



A new subspecies of *Schisandra henryi* Clarke (Schisandraceae) from Tay Nguyen, Vietnam

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ABSTRACT: *Schisandra henryi* subsp. *hoatii*, a new subspecies from Tay Nguyen (Central Highlands), Vietnam is described and illustrated. It differs from the subsp. *marginalis* and the typical subspecies by its flowers with 9–10 tepals, suborbicular largest tepals, essentially free stamens being 19–22 and carpels being 21–25; and differs from *S. henryi* subsp. *yunnanensis* in having leaf blades abaxially glaucescent, yellow flowers, and 19–22 essentially free stamens. Detailed descriptions, color plates, a distribution map, notes on distribution and habitat, uses, conservation status and keys are provided.

KEY WORDS: Kon Tum, medicinal plant, new subspecies, *Schisandra henryi*, Schisandraceae, Vietnam.

INTRODUCTION

Schisandra Michx. (Schisandraceae) is a genus of about 25 species of scrambling and twining woody vines with a disjunct distribution between East Asia and North America, and whose highest species diversity is found in southwestern to eastern China (Lin, 2000; Saunders, 2000). Many species of *Schisandra* have important medicinal values and have been widely used in traditional herbal medicine (Saunders, 2000; Nguyễn *et al.*, 2019). The classification and its infra-generic classification of *Schisandra* have varied considerably over time because of its systematic position in the phylogeny of angiosperms (e.g. Smith, 1947; Yang and Lin, 2005, 2007; Lin and Yang, 2007; Liu *et al.*, 2000, 2006; Wang *et al.* 2003, 2006). The recent infrageneric classification of *Schisandra* based on the morphologically phylogenetic studies recognized two subgenera, *S.* subgen. *Schisandra* and *S.* subgen. *Sphaerostema* (Blume) Y.W.Law. The typical subgenus comprises about 21 species worldwide, and is subdivided into four sections, namely sect. *Pleiostema* A.C.Sm., sect. *Maximowiczia* (Rupr.) Nakai, sect. *Sinoschisandra* (Y.W.Law) Q.Lin & Z.R.Yang, and sect. *Schisandra*, while *S.* subgen. *Sphaerostema* contains only five species (Lin and Yang, 2007). In Vietnam, seven species of *Schisandra* were recognised, namely *S. chinensis* (Turcz.) Baill., *S. perulata* Gagnep., *S. plena* A.C.Sm., *S. propinqua* (Wall.) Baill., *S. pubescens* Hemsl. & E.H.Wilson, and *S. rubiflora* Rehder & E.H.Wilson, and *S. sphenanthera* Rehder & E.H.Wilson (Cuong *et al.*, 2006). Recently, *Schisandra cauliflora* N.T.Cuong, D.V.Hai, N.Q.Hung & M.H.Dat was described from North Vietnam (Cuong *et al.*, 2019).

During our recent surveys in Kon Tum Province, Tay

Nguyen, Vietnam, several interesting plants of *Schisandra* with yellow flowers and red fruits were collected by the authors in 2019–2020. These plants were previously treated as *S. sphenanthera* (Cuong *et al.*, 2006). However, a recent molecular phylogenetic analysis of *Schisandra* based on the *psbA* gene showed that three individuals of *Schisandra* from Kon Tum Province formed a lineage that was sister to a subclade comprising *S. grandifolia* (Wall.) Hook.f. & Thomson, *S. rubriflora* Rehder & E.H.Wilson, and *S. henryi* C.B.Clarke, a relationship that had moderated bootstrap support (85%). This group was in turn sister to the other subclade of *Schisandra*, which includes *S. glaucescences*, *S. viridis* A.C.Sm. [a synonym of *S. arisanensis* subsp. *viridis* (A.C.Sm.) R.M.K. Saunders], *S. elongata*, *S. arisanensis* Hayata, *S. sphenanthera*, and *S. lancifolia* (Rehder & E.H.Wilson) A.C.Sm. This result thus indicate that the plants from Kon Tum Province cannot be accommodated in *S. sphenanthera* (Nguyễn *et al.*, 2019).

Critical examination of the living flowers, dried specimens, and comparisons with type material and relevant taxonomic literatures of *S. sphenanthera* and other related species in Vietnam and China (e.g. Rehder and Wilson 1913; Gagnepain, 1938; Smith, 1947; Law, 1996; Saunders, 2000; Cuong *et al.*, 2006; Lin and Yang, 2007) revealed that these specimens were different from *S. sphenanthera* in having inconspicuously winged or angled lateral branches, large perules that are semi-persistent at the base of lateral branches, leaf blades abaxially glaucescent, yellow flowers and rugulose to tuberculate seed coat. These morphological features showed similarities to *S. henryi* and its subspecies, namely subsp. *henryi*, subsp. *marginalis* (A.C.Sm.)R.M.K. Saunders and subsp. *yunnanensis* (A.C.Sm.)R.M.K.Saunders., but significant differences

**Table 1.** Morphological comparison among the four subspecies of *Schisandra henryi* (all based on Smith, 1947; Saunders, 2000)

Characters	subsp. <i>hoatii</i>	subsp. <i>henryi</i>	subsp. <i>marginalis</i>	subsp. <i>yunnanensis</i>
Lateral branches	inconspicuously angled or narrowly winged (< 0.5 mm broad)	conspicuously winged (1–2.5 mm broad)	angled or narrowly winged (not exceeding 1 mm broad)	angled or narrowly winged (< 0.5 mm broad)
Perules	medium sized, semi-persistent	large sized, semi-persistent (at least until fruiting stage)	medium sized, semi-persistent	medium sized, semi-persistent
Leaf blades	ovate to ovate-elliptic, abaxially glaucescent, base cuneate, attenuate, or subrounded	ovate to ovate-elliptic, abaxially glaucescent, base cuneate to attenuate, rarely rounded	narrowly ovate-elliptic, abaxially glaucescent, base cuneate to attenuate	ovate to ovate-elliptic, abaxially not glaucescent, base obtuse, rarely subrounded
Flower	yellow	yellow	yellow	yellow and red, or orange
Number of tepals (♂)	9–10	6–7(–8)	6–7	8–10
Outermost tepals	elliptic	elliptic, ovate or obovate	elliptic, ovate or obovate	elliptic, ovate or obovate
Innermost tepals	obovate	elliptic to obovate, rarely ovate	elliptic to obovate, rarely ovate	elliptic to obovate, rarely ovate
Largest tepals	suborbicular, 6.5–8.5 × 6–7.5 mm	elliptic to obovate, 9–12 × 6–11 mm	elliptic to obovate, 8–13 × 8–11 mm	suborbicular, 6–11 × 5–12 mm
Number of essentially free stamens	19–22	23–46	12–19	24–34
Number of free carpels	21–25	28–56	28–56	28–56
Seed coat	rugulose to tuberculate	rugulose, rarely tuberculate	rugulose to very tuberculate	rugulose to tuberculate
Geographic distribution	central highlands of Vietnam: Kon Tum	central and southern China: Guangxi, Guizhou, Henan, Hubei, Hunan, Jiangxi, Sichuan, and Yunnan	southern and southeastern China: Fujian, Guangdong, Guangxi, Hunan, and Zhejiang	endemic to Yunnan, China

in its vegetative and floral structures and the three subspecies of *S. henryi* are given in Table 1. Based on the evidence provided above, we concluded that these plants from the Central Highlands of Vietnam is recognized as a new subspecies of *S. henryi* C.B. Clarke, which is described and illustrated below.

MATERIAL AND METHODS

The description and all measurements were made from mature individuals of living plants in the field, supplemented with alcohol preserved and herbarium specimens. Herbarium specimens of the morphologically closely related species were examined from the following herbaria: A, E, K, HN, NIMN, NY, P, US and VNM herbaria, as well as digitized specimen images of *Schisandra* available from the Chinese Virtual Herbarium (<http://www.cvh.ac.cn/>), Jstor Global Plant (<https://plants.jstor.org/>), Muséum National d'Histoire Naturelle (<https://science.mnhn.fr/>). The general terminology used follows the standard works of Saunders (2000) and Beentje (2016). Conservation status was assessed using the IUCN Red List Categories and Criteria version 3.1 (IUCN 2019). The extent of occurrence (EOO) and the area of occupancy (AOO) were estimated using the web Geospatial Conservation Assessment Tool (<http://geocat.kew.org/editor>) (Bachman *et al.* 2011) with an auto-value cell width of 2 km.

TAXONOMIC TREATMENT

Schisandra henryi Clarke subsp. *hoatii* N.S. Lý & X.T. Nguyễn, *subsp. nov.*

Figs. 1, 2 & 3

Most similar to *S. henryi* subsp. *marginalis* and *S. henryi* subsp. *henryi* but differs in male flowers with 9–10 tepals (vs. 6–7), suborbicular largest tepals (vs. elliptic to obovate), androecium with 19–22 essentially free stamens (vs. 12–19 in *S. henryi* subsp. *marginalis*, 23–46 in *S. henryi* subsp. *henryi*), and gynoecium with 21–25 free carpels (vs. 28–56 in the latter two) (Table 1).

Type: VIETNAM. Kontum Province: Tu Mo Rong District, Ngoc Lay Commune, Moya village, 14 May 2019, 14°58'30.42"N, 107°59'13.33"E, 1342 m elev., *Nguyễn Xuân Trường, Ly Ngoc Sam, Tran Thi Lien, Cao Ngoc Giang, NXT-07* (♂) (Holotype: VNM, Isotypes: NIMM).

Description: Deciduous woody vines, 8–15 m long, monoecious, glabrous. **Stem** terete, to 3.5 cm in diameter, brown, somewhat twisted, with flexuous branchlets; young lateral branches inconspicuously angled to narrowly winged (less than 0.5 mm broad); branches in the current year's growth greenish to purple-greenish tinted, smooth, 3–5.5 mm in diam., with semi-persistent perules at base; perules suborbicular ovate to oblong, (3)4–7 mm long, 5–6 mm wide at base, green, turning brown when old; 2-year-old branches bright dark brown, 6–7.5 mm in diam.; stem and older branches smooth to



Fig. 1. *Schisandra henryi* Clark subsp. *hoatii* N.S. Lý & X.T. Nguyễn. **A.** Plant habit. **B1–2.** Basal portion of young lateral branches showing inconspicuously winged (**B1**) and angled (**B2**) stems. **C.** Young shoot showing perules, young leaves, and flower buds. **D.** Young infructescences. **E.** Infructescences showing mature and ripe fruits. Photos: A–C and plate by Ngoc-Sam Ly from plant prior to preparation of the type specimen NXT-07; D–E by Xuan-Truong Nguyễn from plant prior to preparation of the paratype specimens NXT-09 and NXT-12, respectively.

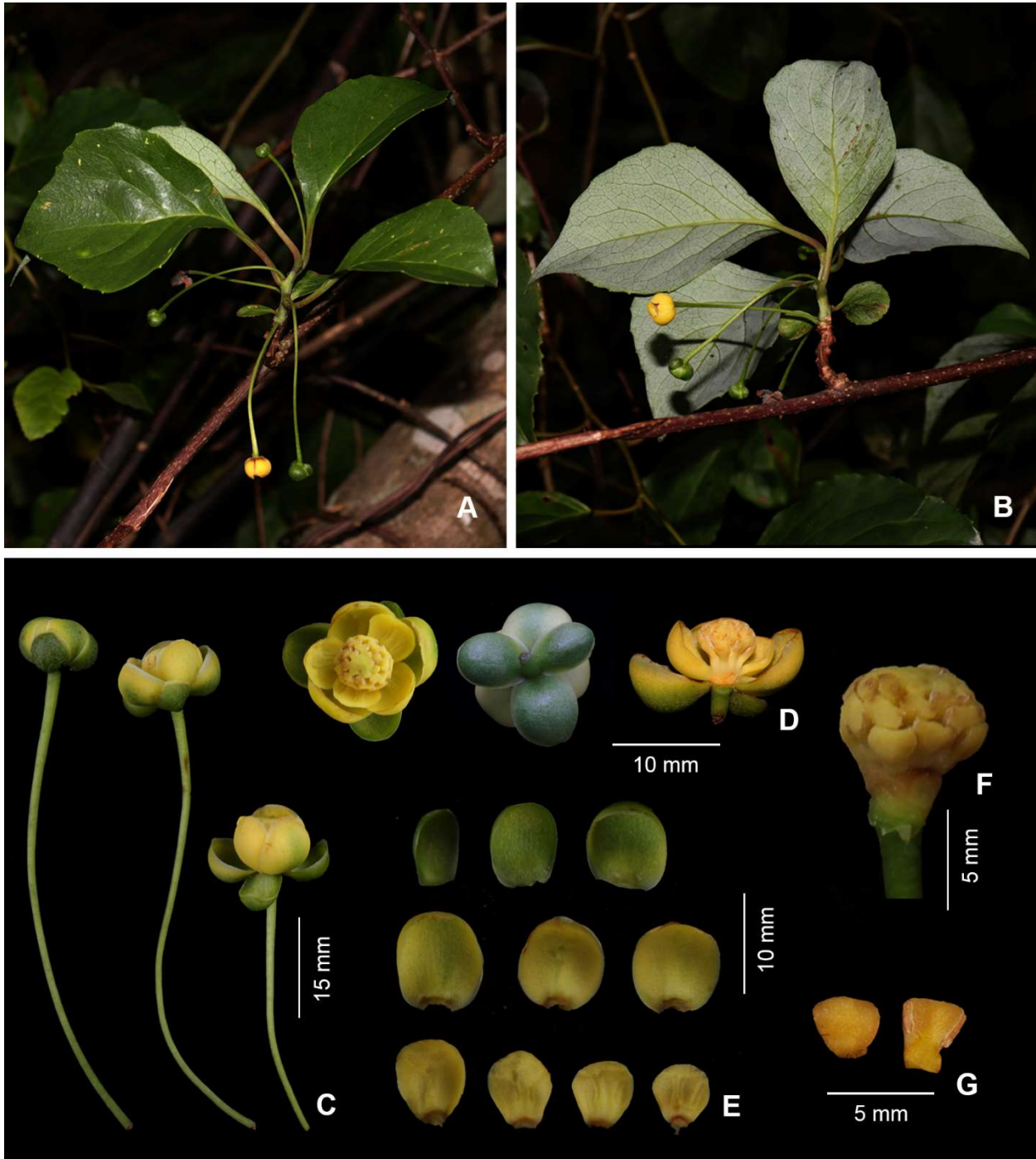


Fig. 2. *Schisandra henryi* Clark subsp. *hoatii* N.S. Lý & X.T. Nguyễn (♂). **A.** Mature branch with leaves (adaxial view) and flowers. **B.** Mature branch with leaves (abaxial view) and flowers. **C.** Flowers with pedicels. **D.** Flowers (top, bottom and side views). **E.** Tepals. **F.** Androecium. **G.** Stamens. Photos and plate by Ngoc-Sam Ly from plant prior to preparation of the type specimen NXT-07.

inconspicuously furrowed, lenticels conspicuous. **Leaves** simple, alternate; leaf blades ovate to ovate-elliptic, adaxially green, abaxially glaucescent, 4.7–9 cm long, 3.2–7.5 cm wide, subcoriaceous; base cuneate to obtuse, or attenuate; apex somewhat acuminate; margins shallowly denticulate with 4–7 teeth per side of leaf; primary vein slightly impressed on adaxial surface,

prominent on abaxial surface; secondary veins 4–5 on each side of primary vein, nearly arcuate, slightly impressed on adaxial surface, raised on abaxial surface; petioles 8–30 mm long, 1.5–2.5 mm in diam., green to tinted green-purple. **Flowers** born in axils of leaves or of semi-persistent bracts at base of young shoots, solitary, pendulous, with a single bracteole on the base of peduncle;

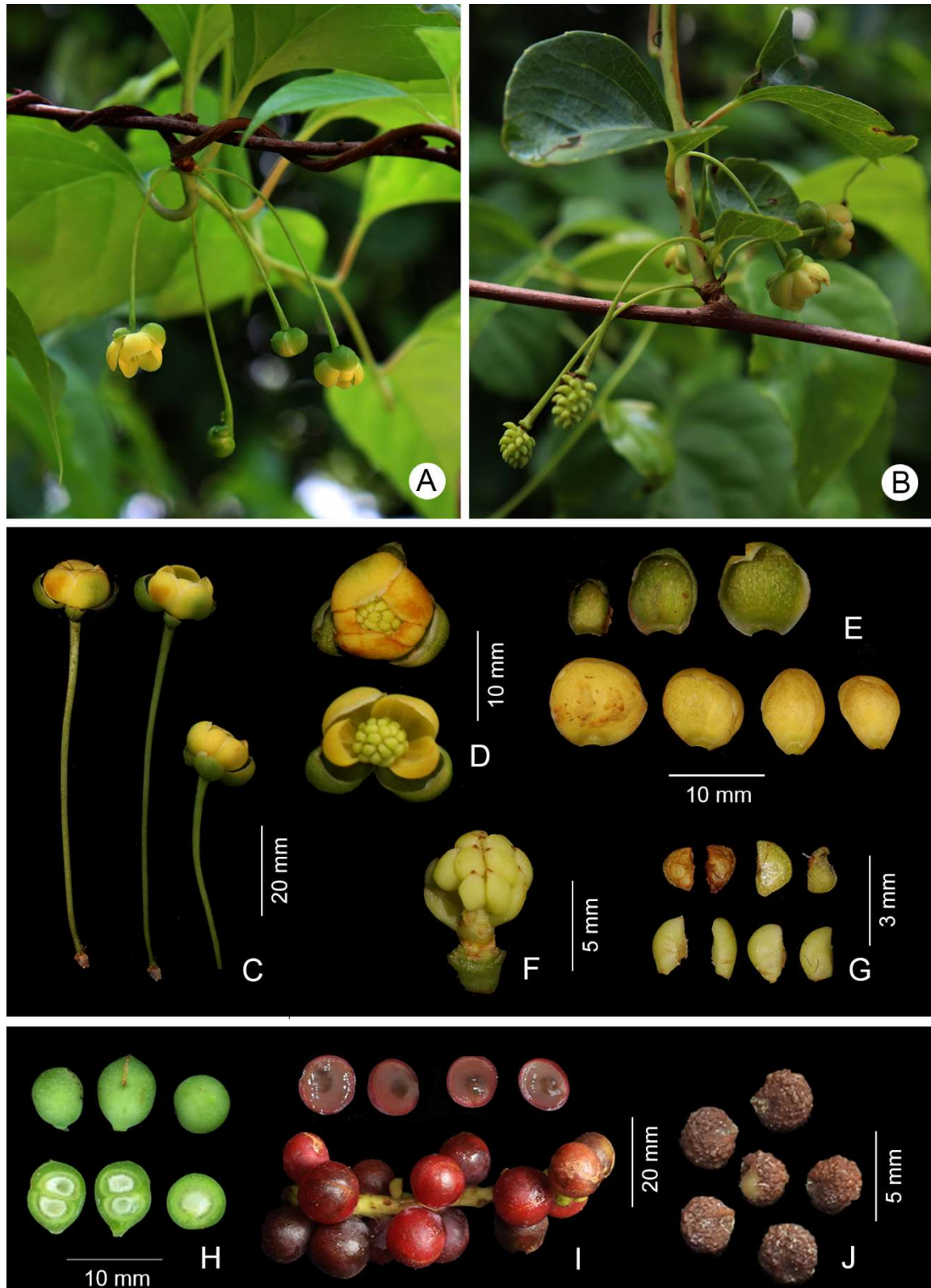


Fig. 3. *Schisandra henryi* Clark subsp. *hoatii* N.S. Lý & X.T. Nguyễn (♀). **A.** Mature branch with flowers at anthesis. **B.** Mature branch with female flowers at anthesis. **C.** Flowers with pedicels. **D.** Flowers (top and side views). **E.** Tepals. **F.** Gynoecium. **G.** Ovaries, exterior and longitudinal sections (above). **H.** Young fruits, exterior and section. **I.** Inflorescence showing entire ripe fruits (below) and dissections (above). **J.** Seeds. Photos and plate by Ngoc-Sam Ly from plant prior to preparation of the paratype specimens NXT-09 and NXT-12.



bracteoles semi-persistent, narrowly ovate, ca. 2 mm long, ca. 1 mm wide at base, brownish, glabrous; **tepals** 7–8 (female), 9–10 (male), green to bright yellow, margin entire; **male flowers**: peduncles terete, green, 3–6.3 cm long, 0.8–1.5 mm in diam., glabrous; outermost tepals elliptic, 5–7.6 mm long, 3–5 mm wide, innermost tepals broadly obovate, 4.5–5.5 mm long, 3.5–4.5 mm wide, with 3 somewhat prominent keels on the basal half of the inner surface; largest tepals sub-orbicular, 6.5–8.5 mm long, 6–7.5 mm wide; **androecium** obovoid, 4–4.2 mm high, 4.5–5 mm in diam., yellow, the column terete, 2.2–3 mm in diam., with 19–22 essentially free stamens, uppermost stamens generally only partially differentiated, appearing connate, forming a carnose mass 3–3.5 mm in diam., with thecae marginal; **stamens** obovoid, 1.5–2 mm in diam., the upper ones often very small, the lower ones with short filaments 0.5–1 mm long, the connective oblong, glabrous, somewhat equal to thecae; **thecae** introrse-lateral 1.2–1.5 mm long; **pollen** unknown; **female flowers**: pedicel terete, green, 2.8–5.5 cm long, 1–1.5 mm in diam., glabrous; innermost tepals elliptic, green, 4–6.3 mm long, 2–5 mm wide, glabrous, innermost tepals broadly obovate, 5–6.5 mm long, 4–5 mm wide, with 3 somewhat prominent keels on the basal half of the inner surface; largest tepals suborbicular, 6.8–8 mm long, 6–6.5 mm wide; **gynoecium** broadly ovoid, 4–4.5 mm in diam., the column 2–3 mm long, 1–1.5 mm in diam., with 21–25 free carpels; **ovary** falcate-ellipsoid, 2.1–2.5 mm long, 1.2–1.5 mm in diam., greenish, glabrous; **pseudostyle** ca. 0.3 mm long. **Fruiting peduncles** not elongated, 3–6.5 cm; **torus** 3.5–6 cm long, 3–4.5 mm in diam., with 18–25 apocarps; **apocarps** subglobose, 7.5–9 mm long, 5–5.5 mm in diam., light green, turning red to scarlet when ripe, with two seeds per apocarp; **seed** suborbicular-reniform, brown, 3.5–4 mm long, 3.5–4 mm in diam., testa tuberculate to rugulose, hilum large, U-shaped; endosperm copious, oily; embryo minute.

Distribution and habitat: Known only from Kon Tum Province, where four subpopulations of mature individuals were observed on steep slopes and near streams in secondary dry and evergreen forests, at elevation between 1100–1500 m elev. (Fig. 4A).

Phenology: The new species was observed flowering in April–May, and to possess ripe fruits in August–September.

Uses: The fruits of the new species are used for medicinal purpose in the same way as those of *S. chinensis*.

Etymology: The infraspecific epithet “*hoatii*” is named in honor of Dr. Nguyễn Ba Hoat, National Institute of Medicinal Materials, Ha Noi, Vietnam, for his remarkable contribution to the discovery of this new medicinal plant.

Vernacular names: Ngũ vị tử hoạt, ngũ vị tử Kon Tum.

Proposed IUCN conservation assessment: At present, subpopulations are known at four localities in Kon Tum Province. Data obtained from field explorations based on coordinates of studied localities

and the GeoCAT website show the extent of occurrence (EOO) of *S. henryi* subsp. *hoatii* is about 159 km² and the area of occurrence is 12 km² (Fig. 4B). The habitat of the new species is scattered, unprotected, and threatened by ongoing habitat loss due to clearing for farming. We therefore provisionally assess this species as Endangered (EN B2ab(ii,iii)) following the IUCN Red list Categories and Criteria (IUCN, 2019).

Additional specimens examined (Paratypes):

VIETNAM. Kon Tum Province: Tu Mo Rong District, Ngoc Lay Commune, Moya Village, secondary evergreen forest, 14°58'30.42"N, 107°59'13.33"E, 1341 m elev., June 2020, Nguyễn Xuân Trường, Ly Ngoc Sam, Tran Thi Lien, Cao Ngoc Giang, NXT-11 (♂)(VNM), and NXT-12 (♀) (VNM, NIMM); the same locality, 14 May 2019, Nguyễn Xuân Trường, Ly Ngoc Sam, Tran Thi Lien, Cao Ngoc Giang, NXT-08 (♂) (VNM); the same locality, Mo Ya village, 14°58'37.61"N, 107°59'21.32"E, 1415 m elev., 13 May 2019, Nguyễn Xuân Trường, Ly Ngoc Sam, Tran Thi Lien, Cao Ngoc Giang, NXT-09 (♀) (VNM); Mang Ri commune, Long Hy Village, secondary evergreen forests, 14°59'12.31"N, 107°54'48.63"E 1542 m elev., 11 May 2019, Nguyễn Xuân Trường, Ly Ngoc Sam, Tran Thi Lien, Cao Ngoc Giang, NXT-06 (♀) (VNM); the same locality 29 May 2006, Cường 51 (HN!); the same locality, s.n., 6 September 2004, N.B.Hoat No. 14 (HN!); Kon Plong District, Mang Canh Commune, secondary evergreen forest, around 14°35'30.84"N, 108°16'21.27"E, 1260 m elev., 15 May 2019, the same locality, Nguyễn Xuân Trường, Tran Thi Lien NXT-10 (♂) (NIMM); the same locality, near Long Nam village, open secondary dry forest at 1400 m elev. on NW slope of Ngoc Linh mountain system, 04 April 1995, L. Averyanow, N.T. Ban, N. Q. Binh, A. Budantzev, L. Budantzev, N.T. Hiep, D.D. Huyen, P.K. Loc, N.X. Tam, G. Yakovlev, No. VH 1146 (MNHN-P00518954!).

Taxonomic notes: *Schisandra henryi* was first described by Clarke (1905) based on materials collected Meng-tzu, Yunnan, China. Both vegetative and reproductive morphological characters of *S. henryi* were variable such as its lateral branches were winged to angled; the abaxial leaf blades were variably glaucescent; the male and female flowers were 6–10 and 6–8 tepals, respectively; the gynoecium being 28–65 free carpels (Smith, 1947; Suander, 2000). In addition, we found several other variations of this species such as the shape of largest tepals and free carpels in flowers in this study.

At infra-specific level, *S. henryi* was formerly classified into four varieties, namely *S. henryi* var. *henryi*, *S. henryi* var. *marginalis* A.C.Sm., *S. henryi* var. *yunnanensis* A.C.Sm., and *S. henryi* var. *longipes* (Merr. & Chun) A.C.Sm. (Smith, 1947). Recently, Saunders (2000) in his monography of *Schisandra* was raised *S. henryi* var. *longipes* as species rank, namely *S. longipes* (Merr. & Chun) R.M.K.Saunders, while the latter three of Smith were treated as subspecies rank, namely *S. henryi* subsp. *henryi*, *S. henryi* subsp. *marginalis* (A.C.Sm.) R.M.K.Saunders, and *S. henryi* subsp. *yunnanensis* (A.C.Sm.) R.M.K.Saunders. Currently, there are four subspecies of *S. henryi* have been recognized, including the new subspecies. Of which, the subsp. *marginalis* was found in southern and south-eastern China, the subsp. *yunnanensis* was endemic to Yunnan, and the typical subspecies was found in central and southern China (Smith, 1947; Saunders, 2000; Xia

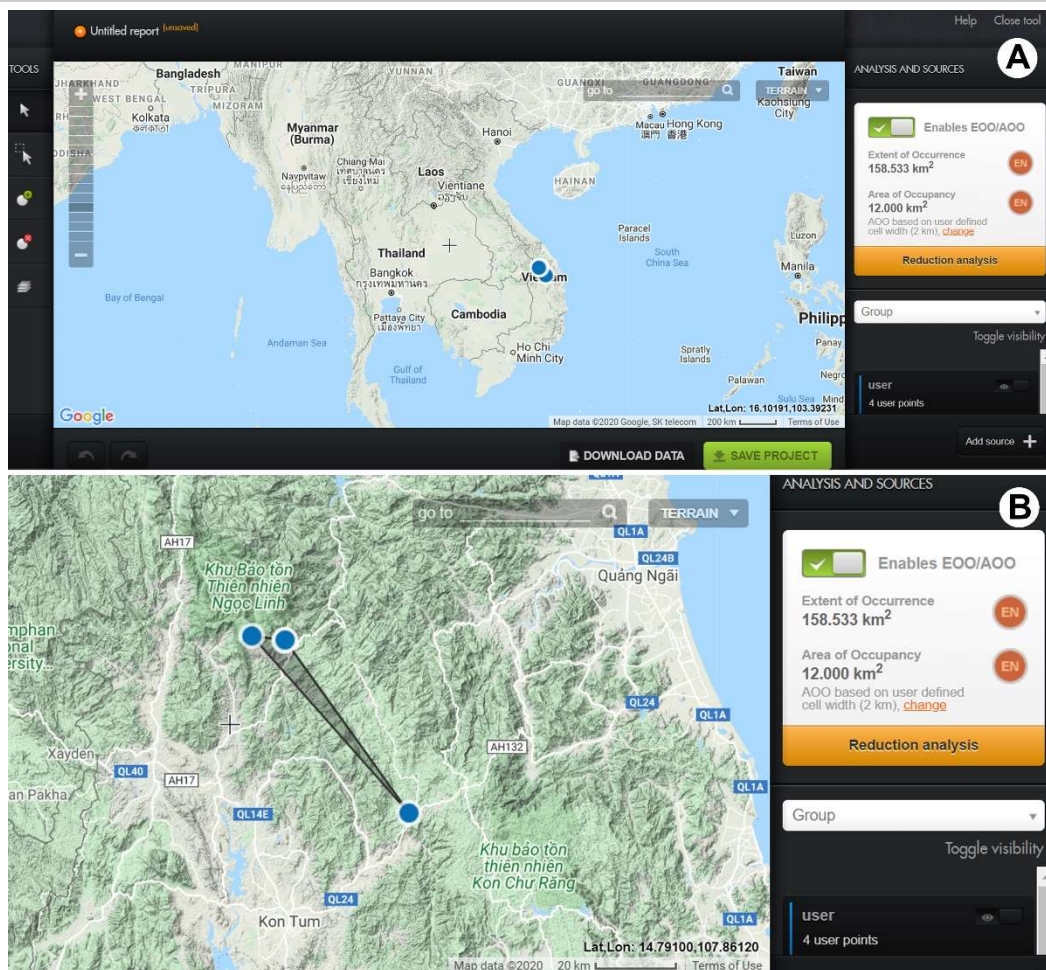


Fig. 4. A. Distribution map of *Schisandra henryi* Clark subsp. *hoatii* in Kon Tum Province, Vietnam. **B.** Extent of Occurrence (EOO) and Area of Occurrence (AOO) subpopulations.

et al., 2008), while the new subspecies is naturally distributed in Tu Mo Rong and Kon Plong Districts, Kon Tum Province, the Central Highlands of Vietnam. With the description of the new subspecies, the distribution of *S. henryi* is extended to Southwards to Kon Tum Province, Tay Nguyen, Vietnam. The new subspecies similar to the latter three in several ways. Their leaf blades are somewhat ovate to elliptic with denticulate margins, and secondary and primary veins that are abaxially conspicuous and prominent; the semi-persistent perules; the flowers are born in the axils of leaves or of fugacious bracts; the same shape of androecium, gynoecium, carpels, apocarps and seeds. It is likely that the new subspecies is most closely related to subspecies *marginalis* and typical subspecies. The compared characters between them are given in the above diagnostic and Table 1. The new subspecies also resembles *S. henryi* subsp. *yunnanensis* but the abaxial leaf blades that are not glaucescent, and yellow and red or orange tepals of *S. henryi* subsp. *yunnanensis* distinguish it from the remained subspecies of *S. henryi*. Moreover, the lateral branches that are conspicuously

winged, larger semi-persistent perules, and rugulose (rarely tuberculate) seed coat of the typical subspecies also distinct from the latter three. A comparison of the distinguishing features among the four subspecies is provided in Table 1.

A key to the subspecies of *Schisandra henryi*

- 1a. Leaf blades abaxially glaucescent, tepals yellow 2
- 1b. Leaf blades abaxially not glaucescent, tepals yellow and red or orange (China: Yunnan) *S. henryi* subsp. *yunnanensis*
- 2a. Young lateral branches angled or narrowly winged, puberules medium, androecium of 12–22 essentially free stamens, seed coat rugulose to tuberculate 3
- 2b. Young lateral branches conspicuously winged, perules large, androecium of with 23–46 essentially free stamens, seed coat rugulose, rarely tuberculate (Central and southern China) *S. henryi* subsp. *henryi*
- 3a. Male flowers with 6–7 tepals, largest tepal elliptic to obovate, androecium of 12–19 essentially free stamens, gynoecium with 28–56 free carpels (southern and south-eastern China) *S. henryi* subsp. *marginalis*
- 3b. Male flowers with 9–10 tepals, largest tepals suborbicular, androecium of 19–22 essentially free stamens; gynoecium with 21–25 free carpels. (central highlands of Vietnam: Kon Tum) *S. henryi* subsp. *hoatii*



With the description of the new subspecies, the distribution of *S. henryi* is extended Southwards to Kon Tum Province, the Central Highlands of Vietnam. A key to species of *Schisandra* in Vietnam is provided below.

A key to distinguish the species of *Schisandra* in Vietnam

- 1a. Stamens connate into an androecial mass 2
- 1b. Stamens essentially distinct but apical stamens occasionally connate 4
- 2a. Anthers on free connective arising from cavities on the surface of androecium 3
- 2b. Anthers sessile, located on opposing sides of cavities on surface of androecium *S. plena*
- 3a. Leaf blades 7–11.5 × 2–4 cm, petioles 0.8–1.6 cm long; peduncles 0.2–1.7 cm long, apocarps 4–8.5 mm wide, seeds 3.7–4.5 × 4.2–4.9 mm *S. propinqua*
- 3b. Leaf blades 16–22 × 8–12 cm petioles 6–8 cm long, peduncles 3–6 cm long, apocarps 1.5–2 cm wide, seeds 8–12 × 10–15 mm *S. cauliflora*
- 4a. Leaf blades, petiole, peduncle, and tepals glabrous 5
- 4b. Leaf blades (abaxially), petiole, peduncle, and outer most tepals pubescent *S. pubescens*
- 5a. Lateral branches somewhat wings, perules semi-persistent, seed coat rugulose to tuberculate 6
- 5b. Lateral branches lacking wings, perules fugaceous, seed coat smooth 7
- 6a. Lateral branches conspicuously winged, larger leaf lobes (10–)12–14.5 × (4.5–)6.5–8.5(–10) cm, tepals yellow or red; androecium with 22–30 essentially free stamens, fruiting torus 12–14 cm, apocarps 9–12 × 8.5–13 mm *S. perulata*
- 6b. Lateral branches inconspicuous winged to angled; leaf blades 4.7–9 × 3.2–7.5 cm, tepals yellow, androecium with 18–22 essentially free stamens, fruiting torus 3.5–6 cm, apocarps 7.5–9 × 5–5.5 mm *S. henryi* subsp. *hoatii*
- 7a. Tepals white, yellow to orange-red, androecium with (4–)5(–6) essentially free stamens, gynoecium with ca. 50 free carpels *S. chinensis*
- 7b. Tepals deep red to purplish red, androecium with 34–66 essentially free stamens, gynoecium with 50–70 free carpels *S. rubriflora*

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