

Two new species of *Aristolochia* series *Thyrsicae* (Aristolochiaceae) from southern Central America, with comments on morphologically similar species

JOSÉ ESTEBAN JIMÉNEZ *Research Associate, Herbario Luis A. Fournier Origgi (USJ), Universidad de Costa Rica, Apdo. 11501-2060, San José, Costa Rica.* <https://orcid.org/0000-0002-8154-2156>

REINALDO AGUILAR FERNÁNDEZ *Los Charcos de Osa, Centro de Diversidad de Plantas Regionales, Apdo. 76–8203, Península de Osa, Puntarenas, Costa Rica.* <https://orcid.org/0000-0002-6243-757X>

MARIO A. BLANCO *Research Associate, Herbario Luis A. Fournier Origgi (USJ), Universidad de Costa Rica, Apdo. 11501-2060, San José, Costa Rica. Herbario Luis A. Fournier Origgi (USJ), Centro de Investigación en Biodiversidad y Ecología Tropical, Jardín Botánico Lankester, and Escuela de Biología, Universidad de Costa Rica, Ciudad Universitaria Rodrigo Facio, Apdo. 11501–2060, San José, Costa Rica.* <https://orcid.org/0000-0001-7369-5411>

Keywords:

Aristolochia chapmaniana, *Aristolochia fragrantissima*, *Aristolochia ovalifolia*, *Aristolochia schmidtiana*, *Aristolochia tonduzii*, Costa Rica, Panama, pellucid gland dots, taxonomy, Magnoliids

Abstract

Aristolochia longissima and *Aristolochia ornithorhyncha*, two new species from the lowland moist forest from the Pacific watershed of southern Costa

Rica and western Panama, are described and illustrated. Both species can be distinguished from most other species of *Aristolochia* series *Thyrsicae*, because of their leaves with pellucid gland dots, which are here documented in Aristolochiaceae for the first time. Comments about their distribution, habitat, phenology, conservation status and distinction from related species are provided. The circumscription of *Aristolochia belizensis*, *A. chapmaniana*, *A. fragrantissima*, *A. ovalifolia*, *A. schmidtiana* and *A. tonduzii* is discussed.

References

Angiosperm Phylogeny Group. (2016) An update of the Angiosperm Phylogeny Group classification for the orders and families of flowering plants: APG IV. *Botanical Journal of the Linnean Society* 181: 1–20.

<https://doi.org/10.1111/boj.12385>

Balick, M.J., Nee, M.H. & Atha, D.E. (2000) Checklist of the vascular plants of Belize, with common names and uses. *Memoirs of The New York Botanical Garden* 85: i–ix, 1–246.

Barringer, K. (1983a). Aristolochiaceae. *In*: Burger, W. (ed.) *Flora costaricensis. Fieldiana, Botany New Series* 13: 79–87.

Barringer, K. (1983b). Notes on Central American Aristolochiaceae. *Brittonia* 35: 171–174. <https://doi.org/10.2307/2805959>

Barringer, K. (2015) Aristolochiaceae. *In*: Davidse, G., Sousa, S., M., Knapp, S. & Chiang, F (eds.) *Flora Mesoamericana*. Vol. 2 (3) Saururaceae a Zygophyllaceae. Missouri Botanical Garden Press, St. Louis, 347pp. [pp. 2–7]

de Bary, A. (1868) *Prosopanche Burmeisteri*, eine neue Hydnooree aus Süd-Amerika. *Abhandlungen der Naturforschenden Gesellschaft zu Halle* 10: 241–269 + Tabs. I–II.

Blanco, M.A. (2002) *Aristolochia gorgona* (Aristolochiaceae), a new species

with giant flowers from Costa Rica and Panama. *Brittonia* 54: 30–39.

[https://doi.org/10.1663/0007-196X\(2002\)054\[0030:AGAANS\]2.0.CO;2](https://doi.org/10.1663/0007-196X(2002)054[0030:AGAANS]2.0.CO;2)

Buchwalder, K., Samain, M.S., Sankowsky, G., Neinhuis, C. & Wanke, S. (2014) Nomenclatural updates of *Aristolochia* subgenus *Pararistolochia* (Aristolochiaceae). *Australian Systematic Botany* 27: 48–55.

<https://doi.org/10.1071/SB13042>

Chodat, R.H. & Hassler, E. (1906) Novitates Paraguarienses. *Bulletin de l'Herbier Boissier*, sér. 2, 6: 138–142.

Duchartre, P. (1854) Tentamen methodicae divisionis generis *Aristolochia*, additis descriptionibus complurium novarum specierum novique generis *Holostylis*. *Annales des Sciences Naturelles; Botanique, série 4*, 2: 29–76 + Tabs. 5–6.

Duchartre, P. (1864) Aristolochiaceae. In: De Candolle, A. (ed.) *Prodromus Systematis Naturalis Regni Vegetabilis* 15 (1): 421–498.

Evans, W.C. (2009) *Trease and Evans Pharmacognosy*. 6th edition. Saunders Elsevier, 604 pp.

González, F. (1990) Aristolochiaceae. In: Rangel, J.O., Cadena, A., Correa, G. & Bernal, R. (eds.) *Flora de Colombia* 12: 3–184.

González, F. (1994) Aristolochiaceae. In: Harling, G. & Andersson, L. (eds.) *Flora of Ecuador* 51: 1–42.

González, F. (2012) Florística y sistemática filogenética innecesariamente disyuntas: El caso de *Aristolochia*, *Euglypha* y *Holostylis* (Aristolochiaceae). *Revista de la Academia Colombiana de Ciencias Exactas, Físicas y Naturales* 36: 193–202.

González, F. & Stevenson, D.W. (2002) A phylogenetic analysis of the subfamily Aristolochioideae (Aristolochiaceae). *Revista de la Academia*

González, F., Ospina, J.C. & Zanotti, C. (2015) Sinopsis y novedades taxonómicas de la familia Aristolochiaceae para la Argentina. *Darwiniana* 3 (1): 38–64.

González, F. & Pabón-Mora, N. (2017) *Aristolochia keratuma* (Aristolochiaceae), nueva especie de la serie *Thyrsicae* del Chocó (Colombia) y clave de identificación para sus especies. *Caldasia* 39: 50–58.
<https://doi.org/10.15446/caldasia.v39n1.63168>

González, F. & Pabón-Mora, N. (2018) Sinopsis actualizada de *Aristolochia* (Aristolochiaceae: Piperales) en Panamá. *Acta Botánica Mexicana* 122: 1–32.
<https://doi.org/10.21829/abm122.2018.1249>

Grisebach, A. (1857) Systematische Untersuchungen über die Vegetation der Karaiben, insbesondere der Insel Guadeloupe, nach den Sammlungen Duchassaing's. *Abhandlungen der Königlichen Gesellschaft der Wissenschaften zu Göttingen* 7: 151–286.
<https://doi.org/10.5962/bhl.title.2742>

Hoehne, F.C. (1942) Algumas novidades do gênero *Aristolochia*, da flora sulamericana (descobertas nos herbários do Jardim Botânico do Rio de Janeiro e do United States National Museum, de Washington, U.S.A.). *Arquivos de Botânica do Estado de São Paulo* 1: 89–92.

Hutchinson, J. & Dalziel, J.M. (1927) Aristolochiaceae. *Flora of West Tropical Africa* 1: 77–81.

IUCN Species Survival Commission. (2012) *IUCN Red List Categories and Criteria. Version 3.1. Second edition*. IUCN Species Survival Commission, International Union for the Conservation of Nature, Gland, 34 pp. Available from: http://jr.iucnredlist.org/documents/redlist_cats_crit_en.pdf (accessed 20 January 2019).

IUCN Standards and Petitions Subcommittee. (2017) *Guidelines for using the IUCN Red List Categories and Criteria. Version 13*. International Union for the Conservation of Nature, Gland, 108 pp. Available from: <http://jr.iucnredlist.org/documents/RedListGuidelines.pdf> (accessed 20 January 2019)

Jacquin, N.J. (1760) *Enumeratio Systematica Plantarum, quas in insulis Caribaeis*. Apud Theodorum Haak, Lugduni Batavorum [Leiden], 41 pp.

Jiménez, J.E. (2016) *Revisión taxonómica de Aristolochiaceae en Costa Rica y Flora vascular de las Sabanas Miravalles, Volcán Miravalles, Costa Rica*. M.Sc. Thesis, Programa de Posgrado en Biología, Sistema de Estudios de Posgrado, Universidad de Costa Rica, San José, 175 pp.

Jiménez, J.E. & Blanco, M.A. (2020) Aristolochiaceae. *In*: Hammel, B.E., Grayum, M.H., Herrera, C. & Zamora, N. (eds.) *Manual de Plantas de Costa Rica, Volumen IV, Parte 1: Dicotiledóneas (Acanthaceae–Asteraceae)*. *Monographs in Systematic Botany from the Missouri Botanical Garden* 137: 496–515.

Jost, M., Samain, M.S., Marques, I., Graham, S.W. & Wanke, S. (2021) Discordant phylogenomic placement of Hydnoraceae and Lactoridaceae within Piperales using data from all three genomes. *Frontiers in Plant Science* 12: 642598. <https://doi.org/10.3389/fpls.2021.642598>

JSTOR. (2021 [continuously updated]) *JSTOR Global Plants*. Available from: <https://plants.jstor.org/> (accessed 20 January 2019)

Linnaeus, C. (1753) *Species plantarum*. Impensis Laurenti Salvii, Uppsala, 1200 pp.

Lundell, C.L. (1971) Studies of American plants – IV. *Wrightia* 4: 173–184.

Nickrent, D.L., Soltis, D.E., Blarer, A., Qiu, Y.-L., Soltis, P.S. & Zanis, M. (2002) Molecular data place Hydnoraceae with Aristolochiaceae. *American Journal*

of Botany 89: 1809–1817. <https://doi.org/10.3732/ajb.89.11.1809>

Nuttall, T. (1837 [1835]) Collections toward a flora of the Territory of Arkansas. *Transactions of the American Philosophical Society, new series* 5 (6[2]): 139–203. <https://doi.org/10.2307/1004943>

Ohi-Toma, T., Sugawara, T., Murata, H., Wanke, S., Neinhuis, C. & Murata, J. (2006) Molecular phylogeny of *Aristolochia* sensu lato (Aristolochiaceae) based on sequences of rbcL, matK, and phyA genes, with special reference to differentiation of chromosome numbers. *Systematic Botany* 31: 481–492. <https://doi.org/10.1600/036364406778388656>

Oliver, D. (1889) *Saruma henryi*, Oliv. *Hooker's Icones Plantarum* 19 (4): pl. 1895.

Ortega-Ortiz, J.F. & Ortega-Ortiz, R.V. (1997) Aristolochiaceae. *In*: Sosa, V., Cabrera-Rodríguez, L., Duncan, T., Escamilla, M., Moreno, N.P., Nee, M., Nevling, L.I., Rzedowski, J. & Schubert, B.G. (eds.) *Flora de Veracruz* 99: 1–46. <https://doi.org/10.21829/abm44.1998.803>

Pfeifer, H.W. (1966) Revision of the North and Central American hexandrous species of *Aristolochia* (Aristolochiaceae). *Annals of the Missouri Botanical Garden* 53: 1–114. <https://doi.org/10.2307/2394940>

Philippi, R.A. (1865) Descripción de algunas plantas nuevas chilenas. *Anales de la Universidad de Chile* 26: 638–650 + Fig. i.

Qiu, Y.L., Dombrowska, O., Lee, J., Li, L., Whitlock, B.A., Bernasconi-Quadroni, F., Rest, J.S., Davis, C.C., Borsch, T., Hilu, K.W., Renner, S.S., Soltis, D.E., Soltis, P.S., Zanis, M.J., Cannone, J.J., Gutell, R.R., Powell, M., Savolainen, V., Chatrou, L.W. & Chase, M.W. (2005) Phylogenetic analyses of basal angiosperms based on nine plastid, mitochondrial, and nuclear genes. *International Journal of Plant Sciences* 166: 815–842. <https://doi.org/10.1086/431800>

Rafinesque, C.S. (1819) *The Genera of North-American Plants and a Catalogue of the Species to the year 1817*. By Thomas Nuttall, F. L. S. &c. &c. 2 vols. 12mo. Philadelphia. 1818. [review and comment of]. *American Monthly Magazine and Critical Review* 4: 184–196.

Reichenbach, H.G.L. (1841) *Der Deutsche Botaniker Herbarienbuch*. Arnoldischen Buchhandlung, Dresden und Leipzig, 240 pp.

Rottbøll, C.F. (1783) Etats-Raad Friis Rottbøll's Bestriebelse ober nogle Planter fra de malabariste Skrifter. *Nye Samling af det Kongelige Danske Videnskabers Selskabs Skrifter* 2: 525–546 + 6 Tabs.

Ruiz, H. (1805) *Memoria sobre las virtudes y usos de la planta llamada en el Perú Bejuco de la Estrella*. Imprenta de D. José del Collado, Madrid, 52 pp + 1 Fig.

Schmidt, O.C. (1927) Beiträge zur Kenntniss der Aristolochiaceen. I. *Repertorium Specierum Novarum Regni Vegetabilis* 23: 282–299.
<https://doi.org/10.1002/fedr.4870231803>

Seeman, B.C. (1854) *The botany of the voyage of H.M.S. Herald*. Lovell Reeve, London, 484 pp + 100 Tabs.

Standley, P.C. (1933) The Flora of Barro Colorado Island, Panama. *Contributions from the Arnold Arboretum of Harvard University* 5: 1–178.
<https://doi.org/10.5962/bhl.title.153450>

Standley, P.C. & Record, S.J. (1936) The forests and flora of British Honduras. *Publications of the Field Museum of Natural History, Botanical Series* 12: 1–432 + 16 plates.

Standley, P.C. & Steyermark, J.A. (1946) Aristolochiaceae. In: Standley, P.C. & Steyermark, J.A. (eds.) *Flora of Guatemala. Fieldiana, Botany* 24 (4): 93–101.

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/>]

Thunberg, C.P. (1775) Beskrifning På en ganska besynnerlig och obekant Svamp, *Hydnora africana*, ifrån Goda Hoppets Udde i Africa infånd. *Kungliga Svenska Vetenskaps Academiens Handlingar* 36: 69–75 + Tab. II.

Wanke, S., González, F. & Neinhuis, C. (2006) Systematics of pipevines: combining morphological and fast-evolving molecular characters to investigate the relationships within subfamily Aristolochioideae (Aristolochiaceae). *International Journal of Plant Sciences* 167: 1215–1227.
<https://doi.org/10.1086/508024>

Weber, A., Huber, W., Weissenhofer, A, Zamora, N. & Zimmerman, G. (2001) An introductory field guide to the flowering plants of the Golfo Dulce rain forests, Costa Rica. *Stapfia* 78: 1–575.
[\[https://www.zobodat.at/pdf/STAPFIA_0078_0001-0575.pdf\]](https://www.zobodat.at/pdf/STAPFIA_0078_0001-0575.pdf)

Zhu, X.X., Li, X.Q., Liao, S., Du, C., Wang, Y., Wang, Z.H., Yan, J., Zuo, Y.J. & Ma, J.S. (2019) Reinstatement of *Isotrema*, a new generic delimitation of *Aristolochia* subgen. *Siphisia* (Aristolochiaceae). *Phytotaxa* 401: 1–23.
<https://doi.org/10.11646/phytotaxa.401.1.1>



Published

2021-09-15

Section

License

Authors need to complete and return an [Assignment of Copyright](#) form when a paper is accepted for publication. Authors from institutions that do not allow transfer of copyrights to publishers (e.g. government institutions such as USDA, CSIRO) should attach a copyright waiver or similar document.