

***Elaeagnus elongatus* Tagane & V.S.Dang (Elaeagnaceae),
a new species from Cambodia and Thailand**

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ABSTRACT. A new species, *Elaeagnus elongatus* Tagane & V.S.Dang is described and illustrated based on materials from Cambodia and Thailand. The new species is similar to *E. gaudichaudiana* Schldtl. in the size and venation of lamina, the 1(–3) flower(s) in axils of new shoots and the 4-angular calyx tube, but is distinct by its larger flowers, shorter filaments, and much longer pedicels when fruiting.

KEY WORDS: Cambodia, Elaeagnaceae, *Elaeagnus*, flora, new species, Thailand.

INTRODUCTION

Elaeagnus established by Linnaeus (1793) is the largest genus of Elaeagnaceae, characterized by the occurrence of scaly-stellate indumentum on the whole plant body, frequent occurrence of thorns on stems, lack of stipules and corolla. It is comprised of 50–90 species most of which are distributed from East and South-East Asia to Australia and a few of which are in North America and southern Europe (Heywood *et al.* 2007). The center of diversity of this genus is East Asia, including China where 36–67 species (Qin & Gilbert 2007; Sun & Lin 2010) and Japan where 15 species (Ohba 1999) have been recorded.

Compared with China and Japan, fewer species have been recorded in Indochina (Table 1): two from Cambodia (Lecomte 1915), three from Laos (Lecomte 1915; Newman *et al.* 2007), one from Myanmar (Kress *et al.* 2003), two from Thailand (Pooma & Suddee 2014) and 10 from Vietnam (Lecomte 1915; Hô 2003).

During our botanical surveys in Cambodia and Thailand in 2011–2015, we collected an

undescribed species of *Elaeagnus* which is described here as *Elaeagnus elongatus* Tagane & V.S.Dang in this paper.

In addition to the morphological examination, DNA sequences and phylogenetic analysis are extremely helpful for delimiting species (Hebert & Gregory, 2005; Dick & Webb, 2012). Here, we report the two DNA barcode regions for this species: the partial genes for the large subunit ribulose-1,5-bisphosphate carboxylase oxygenase (*rbcL*) and maturase K (*matK*) (CBOL Plant Working Group 2009).

DESCRIPTION

***Elaeagnus elongatus* Tagane & V.S.Dang., sp. nov.** Similar to *Elaeagnus gaudichaudiana* Schldtl., but distinct by its larger flowers with the calyx up to 6 mm long (vs. calyx tube ca 4 mm long in *E. gaudichaudiana*), shorter filaments only ca 0.2 mm long (vs. 1.5–2 mm long in *E. gaudichaudiana*) and longer pedicels up to 3 cm long when fruiting (vs. ca 5 mm long in *E. gaudichaudiana*). Type: Cambodia,

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Kampot Province, Bokor National Park, alt. 810 m, 10°37'45"N, 104°05'20"E, 11 Aug. 2013, *Tagane et al.* 5860 [fl. & fr.] (holotype **KYO!**, isotypes **BKF!**, **FU!**, **K**, **P**, **Cam!**). Figs. 1–2.

Evergreen woody climber, occasionally erect, up to 13 m tall; D.B.H. ca 7.6 cm (measured from *Tagane et al.* T2644). *Young branches* with dense ferruginous scales, old branches blackish, glabrous, with spines. *Leaves* alternate, petiolate; petiole 6–9 mm long, densely silver-brown scaly; blade elliptic to ovate-elliptic, (2.4–)3.2–10 × (1.1–)1.5–4.2 cm, apex acute to acuminate, base rounded to acute, margin entire, recurved when dry, thickly chartaceous to coriaceous, sparsely silver or brownish scaly above, densely yellowish white scaly or dark brown scaly below, midrib sunken above, prominent below; secondary veins 4–6 pairs, at angle of 55–60° from midrib, slightly prominent on both surfaces when dry, tertiary veins reticulate, prominent and distinct above when dry, inconspicuous below. *Flowers* bisexual, axillary, 1–3; pedicels 0.5–1.0 cm long when flowering, up to 3.0 cm long when fruiting, silver-yellow stellate hairy with brown scales; calyx tubes oblong-campanulate, 4-angular, ca 6 × 2.6 mm, outside densely yellowish white stellate hairy with brownish scales, inside whitish yellow, glabrous; lobes broadly triangular, 3–4 mm long, inside white to yellow or greenish yellow, with sparse white stellate hairs and brown scales, apex acute; stamens 4, attached very near the throat, filaments ca 0.2 mm long; anthers with two thecae, oblong, ca 1.2 mm long, half-exserted from the throat; ovary superior, 1-locular, with 1 ovule; styles erect, 4.5 mm long, glabrous, stigma ca 0.2 mm long. *Drupes* ellipsoid, 1.4–1.9 cm long, 0.6–0.8 cm in diam. when dry, rust-colored scaly. *Seed* single per drupe, ellipsoid, 1.3–1.9 cm long, 0.5–0.6 cm in diam., very slightly 6-ribbed.

Thailand.—NORTHERN: Chiang Mai [between Sop Aep and Tat Noi, alt. ca 700 m, 21 Mar. 1967, *Smitinand* 10228 (**BK!**, **K!**, **L!**, **P!**); NORTH-EASTERN: Loei [Phu Kradueng National Park, alt. 1200 m, 11 Feb. 1931, *Kerr* 20087 (**BK!**, **K!**, **P!**); *ibid.*, 16°52'N, 101°52'E, 23 Dec. 1971, *Beusekom et al.* 4488 (**BKF!**, **K!**, **L!**, **P!**); *ibid.*, alt. 1300 m, 16 Mar. 1974, *Chermisrivathana & Boonkird* 1821 (**BK!**); *ibid.*, alt. 1263 m, 16°55'25.22"N, 101°46'54.49"E, 10 June 2015, *Tagane et al.* T4636 [fr.]

(**BKF!**, **FU!**); *ibid.*, alt. 1300 m, 10 Nov. 1976, *Smitinand* 12225 (**BKF!**); *ibid.*, ca 1300 m, 16 Mar. 1974, s.coll. 6 (**BKF!**); Phu Luang, alt. 900–1000 m, 15 Nov. 1968, *Chermisrivathana* 1058 (**BK!**); EASTERN: Nakhon Ratchasima [Khao Yai National Park, alt. 600–700 m, 22 Mar. 1965, *Kasem* 476 (**BK!**); alt. 800 m, 7 Dec. 1965, *Smitinand* 10001 (**BKF!**); *ibid.*, ca 800 m, Haeo Suwat Fall, 10 Jan. 1999, *Wongprasert et al.* s.n. (**BKF!**); Khao Lem, Korat, alt. 1000 m, 11 Jan. 1925, *Kerr* 9925 (**L!**, **P!**); Khao Laem, 22 Jan. 1972, *T.S. & C.P.* 11569 (**P!**) & 11570 (**K!**, **L!**, **P!**); Chaiyaphum [Nam Phosem, alt. 600 m, 16°22'N, 101°45'E, 10 Dec. 1971, *Beusekom et al.* 4112 (**K!**, **L!**, **P!**); CENTRAL: Nakhon Nayok [Kao Yai National Park, alt. 1000 m, 14°22.25'N, 101° 24.27'E, 19 Dec. 2005, *Pooma et al.* 5917 [fl.] (**AAU**, **BKF!**, **E**, **KEP**, **L!**); Saraburi [Khao Yai, alt. 800 m, 5 Dec. 1965, *Vidal* 4611 (**P!**); SOUTH-EASTERN: Chanthaburi [Khao Soi Dao Wildlife Sanctuary, alt. 1200 m, 13°03'07.29"N, 102° 09'46"E, 8 Mar. 2014, *Tagane et al.* T2644 [fr.] (**BKF!**, **FU!**).

Distribution.— Cambodia and Thailand. (Map 1).

Other specimens examined.— Cambodia, Kampot Province, Bokor National Park [alt. 868 m, 10°37'19"N, 104°05'09"E, 16 Feb. 2013, *Tagane et al.* 5496 [fl. & fr.] (**FU!**, **Cam!**); *ibid.*, alt. 850 m, 10°37'32"N, 104°05'14"E, 12 Dec. 2013, *Fuse et al.* 6376 [fl.] (**BKF!**, **FU!**, **Cam!**); *ibid.*, alt. 844 m, 10°37'35"N, 104°03'57"E, 22 Oct. 2012, *Yahara et al.* 4305 [fl.] (**FU!**, **Cam!**); *ibid.*, alt. 810 m, 10°37'45"N, 104°05'20"E, 11 Aug. 2013, *Tagane et al.* 5860 [fl. & fr.] (**BKF!**, **FU!**, **K**, **KYO**, **P**, **Cam!**); *ibid.*, alt. 510 m, 10°36'33"N, 104° 06'14"E, 26 Oct. 2012, *Yahara et al.* 4597 [fl.] (**FU!**, **Cam!**)].

Ecology.— *Elaeagnus elongatus* occurs in hill evergreen forest to lower montane evergreen forest, at 500–1300 m elevation. In Mt Bokor, Cambodia, the species is occasionally found at the edge of evergreen forest on the southern slope of the plateau, at an elevation of 510–900 m, and can easily found along roadsides. In Phu Kradueng, Thailand, it is occasionally found at the margins of evergreen forest on the plateau at an altitudinal range of 1200–1300 m. In Khao Soi Dao, Thailand, the species is rarely encountered, and we found

* Abbreviation: Cam = the herbarium of Forest Administration of Cambodia.



Figure 1. *Elaeagnus elongatus* Tagane & V.S.Dang. A. branchlet with young fruits; B. flowering branchlet; C & D. flowers; E. fruits; F. leafy branch; G. abaxial leaf surface; H. thorns on stem. Photographs: A–D. 16 Feb. 2012, Bokor National Park, Cambodia; E–H. 8 Mar. 2014, Khao Soi Dao Wildlife Sanctuary, Thailand.

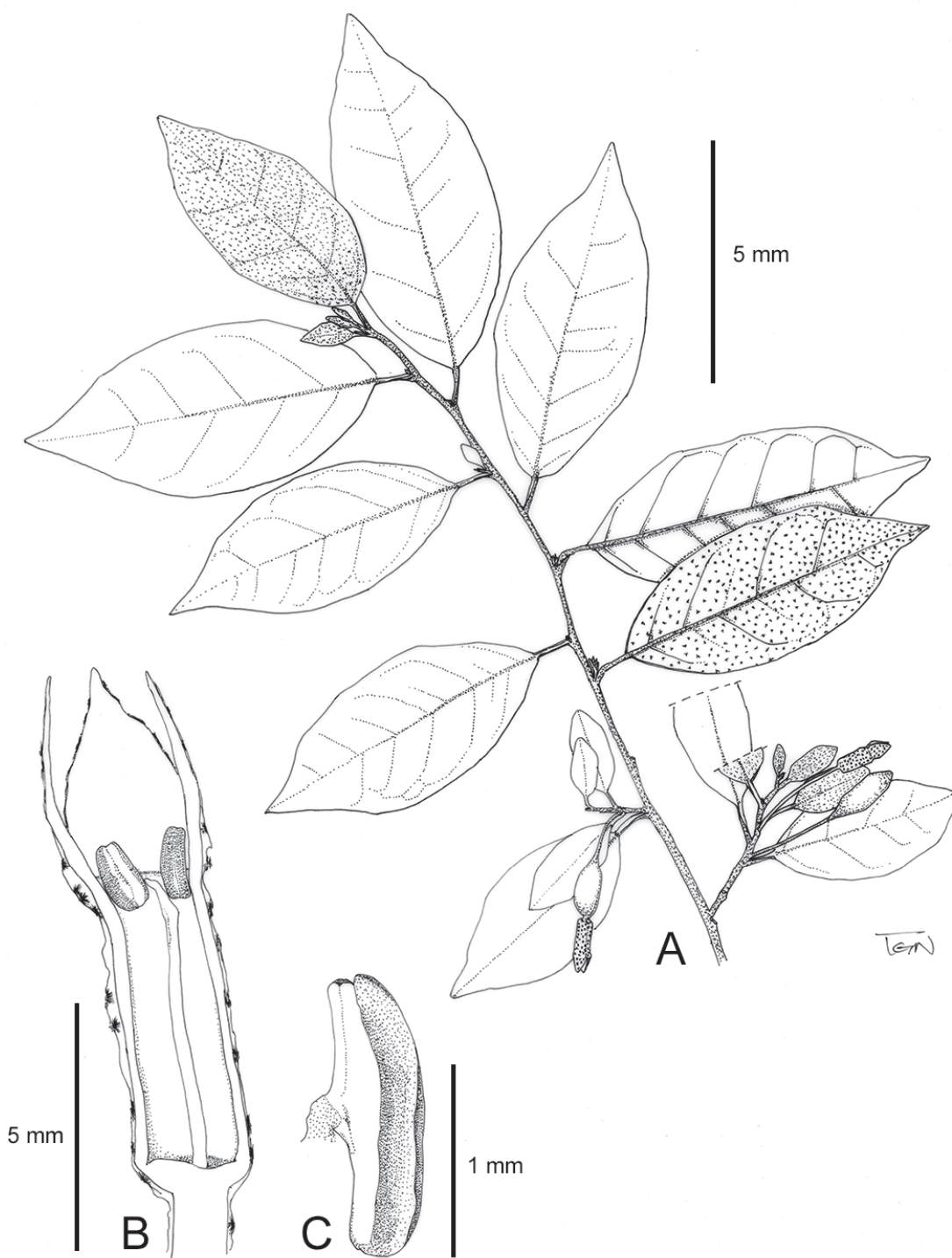


Figure 2. *Elaeagnus elongatus* Tagane & V.S.Dang. A. branchlet with flowers and young fruits; B. vertical section of flower showing two anthers attached very near the throat of calyx and simple style (in center) elongate near the throat; C. anther in lateral view with very short filament. All from Tagane *et al.* 5496 (FU).

Table 1. The species of *Elaeagnus* recorded in Cambodia, Laos, Myanmar, Thailand and Vietnam.

Cambodia	Laos	Myanmar	Thailand	Vietnam
<i>E. gonyanthes</i> Benth. ¹	<i>E. laosensis</i> Lecomte ¹	<i>E. hortensis</i> M.Bieb. ³	<i>E. conferta</i> Roxb. ⁴	<i>E. annamensis</i> S.Moore ⁵
<i>E. umbellata</i> Thunb. ¹	<i>E. latifolia</i> L. ²	<i>E. latifolia</i> L. ³	<i>E. latifolia</i> L. ⁴	<i>E. bonii</i> Lecomte ⁵
	<i>E. conferta</i> ssp. <i>mekongensis</i> Lecomte ¹	<i>E. rivularis</i> Merr. ³		<i>E. conferta</i> Roxb. ⁵
	<i>E. conferta</i> ssp. <i>balansae</i> Servell. ¹			<i>E. conferta</i> ssp. <i>balansae</i> Servell. ^{1, 5}
				<i>E. conferta</i> ssp. <i>mollis</i> Lecomte ⁵
				<i>E. delavayi</i> Lecomte ⁵
				<i>E. fruticosa</i> (Lour.) A.Chev. ⁵
				<i>E. gaudichaudiana</i> Schldtl. ¹
				<i>E. gonyanthes</i> Benth. ^{1, 5}
				<i>E. loureiroi</i> Champ. ⁵
				<i>E. sarmentosa</i> Rehder ⁵
				<i>E. tonkinensis</i> Servett. ⁵
				<i>E. tonkinensis</i> var. <i>grandifolia</i> Lecomte ¹
				<i>E. tonkinensis</i> var. <i>longispicata</i> Lecomte ¹

¹Lecomte 1915; ²Newman et al. 2007; ³Kress et al. 2003; ⁴Pooma & Suddee 2014; ⁵Ho 2003

only a few individuals at 1200 m elevation on the way to the summit from the 16th waterfall. Flowering specimens were collected in February, August, October and December, and fruiting specimens in February, March and August.

Preliminary conservation assessment.—*Elaeagnus elongatus* is widely scattered in higher elevations in Cambodia and Thailand. Especially, in Mt Bokor, Cambodia and on the plateau of Phu Kradueng, Thailand, many mature individuals were found. Since the species is distributed mainly inside well-managed protected areas, we therefore propose the status for this species as Least Concern (LC) according to IUCN Red List criteria (IUCN 2012).

GenBank accession No.— Toyama et al. 1988: AB936032 (*rbcL*), AB936316 (*matK*); Toyama et al. 2386: AB936039 (*rbcL*), AB936315 (*matK*).

Etymology.— The specific epithet *elongatus* refers to the distinctive elongate pedicels of this species.



Map 1. Distribution of *Elaeagnus elongatus* Tagane & V.S.Dang. Black triangle: type locality in Cambodia; white triangle: other collection sites in Thailand.

Note.— Veldkamp (1986) treated *E. gaudichaudiana* as a synonym of *E. conferta* Roxb. *Elaeagnus conferta* is different from *E. elongatus* in the point that *E. conferta* usually has several-flowered fascicles and its pedicels are not elongated.

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