



Aristolochia chlamydothylla (Aristolochiaceae), a New Record for the Flora of Vietnam

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Abstract: *Aristolochia chlamydothylla* C.Y. Wu ex S.M. Hwang, a medicinal plant and main distribution from northern Thailand and south-eastern China, is newly recorded for the flora of Vietnam. This species was misidentified to *A. kaempferi* in Vietnamese herbaria. An extent description, illustrations and taxonomic notes of *Aristolochia chlamydothylla* are also provided.

Keywords: Aristolochiaceae, *Aristolochia chlamydothylla*, new record, Vietnam.

1. Introduction

Aristolochia Linnaeus (Aristolochiaceae) is widely distributed throughout the tropics, subtropics, and the temperate regions with ca. 600 recognized species (Neinhuis *et al.*, 2005) [1]. *Aristolochia* are important host plants for the butterfly family Papilionidae and also is a major group for studying co-evolution, especially the plant-butterfly interaction (Condamine *et al.*, 2012) [2]. Furthermore, some *Aristolochia* species have been widely used in Chinese & Vietnamese traditional

medicine (Hwang *et al.*, 2003) [3]. Recent phylogenetic studies based on morphology and molecular data suggest a subdivision of *Aristolochia* into three monophyletic groups recognized as the subgenera: *Aristolochia*, *Pararistolochia*, and *Siphisia* (Wanke *et al.*, 2006) [4]. In the flora of Vietnam, only two subgenera (*Aristolochia* and *Siphisia*) are recorded. Of which, the subgenus *Siphisia* is well known for its U- or horseshoe-shaped perianth, the utricle and the tube are not sharply delimited, a strongly curved tube, a 3-lobed limb, and a 3-lobed gynostemium, each carrying two anthers. In contrast, the subgenus *Aristolochia* can be recognized by its slightly curved or rectilinear tube, the utricle and the tube are sharply distinct, a 1-lobed limb, and a

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6-lobed gynostemium, each carrying a single anther on the outer surface. Currently 23 *Aristolochia* species belonging to two subgenera are known from Vietnam, of which seventeen are in subgenus *Siphisia* and six are in subgenus *Aristolochia*. Recent studies of herbarium collections from Vietnam have revealed numerous *Aristolochia* specimens at Vietnamese herbaria being unidentified or misidentified to morphologically similar species (Do & Nghiem, 2017) [5].

While revising *Aristolochia* from Vietnam, we found out a specimen collected in Ha Giang and Tuyen Quang province, Northern Vietnam available at National Institute of Medicinal Materials (NIMM) and Museum of Biology, VNU University of Science (HNU), was misidentified to *Aristolochia kaempferi* Willd., a species of the genus *Siphisia* and wide distribution to Japan and China (Watanabe *et al.*, 2006) [6]. This specimen, however, has the morphological characters such as the utricle and the tube are sharply distinct, a 1-lobed limb, and a 6-lobed gynostemium, each carrying a single anther on the outer surface, being specific for the subgenus *Aristolochia*. Re-examination of the specimens and studies on the protologue and type specimens of previously known species revealed that this specimen completely matches with *Aristolochia chlamydophylla* C.Y. Wu ex S.M. Hwang that belongs to the subgenus *Aristolochia* and distributes mainly to China and Thailand (Do & Gao, 2017) [7]. Thus, we here report *Aristolochia chlamydophylla* as a new record for the flora of Vietnam. The description, taxonomic notes and comparison with the morphologically similar species are given.

2. Materials and methods

Herbarium specimens available from related herbaria: BKF, C, HITBC, HN, IBK, IBSC, KUN, NIMM, HNU, P, and PE were examined as well as reviewed the protologue, taxonomic treatments and type specimens of previously

described *Aristolochia* species from Vietnam (Pham 2000) [8] and adjacent areas such as the flora of China (Hwang *et al.*, 2003) [3], the flora of Thailand (Phuphatanaphong, 1987) [9], and the flora Malesianae (Hou, 1984) [10].

Field works were conducted to observe and record the morphological characters of vegetative and productive organizations (e.g. the morphology and the coloration of perianth, utricle, tube, and limb), which were probably not indicated in dried specimens.

The terminology of species description was followed by Harris & Harris (2001) [11] and Hwang *et al.* (2003) [3].

3. Taxonomic treatment

Aristolochia chlamydophylla C.Y. Wu ex S. M. Hwang, *Acta Phytotax. Sin.* 19(2): 223 [12] (Figures 1–2).

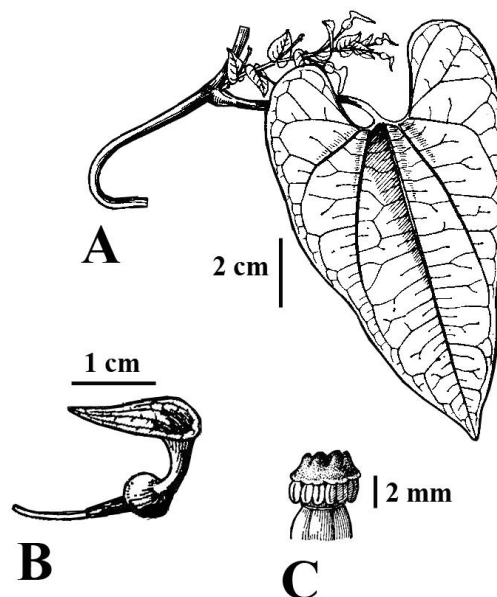


Figure 1. *Aristolochia chlamydophylla*. - A. Branch with a cymose inflorescence; B. Lateral view of open flower; C. Close up of gynostemium. Drawn from the specimens *Trương, Toán, Nam & Thanh TB-10084* (NIMM) by Do Huu Quyet.

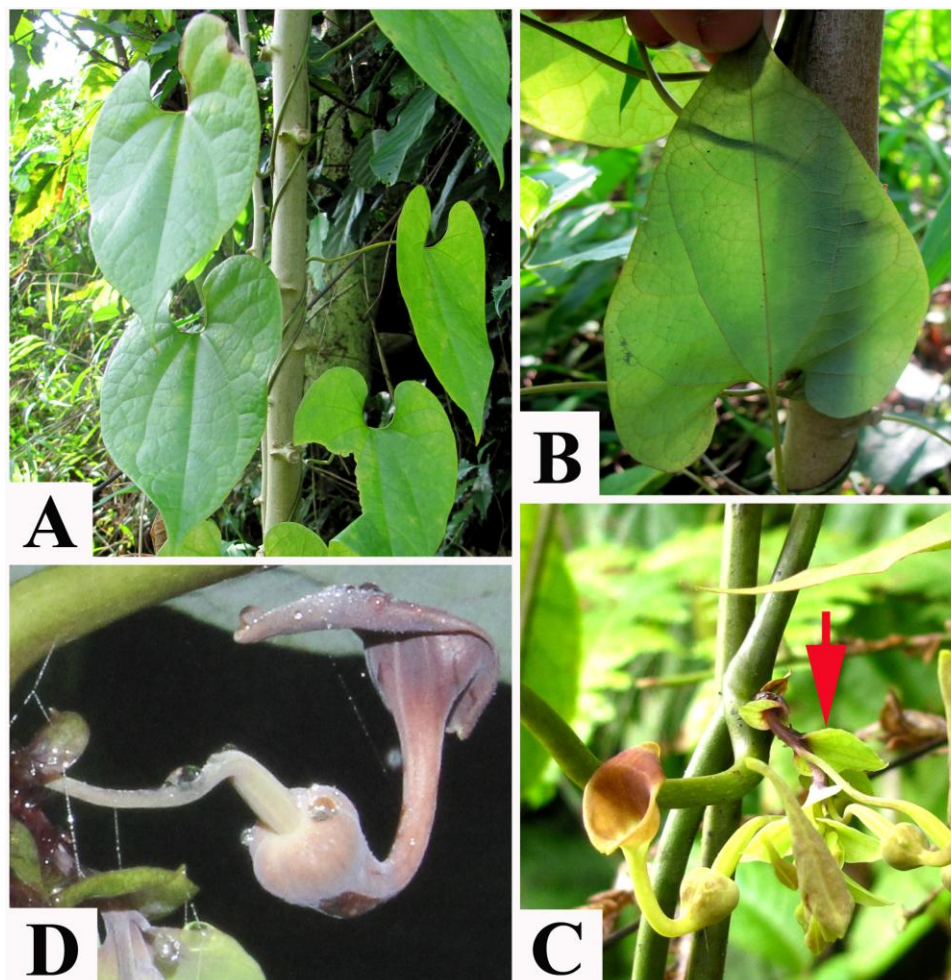


Figure 2. *Aristolochia chlamydophylla* - A. Twining climber; B. Abaxial leaf surface; C. Close up of cymose inflorescence, front view of open flower and amplexicaul bracteole (indicated by a red arrow); D. Lateral view of open flower. A-C taken by Do Van Truong and D taken by Bui Hong Quang.

Prennial, herbs, twinning, 3–4 m long. Roots numerous, fascicle and cylindrical-shaped. Stem terete, slightly striate, glabrate. Leaves leathery or papery, lamina ovate to ovate-deltate, 6–14 cm long, 5–10 cm wide, adaxially glabrous, abaxially puberulous with aromatic-punctate and hairs on veinlets forming closely foveolate reticulation, glaucous, veins palmate, basal veins 3 pairs and merged at margin, venation rather sunken on the adaxial leaf surface and clearly prominent on the abaxial leaf surface, margin entire, apex acute to shortly acuminate, ca. 0.5 cm long, base

deeply cordate, sinus 1.5–2 cm deep and 1.5–1.8 cm wide. Petiole 6–8 cm long, pendulous, glabrescent. Inflorescence cymose, axillary, 2 to 4 cymes, 5 to 8 flowers per each cyme, condensed. Inflorescence axis short, 2–4 cm long, glabrescent. Bracteole ovate, 1.1–1.3 cm long (–1.5 cm), 0.8–1 cm wide, base cordate and slightly amplexicaul, both surfaces glabrous, persistent, margin entire. Pedicel 0.7–0.9 cm long, ascending, glabrescent. Perianth 2.2–2.5 cm long, greenish to purplish, glabrous. Ovary oblong, 6–8 mm long, 2–2.5 mm wide, glabrescent. Utricle spherical, 0.4–0.5 cm

diameter, sessile. Tube bent on transition from utricle, rectilinear or slightly curved at base, 1.1–1.4 cm long, 0.3–0.4 cm wide. Limb unilateral, ligule-like, ovate-lanceolate, 1.2–1.5 cm long, 0.6–0.8 cm wide, apex obtuse, dark purple. Gynostemium 6-lobed, 3–4 mm high; anthers elliptic, ca. 1 mm long. Capsule not seen.

Type: CHINA. Yunnan: Ruili, alt. 1000 m, 27 April 1916, S. Chow 610 (KUN!).

Ecology and Phenology: This species grows in evergreen broadleaf forest on mountain slopes or along stream sides, alt. 800–1000 m. Flowering is March to April.

Distribution: CHINA (Guangxi and Yunnan), THAILAND (Nan), and new to VIETNAM (Hà Giang, Tuyen Quang).

Ethnobotany: *Aristolochia chlamydophylla* is used medicinally. According to Vietnamese traditional medicine, the root is used for treatment of stomach.

Additional specimens examined: Vietnam: Hà Giang prov., Vị Xuyên distr., Cao Bồ comm., Lũng Tào village, 20 March 2015, *Trưởng, Toán, Nam & Thanh TB-10084* (NIMM); Tuyen Quang prov., Hàm Yên distr., Chạm Chu Nature Reserve Area, (Cao Đường village), 22 August 2017, *Oanh, Hải, Thành, OHT-0039* (HNU).

Taxonomic notes: The specimens of *Aristolochia chlamydophylla* in Vietnamese herbaria were misidentified to *A. kaempferi*, a species belonging to the subgenus *Siphisia*. However, the morphological features of these specimens such as having a slightly curved tube, a distinct shape between the utricle and the tube, a 1-lobed perianth limb, and a 6-lobed gynostemium support these specimens in *Aristolochia* subgenus *Aristolochia*, and here determined correctly as *Aristolochia chlamydophylla*. Furthermore, most Old World species of *Aristolochia* subgenus *Aristolochia* belongs to section *Diplolobus* Duchartre. Based on morphological characters, this section is further subdivided into two subsections: *Podanthemum* Klotzsch with a stipe between

utricle and ovary and *Aristolochia* Klotzsch without a stipe between (Do *et al.*, 2015) [13]. As this new record has no stipe between utricle and ovary so it is placed in *Aristolochia* subgenus *Aristolochia* section *Diplolobus* subsection *Aristolochia*.

In comparison to the Chinese populations, the Vietnamese populations of *Aristolochia chlamydophylla* have a shorter inflorescence axis and a purplish perianth. This new record is most morphologically close to *A. fordiana* Hemsley, an endemic species to Guangdong and Guangxi, south-eastern China (Hwang *et al.*, 2003) [3] by sharing an ovate to ovate-deltate lamina, with hairs on veinlets of abaxial leaf surface forming closely foveolate reticulation, deeply cordate at base, and cymose inflorescence in short axils of leafy shoots. However, the former differs clearly from the latter in the shape and size of bracteole (ovate, 1.1–1.5 x 0.8–1 cm, base cordate and slightly amplexicaul vs. subulate to lanceolate-ovate, 0.3–1 x 0.1–0.4 cm, base rounded to cuneate with a lender stip).

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References

- [1] C. Neinhuis, S. Wanke, K.W. Hilu, K. Muller, T. Borsch 2005, Phylogeny of Aristolochiaceae base on parsimony, likelihood, and Bayesian analyses of *trnL-trnF* sequences, *Plant Systematics and Evolution* 250 (2005) 7.
- [2] F.L. Condamine, F.A.H. Sperling, N. Wahlberg, J.Y. Rasplus, G.J. Kergoat, What causes

- latitudinal gradients in species diversity? Evolutionary processes and ecological constraints on swallowtail biodiversity, *Ecology Letter* 15 (2012) 267.
- [3] S.M. Hwang, L.M. Kelly, M.G. Gilbert, Aristolochiaceae in Flora of China, volume 5, Missouri Botanical Garden Press Beijing, St. Louis, 2003.
- [4] S. Wanke, F. González, C. Neinhuis, Systematics of Pipervines: Combining Morphological and Fast-Evolving molecular characters to investigate the relationships within subfamily Aristolochioideae (Aristolochiaceae), *International Journal of Plant Sciences*, 167 (2006) 1215.
- [5] T.V. Do, T.D. Nghiem, Taxonomic notes on some *Aristolochia* species in Vietnam, *Taiwania* 62 (2017) 216.
- [6] K. Watanabe, T. Kajita, J. Murata, Chloroplast DNA variation and geographical structure of the *Aristolochia kaempferi* group (Aristolochiaceae), *American Journal of Botany* 93 (2006) 442.
- [7] T.V. Do, X.F. Gao, *Aristolochia longeracemosa*, a new synonym of *A. chlamydophylla* (Aristolochiaceae), *Phytotaxa* 371 (2017) 076.
- [8] H.H. Pham, Aristolochiaceae in An Illustrated Flora of Vietnam, volume 3, Young Publishing House, Ho Chi Minh, 2000 (In Vietnamese).
- [9] L. Phuphathanaphong, Aristolochiaceae in Flora of Thailand, volume 1, The Chutima Press, Bangkok, 1987.
- [10] D. Hou, Aristolochiaceae in Flora Malesiana, volume 10, Martinus Nijhoff Publishers, Leiden, 1984.
- [11] J.G. Harris, M.W. Harris, Plant identification terminology: An illustrated glossary, Spring Lake Publishing, Utah, 2001.
- [12] S.M. Hwang, Materials for Chinese *Aristolochia*, *Acta Phytotaxa Sinica* 19 (1981) 222.
- [13] T.V. Do, D.Q. Nguyen, T.Q.T. Nguyen, S. Wanke, C. Neinhuis, A new species of *Aristolochia* subgenus *Aristolochia* (Aristolochiaceae) from southern Vietnams, *Annales Botanici Fennici* 52 (2015) 268.

Bổ sung loài Mộc hương (*Aristolochia chlamydophylla* C.Y. Wu ex S.M. Hwang) cho khu hệ thực vật Việt Nam

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Tóm tắt: Loài Mộc hương (*Aristolochia chlamydophylla* C.Y. Wu ex S.M. Hwang) được ghi nhận bổ sung cho khu hệ thực vật Việt Nam. Loài này có giá trị làm thuốc và được ghi nhận trước đó ở Thái Lan và Trung Quốc. Mẫu tiêu bản của loài này thường bị định loài nhầm với loài Mộc hương khác (*A. kaempferi* Willd.) ở phòng tiêu bản của Việt Nam. Trong phạm vi bài báo này, chúng tôi sẽ giới thiệu đặc điểm hình thái của loài, hình ảnh minh họa và những chú ý về mặt phân loại.

Từ khóa: *Aristolochia*, Mộc hương, loài bổ sung, Việt Nam.