Floribunda 8 (1) 2025: 24 — 31
https://ejournal.brin.go.id/floribunda/
DOI: 10.55981/floribunda.2025.11541
P-ISSN : 0215 - 4706, E-ISSN : 2460 - 6944

A TAXONOMIC CONTRIBUTION TO *ARISTOLOCHIA* IN JAVA: INTEGRATING NEW DISCOVERIES AND NOMENCLATURAL UPDATES

Muhammad Hisyam Baidlowi[1], Muhammad Rifqi Hariri[2], Arifin Surya Dwipa Irsyam[3]*, Muzzazinah Muzzazinah[4] & Dian Rosleine[3]

[1]Botani Tropika Indonesia Foundation (Botanika), Bogor, 16112, Indonesia
[2]Research Center for Biosystematics and Evolution, BRIN, Cibinong, 16911, Indonesia
[3]Herbarium Bandungense, School of Life Sciences and Technology, ITB Jatinangor Campus, Sumedang, 45363, Indonesia
[4]Biology Study Program, Faculty of Teacher Training and Education, Sebelas Maret University, Surakarta, 57126, Indonesia
Correspondence: arifin@itb.ac.id

ABSTRACT

Muhammad Hisyam Baidlowi, Muhammad Rifqi Hariri, Arifin Surya Dwipa Irsyam, Muzzazinah Muzzazinah & Dian Rosleine 2025. Kontribusi Taksonomi terhadap *Aristolochia* di Jawa: Integrasi Penemuan Baru dan Pembaruan Nomenklatur. Floribunda 8(1): 24 – 31 — Studi ini memperbarui informasi taksonomi mengenai marga *Aristolochia* di Jawa, Indonesia, dengan menggabungkan perubahan nomenklatur terkini dan pencatatan jenis rekaman baru. Pada survei tahun 2024, *A. leuconeura* Linden didokumentasikan untuk pertama kalinya di pulau ini, kemungkinan diperkenalkan sebagai tanaman hias. Populasi spontan *A. ringens* juga ditemukan di Bandung, menandai pencatatan pertama di luar budi daya. Temuan ini menyoroti proses naturalisasi yang sedang berlangsung serta pentingnya survei botani yang berkelanjutan. Selain itu, penelitian ini juga dilakukan untuk menyediakan data taksonomi dan nomenklatur terkini mengenai *Aristolochia* di Jawa. Penelitian ini memperdalam pemahaman tentang keragaman *Aristolochia* di Jawa dan menjadi referensi penting bagi para ahli botani dan konservasionis dalam memantau keanekaragaman tumbuhan serta dampak spesies asing.

Kata kunci: Asing, Introduksi, Magnoliid, Malesia, Piperales.

Muhammad Hisyam Baidlowi, Muhammad Rifqi Hariri, Arifin Surya Dwipa Irsyam, Muzzazinah Muzzazinah & Dian Rosleine 2025. A Taxonomic Contribution to *Aristolochia* in Java: Integrating New Discoveries and Nomenclatural Updates. Floribunda 8(1): 24 – 31 — This study updates the taxonomic information on the genus *Aristolochia* in Java, Indonesia, incorporating recent nomenclatural changes and new species records. In a 2024 survey, *A. leuconeura* Linden was documented for the first time on the island, likely introduced for ornamental use. A spontaneous population of *A. ringens* was also found in Bandung, marking its first record outside cultivation. These findings highlight ongoing naturalization and the need for continued botanical surveys. Furthermore, this study was also undertaken to furnish updated taxonomic and nomenclatural data on the genus *Aristolochia* in Java. This work enhances understanding of *Aristolochia* diversity in Java and serves as a useful reference for botanists and conservationists monitoring plant biodiversity and introduced species impacts.

Keywords: Alien, Introduced, Magnoliids, Malesia, Piperales.

The Aristolochiaceae comprises eight genera and approximately 746 species, with a global distribution that excludes the Arctic region (Bramley & Edwards, 2015; POWO, 2025). Among these, *Aristolochia* L. is the largest genus, containing 549 species, 28 of which are native to the Malesian region (Ding Hou, 1984; POWO, 2025). Morphologically, *Aristolochia* is characterized by climbing stems; a perianth with a distinct S-shaped curvature; a gynostemium bearing six anthers and six stigmatic lobes enclosed within the utricle; non-siliquiform capsules; and flattened seeds (Ding Hou, 1984; Huber, 1985; Huber, 1993).

Previous studies have documented the natural occurrence of four *Aristolochia* species in Java, Indonesia: *A. acuminata* Lam., *A. coadunata* Backer, *A. jackii* Steud., and *A. zollingeriana* Miq. (Backer & Bakhuizen van den Brink, 1963; Ding Hou, 1984; POWO, 2025). *Aristolochia coadunata* has been further classified into two varieties: *A. coadunata* var. *coadunata* and *A. coadunata* var. *bosschai* Backer, the latter of which is endemic to Talun, Bandung Regency, West Java (Ding Hou, 1984). Additionally, the first volume of Flora of Java recorded ten *Aristolochia* species introduced from the Americas and cultivated in the island for ornamental purposes (Backer & Bakhuizen van den Brink, 1963).

During our 2024 botanical survey, we documented *A. leuconeura* Linden as a newly introduced species in Java, marking its first recorded occurrence on the island. Additionally, a spontaneous population of *A. ringens* was identified in Bandung, indicating that the species has escaped cultivation and successfully established in the wild. These observations suggest ongoing shifts in the distribution and naturalization of *Aristolochi*a species in Java, with potential ecological and conservation implications.

Furthermore, this study incorporates recent taxonomic revisions affecting species previously listed in Flora of Java, thereby ensuring that botanical records remain current and accurate. By integrating newly documented occurrences with updated nomenclature, this research offers a comprehensive and authoritative reference on the taxonomy of *Aristolochia* in Java. These findings enhance our understanding of the region's plant diversity and provide a valuable resource for botanists, ecologists, and conservationists engaged in monitoring and preserving Java's unique flora.

MATERIALS AND METHODS

This research was conducted across various regions in Java, Indonesia, including West Java (Bandung, Bandung Barat, Bogor, Cianjur, Depok, Sumedang), Central Java (Temanggung), and East Java (Malang, Situbondo) between February 2022 and April 2024. Plant materials consisted of four *A. leuconeura* and one *A. ringens* were collected from the field following the guidelines of the Royal Botanic Garden Edinburgh (2017). Specimens were preserved using the techniques described by Davies *et al*. (2024) and subsequently deposited in the Herbarium Bandungense (FIPIA), School of Life Sciences and Technology, Institut Teknologi Bandung.

Species determination was conducted through critical examination of morphological characters using several references, including Backer and Bakhuizen van den Brink (1963), Stoffers (1982), Ding Hou (1984), Acevedo-Rodríguez (2005), Fayaz (2011), Chen *et al*. (2015), Ibarra-Manríquez *et al*. (2015), González and Monzón-Sierra (2022), and Dehgan (2023). Identification was corroborated through comparative analysis of authenticated herbarium specimens deposited at Herbarium Bogoriense (BO) and Herbarium Bandungense (FIPIA). Taxonomic nomenclature and species circumscriptions follow the standards of Plants of the World Online (POWO, 2025).

RESULTS AND DISCUSSION

Taxonomic treatment

Aristolochia leuconeura **Linden**, Belgique Hort. 8: 165 (1858). — Type: Orillas del Rio Guarino, entre el Reten y La Victoria, 200 m, Caldas (Colombia, Western South America,

Southern America), 1957/01/27, *M.R. Jaramillo & P.A. Fernández 715* (Neotype COL! !-image seen [COL000001150]). (Fig. 1)
Aristolochia argyroneura Hoehne ex Uribe, Caldasia. 7: 160 (1955).
Aristolochia variegata van Houtte, Nursery Cat. (Louis van Houtte). 177: 92 (1878-1879 publ. 1878).
Aristolochia veraguensis (Klotzsch) Duch., A.P.de Candolle, Prodr. 15(1): 458 (1864).
Howardia veraguensis Klotzsch, Monatsber. Königl. Preuss. Akad. Wiss. Berlin. 1859: 607 (1859)

Herbaceous climbers without tendrils, up to 5 m long. Stems glabrous, green, with the pit hollow. Leaves alternate; petiole slender, 10–12 cm long, grooved above, glabrous; pseudostipules absent; lamina reniform, 10–17 × 7–5 cm, base reniform, margin entire, apex acute to acuminate, adaxial surface variegated with white, green, or yellow-green along the veins, abaxial surface glaucous, pellucid-dotted, palmate, 7-nerved, prominent beneath, reticulate. Flowers and Fruits not seen.

Distribution. The native range of this species extends from Veracruz, Mexico, to southern Tropical America (POWO, 2025).

Habitat. In Java, this species is cultivated as an ornamental plant in both sun-exposed and shaded environments, at elevations up to 900 meters above sea level.

Specimens examined. INDONESIA. JAVA – West Java • Depok, cultivated in a private nursery, 22.II.2024, *MR Hariri 809* (FIPIA!); Bogor Regency, Tamansari Subdistrict, Gang Pisang, 09.V.2024, *ASD Irsyam 950.* (FIPIA!); Bogor Regency, Pamijahan Subdistrict, Gunung Picung, 08.VI.2024, *ASD Irsyam 951* (FIPIA!). Central Java • Temanggung Regency, Mt. Beser, 08.V.2024, *MR Hariri 845* (FIPIA!).

Note. Generative structures were not observed during fieldwork. However, WFO (2025) provided a morphological description of the reproductive organs: Flowers borne in dense, bracteate racemes on older stems; ovary and pedicel 5–6 cm long; ovary 6-locular, without bracteoles, aligned with the utricle. Calyx 5–7 cm long, slightly curved, reddish-purple; utricle 1–2 cm long; limb 1-lobed, 2–3 cm long, erect, funnel-shaped, acute, yellow on the inside. Gynostemium 6-lobed, stipitate. Capsules 14–20 cm long, narrowly cylindrical, acropetalous, glabrous; septa entire, splitting along the valves.

Aristolochia leuconeura was recently documented during a botanical survey in the western and central regions of Java. It is believed to have been introduced to the island by local horticulturists from the Neotropics for ornamental purposes, although the precise history of its introduction remains unclear. This species can be readily distinguished from other *Aristolochia* taxa in Java by its distinctive vegetative traits, notably its large, cordate leaves featuring prominent yellow-green variegation along the veins and the absence of pseudostipules (Fig. 1).

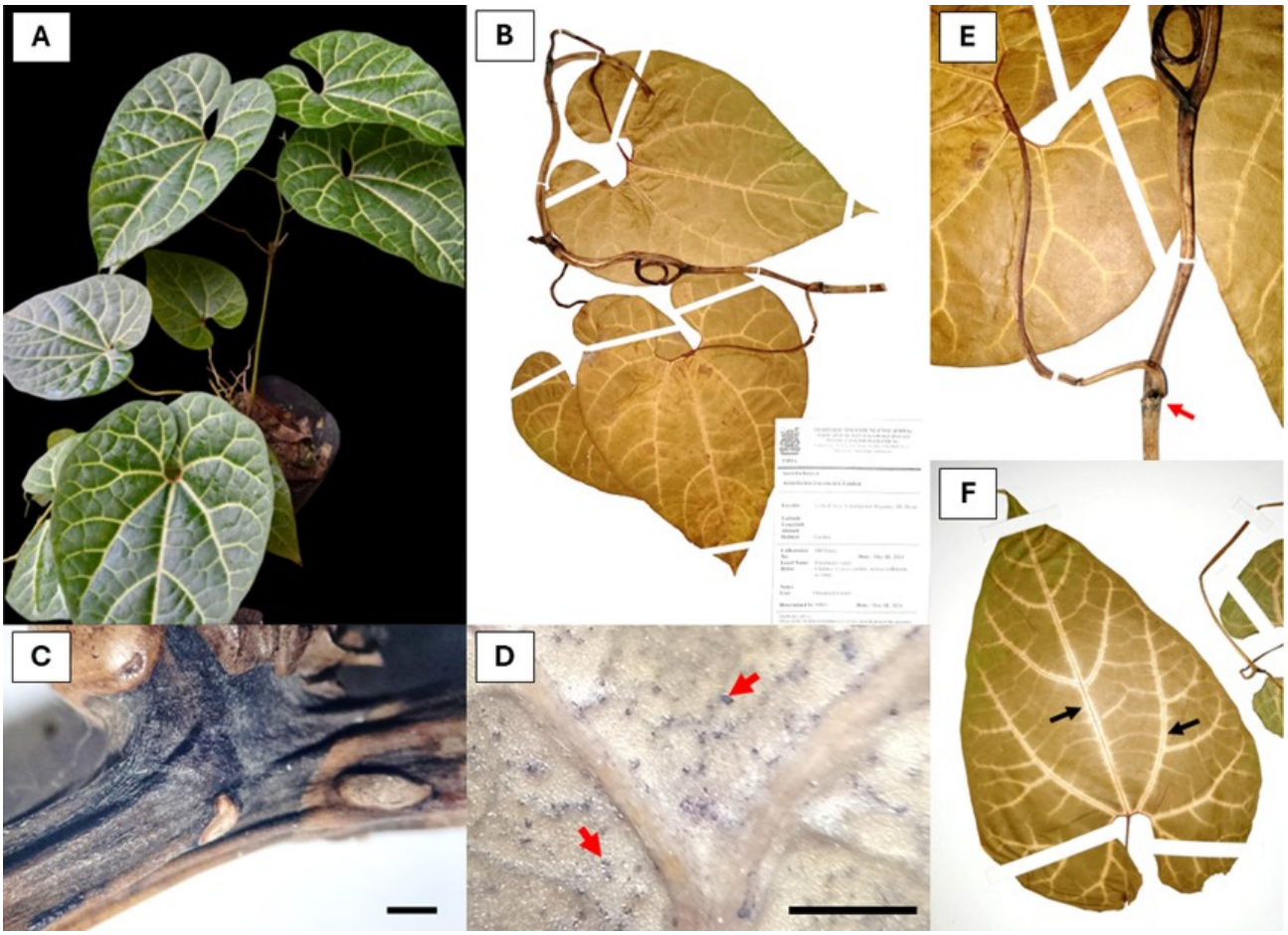

Figure 1. *Aristolochia leuconeura* Linden. A–B. Habit, C. Glabrous branchlet, D. Pellucid dots on leaf (indicated by red arrows), E. Slender petiole lacking pseudostipules (red arrow), F. White-colored veins on dried leaf (black arrows). Scale bars: C = 1 mm; D = 0.5 mm.

***Aristolochia ringens* Vahl**, Symb. Bot. 3: 99 (1794); *Howardia ringens* (Vahl) Klotzsch, Monatsber. Königl. Preuss. Akad. Wiss. Berlin 1859: 607 (1859) — Type: Jamaica, *J. Ryan & J.P.B. von Rohr s.n.* (Syntype C!-image seen [C10006624]). (Fig. 2–3)

Herbaceous climbers without tendrils. Stems glabrous, green, with the pit hollow. Pseudostipules foliaceous, cordate, 1.7–2.9 × 1.6–2.5 cm, amplexicaule, reticulate, pale green; Leaves alternate; petiole slender, 1–9 cm long, grooved above, narrowly winged; lamina reniform, 2.6–13 × 3.1–14 cm, base reniform, margin entire, apex obtuse to rounded, adaxial surface dark green, abaxial surface glaucous, pellucid-dotted, palmate, 7–8-nerved, prominent beneath, veins reticulate. Flowers zygomorphic, solitary, pendulous; peduncle 12.5 cm long, green with dark purple tinge at the apex. Perianth S-shaped, yellowish green with a netlike pattern of dark purple marks; utricle obovoid, 5.5–6.3 × 3.1–4.8 cm, yellowish-green and white at the base inside; tube straight, 3.4 cm long; limb bilabiate, the upper lip spathulate, 5–7.1 cm long; the lower lip lanceolate, 14–16 cm long, curved, pale brown inside, with trapping trichomes. Gynostemium obovoid, 9 × 9 mm; anthers linear, 7 × 1 mm; ovary 6-lobed, ovules many in each locule; stylar column short, cylindrical, white, stigmatic lobes 6, flat, apex mucronate, shiny white. Fruits capsule, 6.5–8.2 × 2.9–3.4 cm, oblong, 6-ribbed, green; seeds numerous, rhomboid, 6–13 × 5–9 mm, flat, winged, white, brown when dried.

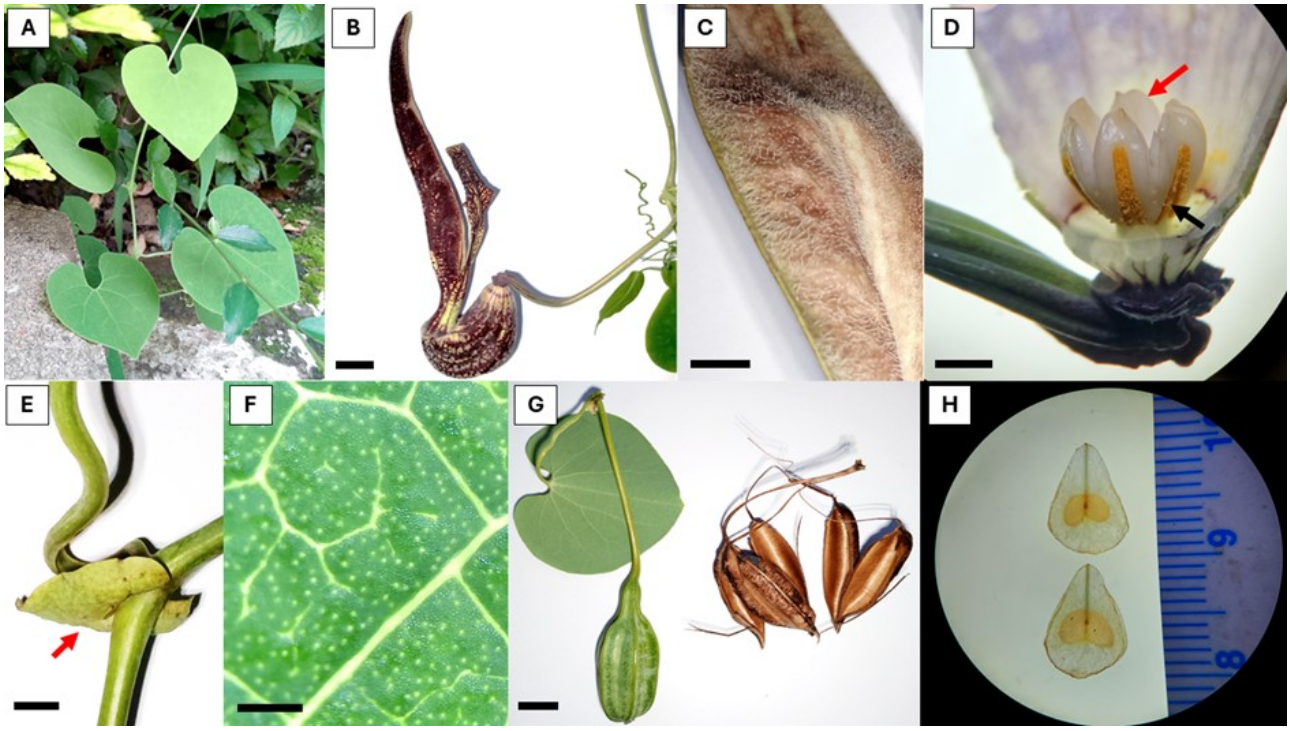

Figure 2. *Aristolochia ringens* Vahl. A. Habit, B. Flower, C. Adaxial surface of the flower limb, D. Gynostemium, showing anthers (black arrow) and stigma (red arrow), E. Pseudostipule, F. Pellucid dots on leaf, G. Immature fruit (left) and dehisced fruit (right), H. Seeds. Scale bars: B= 2 cm, C= 1 cm, D= 3 mm, E= 5 mm, F= 1 mm, G= 2 cm.

Distribution. *A. ringens* is native to Central and Southern Tropical America (POWO 2025).
Habitat. A spontaneous population of *A. ringens* was discovered in Bandung. The species thrives in disturbed habitats such as abandoned areas and roadsides at an elevation of 770 meters above sea level.
Specimen examined. INDONESIA. JAVA – West Java • Bandung City, Babakan Siliwangi City Forest, 27.X.2022, *ASD Irsyam, I Suwandhi, NN Kamila, MR Hariri s.n.* (FIPIA!).

Note. This study documents the presence of a wild population of *A. ringens* in the Coblong Subdistrict of Bandung City. The species was observed growing along roadsides and in abandoned areas adjacent to the Babakan Siliwangi City Forest (BSCF) (Fig. 3). Notably, the spontaneous occurrence of *A. ringens* in this region has not been previously reported. Earlier botanical accounts recorded *A. ringens* solely as a cultivated species (Backer & Bakhuizen van den Brink, 1963). Examination of specimens at the Herbarium Bandungense (FIPIA) revealed that the earliest documented collection of *A. ringens* originated from the Hortus Botanicus Tamansari in Bandung, near the BSCF, obtained from a living collection by Sicco M. Popta on April 30, 1952. Over time, the species has successfully escaped cultivation and established self-sustaining wild populations without human intervention.

Aristolochia ringens produces seeds that are small, flat, and membranous in texture (Fig. 2H). These morphological characteristics facilitate efficient anemochorous (wind-mediated) dispersal, enabling extensive spread throughout the BSCF. Within the study area, the plant co-occurs with several other naturalized species, including *Cissus verticillata* (L.) Nicolson & C.E.Jarvis (Vitaceae), *Epipremnum aureum* (Linden & André) G.S.Bunting (Araceae), *Rivina humilis* L. (Petiveriaceae), and *Syngonium podophyllum* Schott (Araceae). Given its effective dispersal strategy, the range of *A. ringens* is anticipated to expand further in the coming years.

Figure 3. The spontaneous population of *A. ringens* in Babakan Siliwangi City Forest, Bandung. A. Habitat, B. *A. ringens* co-occurring with *Cissus verticillata* (Vitaceae) and *Rivina humilis* (Petiveriaceae), C. Seedling.

Updated data on the genus *Aristolochia* in Java

According to Backer and Bakhuizen van den Brink (1963), 15 species were previously recorded under the genus *Aristolochia* in Java. However, a critical reassessment of the historical records has resulted in the exclusion of *Aristolochia durior* Hill from the regional checklist, as it is now regarded as a heterotypic synonym of *Bignonia capreolata* L. (Bignoniaceae) based on current taxonomic consensus. This refinement enhances the accuracy of the genus delimitation within the Javanese flora. Furthermore, our field observations have identified one additional introduced species, *Aristolochia leuconeura*, not previously included in the inventory. Consequently, this study provides an important update to the taxonomy of *Aristolochia* in Java, maintaining the total number of confirmed species at 15. The updated checklist, detailed in Table 1, integrates recent advances in taxonomic research, including nomenclatural changes, synonymies, and revised species delimitations. This comprehensive revision not only standardizes species names according to the latest International Code of Nomenclature for algae, fungi, and plants (ICN) guidelines but also rectifies historical misidentifications and nomenclatural ambiguities previously present in regional floras.

Table 1. Annotated Checklist of *Aristolochia* (Aristolochiaceae) in Java [modified from Backer and Bakhuizen van den Brink (1963)]

Accepted name	Synonym	Status
Aristolochia acuminata Lam.	*Aristolochia tagala* Cham.*	Native
Aristolochia arborea Linden		Introduced (culta)
Aristolochia coadunata Backer		Native
Aristolochia cymbifera Mart.	*Aristolochia labiosa* Ker Gawl.*	Introduced (culta)
Aristolochia fimbriata Cham.		Introduced (culta)
Aristolochia grandiflora Sw.		Introduced (culta)
Aristolochia jackii Steud.	*Aristolochia tripartita* Backer*	Native
Aristolochia labiata Willd.	*Aristolochia brasiliensis* Mart. & Zucc.*	Introduced (escaped)
Aristolochia leuconeura Linden		Introduced (culta)
Aristolochia littoralis Parodi	*Aristolochia elegans* Mast.*	Introduced (culta)
Aristolochia odoratissima L.	*Aristolochia pandurata* Jacq.*	Introduced (culta)
Aristolochia ridicula N.E.Br.		Introduced (culta)
Aristolochia ringens Vahl		Introduced (escaped)
Aristolochia triangularis Cham.		Introduced (culta)
Aristolochia zollingeriana Miq.		Native

Note: *Previous name in the Flora of Java

REFERENCES

Acevedo-Rodríguez P 2005. Vines and climbing plants of Puerto Rico and the Virgin Islands. *Contributions from the United States National Herbarium* 51: 1–483.

Backer CA & Bakhuizen van den Brink RC 1963. *Flora of Java Volume I*. N.V.P. Noordhoff. Groningen, The Netherlands.

Bramley G & Edwards S 2015. Aristolochiaceae. *In*: Utteridge T & Bramley G [Eds.]. *The Kew Tropical Plant Families Identification Handbook*. Royal Botanic Gardens. Kew. Pp: 20–21.

Chen L, Ang WF, Ng A, Teo J & Tang J 2015. *1001 Garden Plants in Singapore. 3rd Ed*. National Parks Board. Singapore.

Chong KY, Tan, HT & Corlett RT 2009. *A checklist of the total vascular plant flora of Singapore: native, naturalised and cultivated species. A checklist of the total vascular plant flora of Singapore: native, naturalised and cultivated species*. Raffles Museum of Biodiversity Research, National University of Singapore. Singapore.

Davies NMJ, Drinkell C & Utteridge TMA 2024. *The Herbarium Handbook*. Royal Botanic Gardens, Kew. Kew.

Dehgan B 2023. Magnoliids. In: Dehgan B. [Ed.]. *Garden Plants Taxonomy: Volume 2: Angiosperms (Eudicots)*. Springer International Publishing. Cham. Pp: 13–53.

Ding Hou 1984. Aristolochiaceae. *Flora Malesiana - Series 1, Spermatophyta* 10(1), 53–108.

Fayaz A 2011. *Encyclopedia of Tropical Plants: Identification and Cultivation of Over 3000 Tropical Plants*. Firefly Books. Canada.

González F & Monzón-Sierra J 2022. An updated synopsis of *Aristolochia* (Aristolochiaceae) in Guatemala. *Brittonia* 74(3):239–264.

Huber H 1985. Samenmerkmale und Gliederung der Aristolochiaceen. *Botanische Jahrbücher fur Systematik, Pflanzengeschichte und Pflanzengeographie* 107: 277–320.

Huber H 1993. Aristolochiaceae. *In*: Kubitzki K [Ed.]. *The Families and Genera of Vascular Plants Volume II (Flowering Plants: Dicotyledons Magnoliid, Hamamelid and Caryo-*

phyllid Families). Springer-Verlag. Berlin. Pp: 129–137.

Ibarra-Manríquez G, Rendón-Sandoval FJ, Cornejo-Tenorio G & Carrillo-Reyes P 2015. Lianas of Mexico. *Botanical Sciences* 93(3): 365–417.

Jebb M 1993. *Aristolochia in New Guinea*. Christensen Research Institute. California.

POWO 2025. *Plants of the World Online*. Facilitated by the Royal Botanic Gardens, Kew. Published on the Internet; https://powo.science.kew.org/ Retrieved 03 June 2025.

Royal Botanic Garden Edinburgh 2017. *Guide to Collecting Herbarium Specimens in The Field*. Royal Botanic Garden Edinburgh. Inverleith Row, Edinburgh.

Stoffers AL 1982. Aristolochiaceae. *Flora of the Netherlands Antilles* 2(3): 243–246.

WFO 2025. *World Flora Online*. Published on the Internet; http://www.worldfloraonline.org/. Retrieved 03 June 2025.