribes and genera of the tribe Asclepiadeae (Apocynaceae - Asclepiadoideae)—a synopsis. *Taxon* 46: 233–247.
<http://dx.doi.org/10.2307/1224093>
- Liede, S. & Meve, U. (2001) Taxonomic changes in American Metastelminae (Apocynaceae-Asclepiadoideae). *Novon* 11: 171–182.
<http://dx.doi.org/10.2307/3393054>
- Liede, S. & Weberling, F. (1995) On the inflorescence structure of Asclepiadaceae. *Plant Systematics and Evolution* 197: 99–109.
<http://dx.doi.org/10.1007/BF00984635>
- Liede-Schumann, S. & Meve, U. (2013) The Orthosiinae revisited (Apocynaceae, Asclepiadoideae, Asclepiadeae). *Annals of the Missouri Botanical Garden* 99: 44–81.
<http://dx.doi.org/10.3417/2010130>
- Liede-Schumann, S., Nikolaus, M., Silva, U.C.S.S., Rapini, A., Mangelsdorff, R.D. & Meve, U. (2014) Phylogenetics and biogeography of the genus *Metastelma* (Apocynaceae-Asclepiadoideae-Asclepiadeae: Metastelminae). *Systematic Botany* 39: 594–612.
<http://dx.doi.org/10.1600/036364414X680708>
- Livshultz, T., Mead, J.V., Goyder, D.J. & Brannin, M. (2011) Climate niches of milkweeds with plesiomorphic traits (Secamonoideae, Apocynaceae) and the milkweed sister group link ancient African climates and floral evolution. *American Journal of Botany* 98: 1966–1977.
<http://dx.doi.org/10.3732/ajb.1100202>
- Malme, G.O.A.N. (1900) Die Asclepiadaceen des Regnell'schen Herbars. *Kongliga Svenska Vetenskapsakademiens Handlingar* 34(7): 7–101, tab. 101–108.
- Malme, G.O.A.N. (1905) Asclepiadaceae paranenses a D:re P. Dusén collectae. *Arkiv för Botanik Utgivet av Kongliga Svenska Vetenskapsakademien* 4: 1–14.
- Markgraf, F. (1974) New Apocynaceae and Asclepiadaceae from Venezuela. *Acta Botanica Venezuelica* 6(1–4): 65–76.
- Meyer, T. (1947) Asclepiadaceae argentinensis novae aut criticae. *Lilloa* 13: 23–29.
- Morillo, G. (1986) Estudio sobre la flora de las Guayanas. Asclepiadaceae. II. Especies nuevas interesantes en Venezuela y Guyana. *Ernstia* 37: 1–13.
- Morillo, G. (1990) Revisión sinoptica de *Stenomeria* Turcz. (Asclepiadaceae). *Acta Botanica Venezuelica* 16: 79–91.
- Rapini, A., Chase, M.W., Goyder, D.J. & Griffiths, J. (2003) Asclepiadeae classification: evaluating the phylogenetic relationships of New World Asclepiadoideae (Apocynaceae). *Taxon* 52: 33–50.
<http://dx.doi.org/10.2307/3647300>
- Rapini, A., Fontella-Pereira, J. & Goyder, D.J. (2011) Towards a stable generic circumscription in Oxypetalinae (Apocynaceae). *Phytotaxa* 26: 9–16.
- Rusby, H.H. (1920) Asclepiadaceae. In: *Descriptions of three hundred new species of South American Plants*. The author, New York, pp. 92–102.
<http://dx.doi.org/10.5962/bhl.title.56802>
- Rusby, H.H. (1927) Asclepiadaceae. In: *Descriptions of new genera and species of plants collected on the Mulford Biological Exploration of the Amazon Valley, 1921–1922*. *Memoirs of the New York Botanical Garden* 7: 205–208, 331–336.
- Schlechter, R. (1916) Neue Asclepiadaceen von Sumatra und Celebes. *Beihefte zum Botanischen Centralblatt* 34: 1–16.
- Schultes, J.A. (1820) Pentandria, Digynia. In: Roemer, J.J. & Schultes, J.A. (Eds.) *Systema Vegetabilium*. Cotta, Stuttgart, pp. 1–128.
- Schumann, K. (1895) Asclepiadaceae. In: Engler, A. & Prantl, K. (Eds.) *Die natürlichen Pflanzenfamilien*. Engelmann, Leipzig, pp. 189–305.
- Sennblad, B. & Bremer, B. (1996) The familial and subfamilial relationships of Apocynaceae and Asclepiadaceae evaluated with *rbcL* data. *Plant Systematics and Evolution* 202: 153–175.
<http://dx.doi.org/10.1007/BF00983380>
- SINCHI (2011) Herbario Amazónico Colombiano COAH. Available from: http://www.sinchi.org.co/coleccionesbiologicas/index.php?option=com_content&view=article&id=6:servicios-coah&catid=3:informacion-del-proyecto-coah&Itemid=26 (accessed 10 November 2014).
- Stevens, W.D. (1988) New names and combinations in Apocynaceae, Asclepiadoideae. *Phytologia* 64: 333–335.
- Stevens, W.D. (2002) A new *Tassadia* (Apocynaceae, Asclepiadoideae) from Bolivia and Brazil. *Novon* 12: 408–410.
<http://dx.doi.org/10.2307/3393089>
- Swarupandan, K., Mangaly, J.K., Sonny, T.K., Kishore Kumar, K. & Chand Basha, S. (1996) The subfamilial and tribal classification of the family Asclepiadaceae. *Botanical Journal of the Linnean Society* 120: 327–369.

<http://dx.doi.org/10.1006/bojl.1996.0018>

- TROPICOS (2014) Tropicos.org. Missouri Botanical Garden. Available from: <http://www.tropicos.org/> (accessed 9 September 2014).
- Tsiang, Y. & Li, P.T. (1974) Asclepiadaceae. In: Chun, W.-Y., Chan, C.C. & Chen, F.H. (Eds.) *Flora Hainanica*. Institutum Botanicum Austro-Sinense Academiae Sinicae, Beijing, pp. 577–578.
- Turczaninow, P.K.N.S. (1852) Asclepiadeae quaedam hucusque indeductae. *Bulletin de la Société Impériale des Naturalistes de Moscou* 25: 310–325.
- Vegter, I.H. (1988) *Index Herbariorum*, part 2(7). Bohn, Utrecht, Antwerp; Scheltema & Holkema, The Hague; W. Junk, Boston, pp. 987–1213.