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A Taxonomic Revision of *Desmodium* (Leguminosae, Papilionoideae) in Brazil

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Abstract

Desmodium is characterized mainly by lilac flowers arranged in pseudoracemose inflorescences, stamens monadelphous or diadelphous and a lomentaceous fruit generally covered by uncinata hairs. A taxonomic revision of the Brazilian species was carried out based on the analysis of 3,000 herbarium specimens, including all nomenclatural types. Field trips to the most species-rich areas of *Desmodium* in Brazil were undertaken, resulting in the sampling of 29 out of the 34 species recognised for the country. We recognise 101 names as synonyms, 27 of which are new. Lectotypes were designated for 60 accepted names and synonyms, and two neotypes and one epitype were chosen. A new combination is proposed for *Meibomia microcarpa*, as well as a new name for *Meibomia guaranitica* var. *microcarpa*. *Desmodium album* is a new record for Brazil, and *D. craspediferum*, *D. glabrescens* and *D. juruenense*, previously known only by type collections, were recollected during this study. All species are described, mapped and illustrated. An identification key, and comments on taxonomy and nomenclature are provided.

Key words. Desmodieae, Fabaceae, *Meibomia*, nomenclatural notes, South America

Resumo

Desmodium é caracterizado principalmente pelas flores de corola lilás reunidas em pseudorracemos, estames monadelfos ou diadelfos e lomento geralmente com indumento uncinado. A revisão taxonômica das espécies brasileiras foi baseada em análise de 3.000 espécimes de herbário, incluindo os tipos nomenclaturais. Expedições de campo foram conduzidas para a maioria das áreas ricas em espécies de *Desmodium*, nas quais foram amostradas 29, das 34 espécies aqui reconhecidas neste estudo. Nós aceitamos 101 sinônimos, dos quais 27 são novos. Lectótipos foram designados para 60 nomes, incluindo nomes aceitos e sinônimas, dois neótipos e um epítipo foram escolhidos. Nova combinação é proposta para *Meibomia microcarpa* e novo nome para *Meibomia guaranitica* var. *microcarpa*. *Desmodium album* é uma nova ocorrência para o Brasil e *D. craspediferum*, *D. glabrescens* e *D. juruenense*, que até então eram conhecidas apenas pela coleção-tipo, foram recoletadas neste estudo. Todas as espécies são descritas, plotadas em mapas e ilustradas. Uma chave de identificação, comentários taxonômicos e nomenclaturais são fornecidos.

Palavras-Chave. América do Sul, Desmodieae, Fabaceae, *Meibomia*, notas nomenclaturais

Introduction

Desmodium Desvaux (1813: 122) comprises 275 species, and has an almost cosmopolitan distribution with centres of diversity at specific level in Mexico and South America (Ohashi 2005), occurring in Brazil mainly in the *Cerrado* and *Pampa* biomes (Lima *et al.* 2010).

The main morphological characters that define the genus are: habit: shrubs or subshrubs; leaves uni- to trifoliolate; inflorescence a pseudoraceme or panicle, flowers with pinkish to purple (never yellow) corollas; fruit a loment, generally covered by uncinata hairs (Ohashi *et al.* 1981, Queiroz 2009). The fruit morphology has been

Uraria lagocephala (Link) DC., Prodr. 2: 324. 1825. *Hedysarum lagocephalum* Link., Enum. Pl. 2: 248. 1822.
Type:—BRAZIL. (B†).

Hedysarum lagocephalum was reported by Schindler (1928), Bentham (1859) and Azevedo (1981) as a synonym of *Desmodium barbatum*. Part of the diagnosis of *Hedysarum lagocephalum*: "estipulis lanceolatis, panicula terminali contracta, legumen triarticulatum pilosum" includes morphological characteristics seen in *Desmodium barbatum* and *D. juruenense*. As a type collection of *Hedysarum lagocephalum* was not found, and the diagnosis is superficial, this name is considered doubtful.

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References

- Adanson, M. (1763) *Familias des plantes* 2. Vicente, Paris, 640 pp.
- Arcy, W.G.D. (1970) Jacquin names, some notes on their typification. *Taxon* 19(4): 554–560.
<http://dx.doi.org/10.2307/1218948>
- Arthur, J.C. (1907) American code of botanical nomenclature. *Bulletin of the Torrey Botanical Club* 34(4): 175.
- Aymard, G.A., Berry, P.E., Cowan, R.S., Cuello, N., Delgado Salinas, A., Fantz, P.R., Maxwell, R.H., Redden, K.M., Rudd, V.E., Sousa, M. & Wind, D.R. (2007) Checklist of the plants of the Guiana Shield (Venezuela: Amazonas, Bolivar, Delta Amacuro, Guyana, Surinam, French Guiana): Leguminosae-Faboideae. *Contributions from the United States National Herbarium* 55: 346–365.
- Azevedo, A.M.G. (1981) *O gênero Desmodium Desv. no Brasil- considerações taxonômicas*. M.S. Thesis. Universidade Estadual de Campinas, Campinas, 315 pp.
<http://www.bibliotecadigital.unicamp.br/document/?code=vtls000075165>
- Azevedo, A.M.G. (1982) Uma nova espécie para o gênero *Desmodium* Desv. (Leguminosae-Papilionoideae): *Desmodium craspediferum* Azevedo & Oliveira. *Revista Brasileira de Botânica* 5: 1–3.
- Baker, J.G. (1876) *Desmodium*. In: Hooker, J.D. (ed.). *The Flora of British India* 2. Rev. & Co. Kent, London, pp. 161–175.
- Barroso, G.M. (1964) Leguminosas da Guanabara. *Arquivos do Jardim Botânico do Rio de Janeiro* 18: 109–177.
- Bentham, G. (1844) *The Botany of the Voyage of H.M.S. Sulphur*. Smith, Elder and Co., London, 195 pp.
- Bentham, G. (1852) Leguminosae. In: Miquel, F.A.W. (ed.). *Plantae Junghuhnianae*. Sythoff, Leiden, pp. 205–269.
- Bentham, G. (1859) Leguminosae 1, Papilionaceae. In: Martius, C.F.P., Endlicher, S., Urban, I. (eds.). *Flora Brasiliensis* v. 15, pt. 1. Monachii, Lipsiae, pp. 1–215.
- Bentham, G. (1865) Leguminosae: *Desmodium*. In: Bentham, G. & Hooker, J.D. (eds.). *Genera Plantarum* 1. Londini, Reeve & co., London, pp. 519–521.
- Blake, S.F. (1922) New American Meibomias. *Botanical Gazette* 78: 271–288.
<http://dx.doi.org/10.1086/333396>
- Brandão, M., Ferreira, M.B.D. & Lopez, B.C. (1996) O gênero *Desmodium* Desvaux (Leguminosae-Faboideae) no herbário da Empresa Brasileira de Pesquisa Agropecuária de Minas Gerais, PAMG/EPAMIG. *Daphne* 6(1): 12–25.
- Britton, N.L. & Brown, A. (1897) *An illustrated flora of the northern United States, Canada, and the British Possessions vol II Portulacaceae to Menyanthaceae*. Charles Scribner's Sons, New York, 643 pp.
- Brummitt, R.K. (1978) Report of the Committee for Spermatophyta 20. *Taxon* 27: 285–314.
<http://dx.doi.org/10.2307/1220263>
- Burkart, A. (1939) Estudios sistematicos sobre las Leguminosas-Hedisareas de la República Argentina y regiones adyacentes. *Darwiniana* 3(2): 118–302.
- Burmans, J. (1768) *Flora Indica*. Roderic Bowen Library and Archives, Amsterdam, 241 pp.
- Capdevila, M.B. (1994) *A taxonomic revision of the genus Desmodium Desv. (Leguminosae) for Flora of Ecuador*. M.S. Thesis. Aarhus University, Aarhus, 44 pp.
- Cervi, A.C., Linsingen, L. von, Hatschbach, G. & Ribas, O.S. (2007) A vegetação do Parque Estadual de Vila Velha, município de Ponta Grossa, Paraná, Brasil. *Boletim do Museu Botânico Municipal* 69: 1–52.
- Chodat, R.H. & Hassler, E. (1904) *Desmodium* Desv. *Bulletin de l'Herbier Boissier*, ser. 2, 4(9): 889–890.
- Córdula, E., Queiroz, L.P. de & Alves, M. (2009) Leguminosae. In: Alves, M., Araújo, M. de F., Maciel, J.R., & Martins, S. (eds.). *Flora de Mirandiba*, Associação Plantas do Nordeste, Recife, pp. 183–233.

- Cuello, N. & Aymard, G. (1991) Contribuciones a la flora del Estado Portuguesa, Venezuela: el genero *Desmodium* (Leguminosae-Papilionoideae-Desmodieae-Desmodiinae). *Biollania* 8: 47–59.
- De Candolle, A.P. (1825) Leguminosae. *Prodromus Systematicus Naturalis Regni Vegetabilis* 2(2): 307–353.
- Desvaux, N.A. (1813) Précis des caracteres de plusieurs genres de la famille des Legumineuses, plants. *Journal de Botanique, Appliquée à l'Agriculture, à la Pharmacie, à la Médecine et aux Arts* 2 (1): 118–125.
- Dietrich, D. (1847) *Synopsis Plantarum seu enumeratio systematica plantarum*, volume 4. Sumtibus et typis Bernh. Frieder., Weimar, 1692 pp.
- Don, G. (1832) *A general history of the dichlamydeous plant*, 2. Rivington, London, 875 pp.
- Dubs, B. (1998) Leguminosae in *Prodomus Flora Matogrossensis*. Betrona Verlag, Kusnacht, 444 pp.
- Duchassaing, E.P. de F & Walpers, W.G. (1850) Plaiitae novae et minus cognitae in isthmo Panamensi et in insulis Guadeloupe et Sti, Tiomae collectae. *Linnaea* 23: 737–756.
- Ducke, A. (1949) Notas sobre a flora Neotrópica II: As Leguminosas da Amazônia Brasileira. *Boletim Técnico do Instituto Agrônomo do Norte* 18: 170–171.
- Endlicher, S.F.L. (1840) *Genera plantarum secundum ordines naturales disposita*. F. Beck, Vindobonae, 1483 pp.
<http://dx.doi.org/10.5962/bhl.title.728>
- ESRI (1999) *ArcView 3D Analyst*. Surface Creation, Visualization in Analysis.
- Fabricius, P.C. (1759) *Enumeratio Methodica Plantarum*. Ioannis Drimbornii, Helmstadt, 239 pp.
- Fairchild, D.G. (1892) Rochester code of nomenclature: Proceedings of the Botanical Club of the forty-first meeting of the A.A.A.S., Rochester, N.Y., August 18–24, 1892. *Bulletin of the Torrey Botanical Club* 19: 281–297.
- Fawcett, W. & Rendle, A.B. (1920) *Flora of Jamaica* 4: *Dicotyledons*. British Museum, London, 369 pp.
<http://dx.doi.org/10.5962/bhl.title.2760>
- Flores, A.S. & Rodrigues, R.S. (2010) Diversidade de Leguminosae em uma área de savana do Estado de Roraima, Brasil. *Acta Botânica Brasileira* 24(1): 175–183.
<http://dx.doi.org/10.1590/s0102-33062010000100017>
- Font Quer, P. (1953) *Diccionario de botánica*. Labor S.A, Barcelona, 1244 pp.
- Fosberg, F.R. & Sachet, M.O.R. (1979) A geographical checklist of the Micronesian dicotyledonae. *Micronesica* 15: 1–295.
- Garcia, E.N. & Baseggio, J. (1999) Poder germinativo das sementes de *Desmodium incanum* DC. (Leguminosae). *Revista Brasileira de Agrociências* 5(3): 199–202.
- Harris, J.G. & Harris, M.W. (1994) *Plant identification terminology: an illustrated glossary*. Spring Utah, Lake, 198 pp.
- Heister, L. (1730) *Index plantarum rariorum atque officinalium (indigenis vulgarioribus omissis)*. Hehnstadt, Helmstedt, 40 pp.
- Hoehne, F.C. (1919) *Desmodium asperum*. Relatório Comissão das Linhas Telegráficas Estratégicas de Matto Grosso ao Amazonas 5, Bot. pt. 8: 73–74.
- Hoehne, F.C. (1920) *Desmodium pabulare* Hoehne. *Chácaras e Quintais* 21: 460.
- Hoehne, F.C. (1921) Leguminosas forrageiras do Brasil 1: *Meibomia*, Moehr (*Desmodium*, Desv.). *Anexos das Mem. do Instituto de Butantan, sec Bot*, 1(1): 1–54.
- Hoehne, F.C. (1952) Acheugas para a história do nome *Meibomia* na taxonomia botânica. *Arquivos de Botânica do estado de São Paulo* 2(6): 168–170.
- Hooker, W.J. & Arnott, G.A.W. (1832) *The Botany of Captain Beechey's Voyage*. Henry G. Bohn, London, pp. 49–96.
- Huber, J.E. (1906) Materiaes para a flora amazonica. VI. Plantas vasculares colligidas e observadas no baixo Ucayali e no Pampa del Sacramento, nos mezes de outubro a dezembro de 1898. *Boletim do Museo Paraense de Historia Natural e Ethnographia* 4: 510–619.
- Hutchinson, J. (1964) Leguminales in *The genera of flowering plants*. Clarendon Press, Oxford, pp. 221–489.
- IPNI. (2011) *The International Plant Names Index*. Available from: <http://www.ipni.org/ipni/plantnamesearchpage.do> (accessed: June 2011).
- IUCN. (2001) *IUCN Red List Categories and Criteria* Version 3.1. Available from: http://www.iucn.org/about/work/programmes/species/red_list/about_the_red_list, (accessed: August 2011).
- Izaguirre, P. & Beyhaut, R. (1998) *Desmodium* Desv. in *Las Leguminosas em Uruguay y regiones vecinas—Parte I Papilionoideae*. Editorial Hemisfério Sur, Montevideo, pp. 256–264.
- Jacquín, N.J.B. von. (1798) *Plantarum Rariorum Horti Caesarei Schoenbrunnensis* Linnaeus *Descriptiones et Icones* 3. C.F. Wappler, Viena, 80 pp.
<http://dx.doi.org/10.5962/bhl.title.332>
- Jarvis, C. (2008) *Order out of Chaos, Linnean Plant Names and their types*. The Linnean Society of London, London, 1016 pp.
- Kuntze, O. (1891) *Revisum generum plantarum secundum Leges Nomenclaturae Internationales cum Enumeratione Plantarum Exoticarum I*. Ducao & Co., London, 374 pp.
- Lemos, R.P. de L., Mota, M.C. da S., Chagas, E.C. de O. & Silva, F.C. da. (2010) *Desmodium* Desv. in *Checklist Flora de Alagoas: Angiospermas*. Instituto do Meio Ambiente de Alagoas, Maceió, 56 pp.
- Lewis, G.P. (1987) *Desmodium* Desv. in *Legumes of Bahia*. Royal Botanic Gardens, Kew, pp. 245–249.
- Lewis, G.P. & Owen, P.E. (1989) *Desmodium* Desv. in *Legumes of the Ilha de Maraca*. Royal Botanic Gardens, Kew, pp. 69–72.
- Lima, H.C. de, Tozzi, A.M.G.A., Fortuna-Perez, A.P., Flores, A.S., Vaz, A.M.S.F., Klitgaard, B.B., Cardoso, D.B.O.S., Filardi, F.R., Garcia, F.C.P., Lewis, G.P., Iganci, J.R.V., Meireles, J.E., Valls, J.F.M., Lima, L.C.P., Queiroz, L.P. de, Silva, M.J. da,

- Morim, M.P., Barros, M.J.F., Queiroz, R.T., Fortunato, R.H., Pennington, R.T., Miotto, S.T.S., Moura, T.M., Dutra, V.F., Mansano, V.F., Souza, V.C. & Scalon, V.R. (2009) Fabaceae (Leguminosae) *In*: Stehmann, J.R., Forzza, R.C., Salino, A., Sobral, M., Costa, D.P. da & Kamino, L.H.Y. (eds.). *Plantas da Floresta Atlântica*. Jardim Botânico do Rio de Janeiro, Rio de Janeiro, pp. 259–283.
- Lima, L.C.P., Vanni, R.O., Queiroz, L.P. de & Tozzi, A.M.G.A. (2012a) An overlooked new species of *Desmodium* (Fabaceae, Papilionoideae) from Argentina. *Phytotaxa* 40: 55–59.
- Lima, L.C.P., Queiroz, L.P. de, Tozzi, A.M.G.A. & Lewis, G.P. (2012b). (2089) Proposal to conserve the name *Hedysarum incanum* Sw. against *H. incanum* Thunb. (Leguminosae). *Taxon* 61: 1122–1123.
- Lima, L.C.P., Oliveira, M.L.A.A. & Tozzi, A.M.G.A. (2010) Fabaceae: *Desmodium*. *In*: Forzza, R.C. & Leitman, P. (orgs.). *Catálogo de Plantas e Fungos do Brasil*, v. 2., Andrea Jakobsson Estúdio, Rio de Janeiro, pp. 1029–1030.
- Linnaeus, C. (1753) *Species Plantarum* 2. Laurentii Salvii, Stockholmiae, 1200 pp.
- Loesener, T. (1923) *Plantae selerianae die von Dr. Eduard Seler und Frau Caecilie Seler in Mexico und Centralamerika Gesammelt: Desmodium asperum var. michelii* Schindl. *In*: Ulbrich, E. & Arndt, A. (eds.) *Verhandlungen des Botanischen vereins der Provinz Brandenburg*, v. 45. kommissions verlag von Rudolph Gaertner, Berlin, 91 pp. <http://dx.doi.org/10.5962/bhl.title.25164>
- Lorenzi, H. (2008) *Plantas daninhas do Brasil: terrestres, aquáticas, parasitas, tóxicas e medicinais*, ed 4. Plantarum, Nova Odessa, pp. 332–337.
- Loureiro, J. (1790) *Flora cochinchinensis*. Ulyssipone, Lisbon, 744 pp.
- Malme, G.O.A.N. (1922) Desmodii species in Herbario Regnelliano asservatae, Stockholm. *Arkiv för Botanik* 18(7): 1–20.
- Malme, G.O.A.N. (1931) Die leguminosen der zweiten Regnellschen Reise. *Arkiv för Botanik* 23A(13): 27–29.
- McNeill, J., Barrie, F.R., Burdet, H.M., Demoulin, V., Hawksworth, D.L., Marhold, K., Nicolson, D.H., Prado, J., Silva, P.C., Skog, J.E. & Wiersema, J.H. (2006) *Código Internacional de Nomenclatura Botânica (Código de Viena)*. Tradução: Bicudo, C.E.M. & Prado, J. Rima, São Paulo, 181 pp.
- McVaugh, R. (1987) *Flora Novo-Glaciana. A descriptive account of the vascular plants of Western Mexico*. v 5. University of Michigan Press, Michigan, 786 pp.
- Medikus, F.K. (1787) *Vorlesungen der Churpfälzischen physicalisch öconomischen Gesellschaft* 2. Schwan und Götz, Mannheim, 840 pp.
- Miller, J. (1768) *Gardner Dictionary* 8. The Gardener's Dictionary, ed. 8. Rivington et al., London, 228 pp.
- Möhring, P.H.G. (1736) *Meibomia in Primae lineae horti privati in proprium et amicorum usum per triennium exstructi*. Oldenburgi, Göttingen, 65 pp.
- Morong, T. & Britton, N.L. (1892) Plants collected in Paraguay. *Annals of New York Academics Science* 7: 82–83.
- Nicolson, D.H. (1978) Illegitimate “Basionyms” impact on priority and author citation or, the rise of *Desmodium incanum* and fall of *D. canum* (Fabaceae). *Taxon* 27: 365–370. <http://dx.doi.org/10.2307/1220378>
- Nobre, A.V.M., Sartori, A.L.B. & Rezende, U.M. (2008) As espécies de *Desmodium* Desv. (Leguminosae-Papilionoideae-Desmodieae) ocorrentes em Mato Grosso do Sul. *Revista Iheringia, Série Botânica*. 63(1): 37–67.
- Ohashi, H. (1973) Contributions to the Flora of Asia and Pacific region: the Asiatic species of *Desmodium* and its allied genera (Leguminosae). *Ginkgoana* 1: 1–300.
- Ohashi, H. (2004a) Taxonomy and Distribution of *Desmodium* and Related Genera (Leguminosae) in Malesia (I). *Journal of Japanese Botany* 79: 101–139.
- Ohashi, H. (2004b) Taxonomy and Distribution of *Desmodium* and Related Genera (Leguminosae) in Malesia (II). *Journal of Japanese Botany* 79: 155–185.
- Ohashi, H. (2005) Desmodieae Tribe. *In*: Lewis, G., Schrire, B., Mackinder, B., Lock, M. (eds.). *Legumes of the World*. Royal Botanic Gardens, Kew, pp. 433–453.
- Ohashi, H. & Mill, R.R. (2000) *Hylodesmum*, a new name for *Podocarpium* (Leguminosae). *Edinburgh Journal of Botany* 57(2): 171–188. <http://dx.doi.org/10.1017/s0960428600000123>
- Ohashi, H. & Ohashi, K. (2012) *Ototropis*, a genus separated from *Desmodium* (Leguminosae). *Journal of Japanese Botany* 87(2): 108–118.
- Ohashi, H., Polhill, R.M. & Schubert, B.G. (1981) Desmodieae (Benth.) Hutch. *In*: Polhill, R.M. & Raven, P.H. (eds.). *Advances in Legume Systematics, part 1*, Royal Botanic Gardens, Kew, pp. 292–300.
- Oliveira, M. de L.A.A. de. (1983) Estudo taxonômico do gênero *Desmodium* Desv. (Leguminosae, Faboideae, Desmodieae). *Iheringia, Série Botânica* 31: 37–104.
- Oliveira, M. de L.A.A. de. (1990) Adições para o gênero *Desmodium* Desvaux (Leguminosae-Faboideae) no Rio Grande do Sul, Brasil. *Iheringia, Série Botânica* 40: 77–87.
- Pedley, L. (1999) *Desmodium* Desv. (Fabaceae) and related genera in Australia: a taxonomic revision. *Austrobaileya* 5(2): 209–261.
- Peña-Chocarro, M.C., Espada-Mateos, C., Vera, M., Céspedes, G. & Knapp, E.S. (2010) Updated checklist of vascular plants of the Mbaracayú Forest Nature Reserve (Reserva Natural del Bosque Mbaracayú), Paraguay. *Phytotaxa* 12: 1–224.
- Pilger, R.K.F. (1901). Beitrag zur Flora von Mattogrosso. *Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie* 30: 127–238.

- Poiret, J.J.M. (1805) *Encyclopedic méthodique Botanique* (Lamarck) 6. Chez H. Agasse, Paris, 761 pp.
- Pott, A. & Pott, V.J. (1994) *Plantas do Pantanal*. Embrapa, Brasília, 320 pp.
- Queiroz, L.P. de. (2009) *Desmodium* Desv. in *Leguminosas da Caatinga*. Universidade Estadual de Feira de Santana, Feira de Santana, pp. 430–343.
- Radford, A.E., Dickison, W.C., Massey, J.R. & Bell, C.R. 1974) *Vascular plant systematics*. Harper & Row, New York, 891 pp.
- Ramela, L. & Perret, P. (2003) Editores, autores y autoridades em la obra *Planta Hasslerianae* de R. Chodat & E. Hassler. *Candollea* 58: 407–427.
- Roxburgh, W. (1814) *Hortus Bengalensis*. Mission, Calcutta, 105 pp.
- Rusby, H.H. (1927) 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: 205–265.
- Saint-Hilaire, J.H.J. (1812) *Nouveau Bulletin des Sciences* 3. Société Philomatique de Paris, Paris, 400 pp. <http://www.biodiversitylibrary.org/item/99186#page/9/mode/1up>
- Schindler, A.K. 1924. *Desmodium* und *Meibomia*. *Repertorium Specierum Novarum Regni Vegetabilis* 20: 136–155.
- Schindler, A.K. 1925. Desmodii generumque affinium species et combinationes novae. *Repertorium Specierum Novarum Regni Vegetabilis* 21: 1–22.
- Schindler, A.K. (1926) Desmodii generumque affinium species et combinationes novae II. *Repertorium Specierum Novarum Regni Vegetabilis* 22: 250–288.
- Schindler, A.K. (1928) Die Desmodiinen in der botanischen Literatur nach Linne. *Repertorium Specierum Novarum Regni Vegetabilis Beihefte* 49: 1–371.
- Schlechtendal, D. (1838) De plantis Mexicanis a G. Schiede, M.Dr., Car. Ehren-bergi o aliisque collectis. *Linnaea* 12: 201–312.
- Schlechtendal, D. & Chamisso, A. von. (1830) Platarum Mexicanarum a cel. viris Schiede et Deppe Collectarum recensio brevis. *Linnaea* 5: 554–626.
- Schubert, B.G. (1940) *Desmodium*: preliminary studies I. *Contributions of the Gray Herbarium of Harvard University* 129: 30–31.
- Schubert, B.G. (1941) *Desmodium*: preliminary studies II. *Contributions of the Gray Herbarium of Harvard University* 136: 78–115.
- Schubert, B.G. (1945) Flora of Peru: *Desmodium* Desv. *Publications of Field Museum of Natural History* 13: 413–439.
- Schubert, B.G. (1952) *Desmodium adscendens* var. *robustum*. *National Botanic Garden of Belgium Bulletin* 22: 290.
- Schubert, B.G. (1963) *Desmodium*: preliminary studies IV. *Journal of the Arnold Arboretum* 44: 284–297.
- Schubert, B.G. (1971) Leguminosae 3: *Desmodium*. In: Milne-Redhead, E. & Polhill, R.M. (eds.). *Flora of Tropical East Africa*. Royal Botanic Gardens, Kew, pp. 475–477.
- Schubert, B.G. (1980) Flora of Panamá: *Desmodium* Desv. *Annals of the Missouri Botanical Garden* 67(3): 622–662.
- Setubal, R.B., Lima, L.C.P. & Grings, M. (2010) Espécie campestre provavelmente extinta (*Desmodium craspediferum* Azevedo & Oliveira, Fabaceae) reencontrada no Rio Grande do Sul, Brasil. *Revista Brasileira de Biociências* 8(4): 342–348.
- Tucker, S.C. (1987) Pseudoracemes in papilionoid legumes: their nature, development, and variation. *Botanical Journal of the Linnean Society* 95: 181–206.
<http://dx.doi.org/10.1111/j.1095-8339.1987.tb01996.x>
- Silva, R.R. (2010) Leguminosae do município de Poconé, Pantanal de Poconé, Mato Grosso, Brasil. *Biota Neotropica* 10(4): 1–7.
<http://dx.doi.org/10.1590/s1676-06032010000400035>
- Soukup, J. (1968) Las leguminosas del Peru, sus generos y lista species. *Biota* 7(2): 53–54.
- Sprengel, K.P.J. (1826). *Systema vegetabilium* 3. Librariae Dieterichianae, Gottingae, 936 pp.
<http://dx.doi.org/10.5962/bhl.title.822>
- Stafleu, F.A. (1972) International code of Botanical nomenclature: *Desmodium* Desv. (3807) *Regnum vegetabile* 82: 319.
- Stafleu, F.A. & Cowan, R.S. (1979) Taxonomic literature. *Regnum vegetabile* v. 92.
- Stafleu, F.A. & Cowan, R.S. (1985) Taxonomic literature. *Regnum vegetabile* v. 112.
- Standley, P.C. (1922) Trees and shrubs of Mexico. Fabaceae. *Contributions from the United States National Herbarium* 23 (2): 484–487.
- Standley, P.C. & Steyermark, J.A. (1946) Flora of Guatemala: *Desmodium* Desv. *Fieldiana Botany* 24: 217–242.
- Standley, P.C.L. & Williams, O. (1953) *Desmodium procumbens* f. *quinquefolium* Standl. *Ceiba* 3(3): 224.
- Standley, P.C. (1978) Flora of Barro Colorado Island Panama. Stanford University Press, California, 32 pp.
<http://dx.doi.org/10.5962/bhl.title.46805>
- Sweet, R. (1830) *Tetranema*. *Sweet's Hortus Britannicus: or a catalogue of plants cultivated in the gardens of Great Britain, arranged in natural orders* 2: 149.
<http://dx.doi.org/10.5962/bhl.title.43792>
- Téllez, O. (2001) *Desmodium* Desv. In: Stevens, W.D., Ulloa, C.U., Pool, A. & Montiel, O.M. (eds.). *Flora de Nicaragua* 85: *Angiospermas Fabaceae-Oxalidaceae*, Missouri Botanical Garden Press, Washington, pp. 990–1000.
- Thiers, B. [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: June 2011).
- Turland, N.J. & Jarvis, C.E. (1997) Typification of Linnaean Specific and Varietal Names in the Leguminosae (Fabaceae).

Taxon 46: 472.

<http://dx.doi.org/10.2307/1224388>

Urban, I. (1891) On Sprengel's herbarium; 12000 came to B with Karl Muller's phanerogam herbarium. *Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie* 14: 38.

Urban, I. (1900) Leguminosae novae vel minus cognitae. I. *Symbolae Antillanae seu Fundamenta Florae Indiae Occidentalis* 2: 257–337.

<http://dx.doi.org/10.5962/bhl.title.144>

Urban, I. (1905) *Desmodium* in Flora portoricensis. *Symbolae Antillanae seu Fundamenta Florae Indiae Occidentalis* 4(2): 291–292.

<http://dx.doi.org/10.5962/bhl.title.144>

Vail, A.M. (1892) A preliminary list of the species of the genus *Meibomia* Heist., occurring in the United States and British America. *Bulletin of the Torrey Botanical Club* 19: 108–118.

<http://dx.doi.org/10.2307/2475692>

Vanni, R.O. (2001) El género *Desmodium* (Leguminosae-Desmodieae) en Argentina. *Darwiniana* 39: 255–285.

Vellozo, J.M. da C. (1829). *Florae fluminensis*. A. Senefelder, Rio de Janeiro, 352 pp.

Vellozo, J.M. da C. (1831) *Florae Fluminensis Icones* 7. Parisiis, ex off. lithogr. Senefelder. Tabulas 148–150.

Vogel, J.R.T. (1838) De Hedysareis Brasiliae, scripsit. *Linnaea* 12: 51–111.

Walpers, W.G. (1843) *Cyclomorium*. *Repertorium Botanices Systematicae* 2: 890.

<http://dx.doi.org/10.5962/bhl.title.7553>

Wight, R. & Arnott, G.A.W. (1834). *Prodromus Florae Peninsulae Indiae Orientalis* 1. Parbury. Allen, & Co., London, p. 223.

<http://dx.doi.org/10.5962/bhl.title.252>