

## The genus *Campylotropis* (Leguminosae) in Thailand

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### ABSTRACT

Seven taxa of Thai *Campylotropis* are recognized: *C. bonii* Schindl., *C. capillipes* (Franch.) Schindl. subsp. *prainii* (Collett & Hemsl.) Iokawa & H. Ohashi, *C. decora* (Kurz) Schindl., *C. harmsii* Schindl., *C. parviflora* (Kurz) Schindl., *C. pinetorum* (Kurz) Schindl. and *C. sulcata* Schindl. The reinstatement of *C. parviflora* is proposed here and *C. cytisoides* f. *parviflora* is reduced to a synonym of *C. parviflora*. A key to the species and descriptions with notes on their distribution, ecological data, vernacular names and photographs are also provided.

KEYWORDS: *Campylotropis*, Desmodieae, Leguminosae, Thailand.

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### INTRODUCTION

The genus *Campylotropis* Bunge (Desmodieae, Leguminosae) comprises about 37 species distributed in temperate and tropical Asia (Iokawa & Ohashi, 2002, 2008; Lewis *et al.*, 2005; Huang *et al.*, 2010). The genus was first described by Bunge (1835) based on *C. chinensis* Bunge, now a synonym of *C. macrocarpa* (Bunge) Rehder. This genus is similar to genus *Lespedeza* Michx., but the character to distinguish *Campylotropis* from *Lespedeza* is the presence of one flower per bract while *Lespedeza* has two flowers per bract (Iokawa & Ohashi, 2002). The name ‘*Campylotropis*’ is derived from two Greek words, ‘*campylo*’ meaning curved and ‘*tropis*’ meaning keel which is a distinct character of the genus (Lewis *et al.*, 2005). Craib (1928) listed seven species of *Campylotropis* (as *Lespedeza*), and we recognize six of those (except *C. henryi* non Schindl. treated as a synonym of *C. decora* (Kurz) Schindl.) in the seven species treated here.

### MATERIALS AND METHODS

Fresh field collections in Thailand and specimens from the following herbaria: AAU, BCU, BK, BKF,

BM, C, CAL, CMU, CMUB, E, K, KKU, L, P, PSU, QBG, US and WAG (herbarium acronyms follow Thiers, 2016) were examined. Most type specimens cited have been seen, indicated in the text by !, *n.v.* (*non vide*) indicates when the type was not seen.

### TAXONOMIC TREATMENT

#### CAMPYLOTROPIS

Bunge, Uchen. Zap. Imp. Kazansk. Univ. 4: 157. 1835; Miq., Fl. Ned. Ind. 1: 229. 1855; Schindl. in Fedde, Repert. Spec. Nov. Regni Veg. 11: 338, 424. 1912; Rehder, Man. Cult. Trees & Shrubs 1: 517. 1927; Hutch., Gen. Fl. Pl. 1: 488. 1964; H. Ohashi, J. Jap. Bot. 49(2): 40. 1974; H. Ohashi *et al.* in Polhill & P.H. Raven, Advances Legume Syst. 1: 300. 1981; Thuan in Thuan *et al.*, Fl. Cambodge, Laos & Vietnam 23: 143. 1987; P.Y. Fu, Bull. Bot. Res., Harbin 7(4): 22. 1987; P.Y. Fu, Fl. Reipubl. Popularis Sin. 41: 92. 1995; Iokawa & H. Ohashi, J. Jap. Bot. 77: 191. 2002; X.F. Gao, in Inst. Bot. Kunming. Acad. Sin., Fl. Yunnan. 10: 550. 2006; P. Huang *et al.* in Z.Y. Wu *et al.*, Fl. China 10: 292. 2010. Type species: *C. chinensis* Bunge (= *C. macrocarpa* (Bunge) Rehder).

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— *Phlebosprium* Jungh., *Reisen Durch Java*: 346. 1847; Hassk., *Flora* 30: 508. 1847. Type species: *P. cytisoides* Jungh.

— *Phlebosporium* Benth. & Hook.f., *Gen. Pl.* 1: 524. 1865. Type species: *P. cytisoides* Benth.

— *Lespedeza* sect. *Campylotropis* (Bunge) Benth., Hook's *J. Bot. Kew Gard. Misc.* 4: 48. 1852; Taub. in Engl. & Prant, *Nat. Pflanzenfam.* 3(3): 332. 1894; Nakai, *Lespedeza* of Japan & Korea: 3. 1927. Type species: *L. cytisoides* Benth.

— *Lespedeza* subgen. *Campylotropis* (Bunge) Maxim, *Trudy Imp. S.-Peterburgsk. Bot. Sada* 2: 345, 347. 1873. Type species: *L. cytisoides* Benth.

— *Lespedeza* Michx. subgen. *Oxyramphis* (Wall. ex Meisn.) Baker in Hook.f., *Fl. Brit. India* 2: 143. 1879.— *Oxyramphis* Wall., *Numer. List nr.* 5348. 1831, *nom. nud.* Type species: *O. macrostyla* (D. Don) Wall. ex Meisn.

Shrubs, 1–4 m tall. *Stems* erect or ascending, much branched, terete or multi-angular, hairy. *Leaves* pinnately 3-foliolate, alternate, subcoriaceous to chartaceous; petioles hairy; stipules triangular or triangular-lanceolate or triangular-linear, striate, persistent, outside hairy, inside glabrous; stipels absent. *Inflorescences* axillary raceme or terminal panicle with reduced subtending leaves, peduncles hairy. *Flowers* papilionaceous, 1-flowered per subtending bract, fragrant; bracts present at base

of pedicels, mostly narrowly triangular, persistent or caducous, outside hairy, inside glabrous; bracteoles occurring at base of calyx, triangular, ovate-triangular or setaceous, persistent or caducous, outside hairy, inside glabrous. *Calyx* of 4 sepals, campanulate, outside hairy, inside glabrous; dorsal 1-lobed, entire or 2-toothed at apex; lateral 2-lobed, slightly shorter than dorsal one; lowest 1-lobed, longest. *Corolla* of 5 petals, light to dark violet, dark blue or pinkish-white to creamy-white, glabrous; standard variable in shape, mostly broadly obovate or elliptic, clawed, auricle present or absent; wings mostly oblong, clawed, auricle 1; keel boat-shaped, narrowly oblong, falcate, clawed, auricle 1, ventral sutures joined. *Stamens* 10, diadelphous (9+1), base connate into staminal tubes about  $\frac{3}{4}$  of its length; anthers uniform, ovate-oblong or oblong, yellow. *Pistils* 1-carpellate; ovary superior, oblong, glabrous to hairy, 1-locular, 1-ovuled; styles filiform, incurved at right angle about  $\frac{1}{4}$  of its length; stigmas terminal, capitate. *Pods* a legume, 1-articulated, indehiscent, laterally flattened, apex acuminate or rounded and mucronate, obvious reticulate veins, hairy; fruiting stalks elongated. *Seeds* 1, reniform, obliquely elliptic or oblong, brown, reddish-brown or blackish-brown; hilum with annulus aril.

A genus of about 37 species, widely distributed in India to Indo-China and East Asia. Six species and 1 subspecies in Thailand.

#### KEY TO THE SPECIES

1. Corolla pinkish-white to creamy-white; standard with green blotches on both sides; wings less than or equal to 6 mm long
  2. Lower surface of leaflets covered with ascending velutinous hairs; upper surface of leaflets with black spots; pods less than or equal to 6 mm long **6. *C. pinetorum***
  2. Lower surface of leaflets covered with appressed hairs; upper surface of leaflets without black spot; pods more than 6 mm long **5. *C. parviflora***
1. Corolla dark blue or light to dark violet; standard without green blotches; wings more than 6 mm long
  3. Upper surface of leaflets pilose; stems with shortly zigzag lateral branches **4. *C. harmsii***
  3. Upper surface of leaflets glabrous; stems without shortly zigzag lateral branches
    4. Peduncle covered with appressed hairs; pods glabrous or covered with appressed hairs
      5. Standard with white and yellow blotches, 7.5–9 mm long and without auricles; peduncle sparsely cover of appressed-hairy; wings less than or equal to 8.5 mm long **1. *C. bonii***
      5. Standard without white and yellow blotches, 10–11 mm long and with auricles; peduncle densely appressed-hairy; wings more than 8.5 mm long **2. *C. capillipes* subsp. *prainii***
    4. Peduncle covered with patent hairs and glandular hairs; pods patent-hairy
      6. Calyx lobes longer than 3 mm long, overlapping, dorsal lobe ovate-triangular; lower surface of leaflets shortly appressed-hairy; pedicels more than 2 mm long **3. *C. decora***
      6. Calyx lobes shorter or equal to 3 mm long, not overlapping, dorsal lobe triangular; lower surface of leaflets appressed sericeous; pedicels less than or equal to 2 mm long **7. *C. sulcata***

**1. *Campylotropis bonii*** Schindl. in Engl., Bot. Jahrb. Syst. 54 (1): 64. 1916; Thuan in Thuan *et al.*, Fl. Cambodge, Laos & Vietnam 23: 143. 1987; Iokawa & H. Ohashi, J. Jap. Bot. 77(4): 201. 2002. — *Lespedeza bonii* (Schindl.) Gagnep. in Lecomte & Gagnep., Fl. Indo-Chine 2: 520. 1920. Type: Vietnam, Tuan-Du, *Bon* 4320 (holotype **P** P00758118!, isotypes **P** P00758120!, **P** P00758119!).

— *Campylotropis bonii* var. *anguticarpa* Schindl. in Fedde Repert. Nov. Regni Veg. 22: 271. 1926; Craib, Fl. Siam. 1(3): 432. 1928. Type: Thailand, Phang Nga, small island near Panyi island, *Herb. Hort. Singapore* no. 4079 (holotype **BM!**, isotype **K!**). Fig. 1A–B.

Shrub, 1–3 m tall. *Stems* erect or ascending, terete, dark brown, glabrous or sparsely covered with appressed hairs. *Leaves*: petioles 8–17 mm long, glabrous or sparsely appressed-hairy; rachis 2–5 mm long; stipules triangular or triangular-lanceolate, 2–3 × 0.8–1 mm, outside appressed-hairy; leaflets obcordate-obdeltoid, subcoriaceous; terminal leaflets 1.2–2.5 × 0.9–2 cm, lateral leaflets 1–2 × 0.5–1.5 cm, apex emarginate, base cuneate, margins entire; upper surface green, glabrous; lower surface light green, appressed-hairy; lateral veins 9–12 pairs; petiolules 2.5–4 mm long, densely appressed-hairy. *Inflorescences* axillary raceme, 2.5–3.5 cm long, laxly flowered; peduncles 8–10 mm long, sparsely appressed-hairy; bracts triangular, 0.5–1 × 0.2–0.5 mm, glabrous; bracteoles triangular, 0.7–1 × 0.3–0.5 mm, glabrous; pedicels 7–11 mm long, sparsely appressed-hairy. *Calyx* green, appressed-hairy; tube 1.8–2 mm long; dorsal lobe triangular, 1.5–2 × 1–1.5 mm; lateral lobes narrowly triangular, 1.3–1.5 × 0.7–0.8 mm; lowest lobe triangular to narrowly triangular, 1.5–1.8 × 0.6–1 mm. *Corolla* light to dark purple with white and yellow blotches at base; standard elliptic-ovate, 7.5–9 × 5–7 mm, apex acute, claw 1.5–2 mm long, auricles absent; wings oblong, 8–8.5 × 2.5–3 mm, slightly upward, apex rounded, claw 1.5–2.5 mm long, auricle 0.5–0.6 mm long; keel 7.5–8 × 2.5–3 mm, claw 1.5–2.5 mm long, auricle 0.2–0.3 mm long. *Stamens* 7–9 mm long, staminal tubes 6–7 mm long, free part of filaments 2–2.5 mm long; anthers oblong 0.3–0.4 × 0.2–0.3 mm. *Pistils* 9–9.5 mm long; ovary 2–2.5 × 0.3–0.5 mm, appressed-hairy; styles 6–6.5 mm long, appressed-hairy at base. *Pods* obliquely oblong, 11–15 × 4–5 mm, brown, apex rounded and mucronate, sparsely appressed-hairy; fruiting stalks 8–10 mm

long. *Seeds* reniform to oblong, 6–8 × 3–3.5 mm, brown.

Thailand.—PENINSULAR: Krabi [Sra Morakot Wildlife Sanctuary, 10 Apr. 2003, *Middleton et al.* 2100 (**BKF**); Tham Suea Temple, 5 Jan. 2006, *Gardner & Sidisunthron* ST2161 (**QBG, L**), *ibid.*, 18 Apr. 2007, *Gardner* ST2895 (**BKF, QBG**), *ibid.*, 24 Oct. 1991, *Larsen et al.* 42555 (**BKF, P**), *ibid.*, 8 May 2002, *Pooma et al.* 3609 (**BKF**), *ibid.*, 10 May 2017, *Sattaphorn & Leeratiwong* 80 (**PSU**), *ibid.*, 22 Aug. 2017, *Sattaphorn & Leeratiwong* 81 (**PSU**); Phang Nga [Khao Ping Kan, 25 Oct. 1974, *S.N.* (**BK**); Small Island near Panyi Island, 17 Dec. 1928, *Herb. Hort. Singapore* no. 4079 (**BM, K**); Phuket [28 Feb. 1994, *Schmidt s.n.* (**P**)].

Distribution.— Vietnam.

Ecology.— Fissures on limestone outcrops, alt. 150–330 m. Flowering: April to October. Fruiting: April to October.

Vernacular.— Lueat nai tai (เลือดในใต้).

Note.— *Campylotropis bonii* has a light to dark purple corolla with white and yellow blotches on the standard petal, sparsely appressed hairs on the peduncle, and distinctly obcordate-obdeltoid leaflets.

**2. *Campylotropis capillipes*** (Franch.) Schindl. in Fedde, Repert. Spec. Nov. Regni Veg. 11: 341. 1912; Hand.-Mazz., Symb. Sin. 7: 573. 1933; C.Y.Wu *et al.*, Index Fl. Yunnan. 1: 573. 1984; P.Y.Fu, Bull. Bot. Res., Harbin 7(4): 28. 1987; P.Y.Fu, Fl. Reipubl. Popularis Sin. 41: 98. 1995.— *Lespedeza capillipes* Franch., Pl. Delavay. 165. 1890; Iokawa & H. Ohashi, J. Jap. Bot. 77(4): 206. 2002; X.F.Gao, in Inst. Bot. Kunming. Acad. Sin., Fl. Yunnan. 10: 557. 2006; P.Huang *et al.* in Y.Z.Wu *et al.*, Fl. China 10: 294. 2010. Type: China, Yunnan, monte Hee-chan-men, *Delavay* 2733 (lectotype **K** K03089370! selected by Iokawa and Ohashi (2008), isolectotypes **K** K000894863!, **P** P00758122!).

subsp. **prainii** (Collett & Hemsl.) Iokawa & H. Ohashi, J. Jap. Bot. 77(4): 209. 2002; Iokawa & H. Ohashi, J. Jap. Bot. 83(1): 41. 2008; P.Huang *et al.* in Y.Z.Wu *et al.*, Fl. China 10: 295. 2010.— *Lespedeza prainii* Collett & Hemsl., J. Linn. Soc., Bot. 28: 46. 1890; H.Lév., Cat. Pl. Yun-Nan: 158. 1916.— *Campylotropis prainii* (Collett & Hemsl.)

Schindl. in Fedde, Repert. Spec. Nov. Regni Veg. 11: 341. 1912; C.Y.Wu *et al.*, Index Fl. Yunnan. 1: 576. 1984; P.Y.Fu, Bull. Bot. Res., Harbin 7(4): 28. 1987; P.Y.Fu, Fl. Reipubl. Popularis Sin. 41: 98. 1995. Type: Myanmar (Burma), Shan, *Collett 951* (holotype **K** K000894915!). Fig. 1C–D.

Shrub, 1–3 m tall. *Stems* erect, multi-angular, blackish-brown, densely appressed-hairy. *Leaves*: petioles 5–33 mm, densely appressed-hairy; rachis 1–3 mm long; stipules triangular-lanceolate or setaceous, 4–10 × 1–2 mm, outside appressed-hairy; leaflets obovate-oblong or orbiculate, chartaceous; terminal leaflets 0.8–2.8 × 0.5–1.5 cm, lateral leaflets 0.5–2.2 × 0.5–2 cm, apex retuse or rounded and mucronate, base cuneate or rounded, margins entire; upper surface dark green, glabrous; lower surface light green, densely appressed-hairy; lateral veins 7–12 pairs; petiolules 1–2 mm long, densely appressed-hairy. *Inflorescences* axillary raceme, 2.5–6 cm long, densely flowered, flowers usually pendulous; peduncles 1–2.6 cm long, appressed-hairy; bracts triangular, 3–7 × 1–2 mm, appressed-hairy; bracteoles triangular, 1–2.5 × 1–2 mm, glabrous; pedicels 3–10 mm long, densely appressed-hairy. *Calyx* reddish-brown to red, appressed-hairy; tube 2–2.5 mm long; dorsal lobe triangular, 1.2–2.5 × 1–2.5 mm, with or without 2 teeth; lateral lobes triangular 1–2 × 0.5–1.2 mm; lowest lobe narrowly triangular, 1.5–2.2 × 0.5–1.2 mm. *Corolla* dark blue to purple; standard obovate-oblong, 10–11 × 7–8 mm, apex obtuse or emarginate, claw 1.7–2 mm long, auricles 0.3–0.5 mm long, reflexed; wings oblong to oblong-obovate, 9.5–10 × 4.5–5.5 mm, apex rounded, claw 2.5–3.5 mm long, auricle 0.5–1 mm long; keel 9.5–10 × 2.5–3 mm, claw 2.5–3.5 mm long, auricle 0.4–0.5 mm long. *Stamens* 9.5–11.5 mm long, staminal tubes 5.5–9 mm long, free part of filaments 1.5–2.5 mm long; anthers ovate-oblong, 0.4–0.6 × 0.3–0.4 mm. *Pistils* 10.5–13 mm long; ovary 5–7 × 0.6–1 mm, glabrous or appressed-hairy; styles 5.5–8 mm long, glabrous or appressed-hairy. *Pods* obliquely elliptic to oblong, 10–14 × 3–7 mm, greenish-red to brownish-red, apex rounded and mucronate, glabrous or appressed-hairy; fruiting stalks 5–11 mm long. *Seeds* reniform or obliquely elliptic, 1.5–2 × 0.7–1.2 mm, reddish-brown.

Thailand.—NORTHERN: Chiang Mai [Ban Sa Ngin Nhua, 27 Nov. 2014, *Pongamornkul 4453* (**QBG**), *ibid.*, 27 Jan. 2016, *Pongamornkul 5639*

(**QBG**); Doi Chiang Dao, 12 Nov. 1963, *Adisai 648* (**BK**), *ibid.*, 4 Nov. 1963, *Bunchuai 1305* (**K**, **L**), *ibid.*, 7 Dec. 1965, *Hannipman 3278* (**C**, **L**), *ibid.*, 8 Feb. 1983, *Koyama et al. T-33268* (**BKF**), *ibid.*, 11 Nov. 1995, *Maxwell 95-1174* (**BKF**, **CMUB**, **L**), *ibid.*, 30 Jan. 1996, *Maxwell 96-136* (**BKF**, **CMUB**), *ibid.*, 27 Sept. 1971, *Murata et al. T-15201* (**BKF**, **P**), *ibid.*, 28 Nov. 2005, *Norsaengsri 276* (**QBG**), *ibid.*, 23 Oct. 1992, *Pooma 690* (**BKF**, **CMUB**), *ibid.*, 11 Nov. 2016, *Satthaphorn 76* (**PSU**), *ibid.*, 12 Nov. 2016, *Satthaphorn 77* (**PSU**), *ibid.*, 27 Oct. 2017, *Satthaphorn 82* (**PSU**), *ibid.*, 28 Oct. 2017, *Satthaphorn 83* (**PSU**), *ibid.*, 15 Jan. 2018, *Satthaphorn & Leeratiwong 90* (**PSU**); *ibid.*, 18 Dec. 2003, *Sawai 492* (**KKU**), *ibid.*, 19 Dec. 2003, *Sawai 481* (**KKU**), *ibid.*, 27 Oct. 1979, *Shimizu et al. T-21037* (**BKF**), *ibid.*, 27 Oct. 1979, *Shimizu et al. T-21090* (**BKF**), *ibid.*, Dec. 1959, *Smitinand & Abbe 6244* (**K**), *ibid.*, 3 Dec. 1961, *Smitinand & Anderson 7347* (**BK**, **K**), *ibid.*, 10 Nov. 1962, *Smitinand 7762* (**BKF**), *ibid.*, 21 Nov. 1999, *Suksathan 2170* (**QBG**), *ibid.*, 9 Nov. 1997, *Triboun 649* (**BK**); Doi Nom, 2 Nov. 1963, *Phusomeseang 47* (**K**, **L**); Hui Nam Dang National Park, 17 Jan. 2002, *Chayamarit et al. 3131* (**BKF**); Uttaradit [Phu Soi Dao National Park, 8 Feb. 2010, *Norsaengsri 6484* (**QBG**)].

Distribution.—Myanmar, China.

Ecology.—On exposed rugged limestone, lower montane pine oak forest, alt. 1300–2100 m. Flowering: September to November. Fruiting: October to February.

Vernacular.—Thua khao dok khram (ถั่วเขาดอกคราม).

Note.—*Campylotropis capillipes* is similar to *C. bonii* in having appressed hairs on the peduncle and purple corolla, but the former species is easily separated by having dense appressed hairs (vs. sparsely appressed hairs) on the peduncle and the absence of white and yellow blotches on the standard petal. The subspecies is different from the typical subspecies by the leaflets being glabrous on the upper surface (vs. appressed hairs).

**3. *Campylotropis decora*** (Kurz) Schindl. in Fedde, Repert. Spec. Nov. Regni Veg. 11: 428. 1912; Iokawa & H. Ohashi, J. Jap. Bot. 77(4): 213. 2002; Iokawa & H. Ohashi, J. Jap. Bot. 83(1): 44. 2008; P. Huang *et al.* in Y.Z. Wu *et al.*, Fl. China 10: 295. 2010.



— *Lespedeza decora* Kurz, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 42: 231. 1873; Kurz, Forest Fl. Burma 1: 381. 1877; Collett & Hemsl., J. Linn. Soc., Bot. 28: 45. 1890; Prain in King, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 66: 377. 1897; Craib, Fl. Siam. 1(3): 433. 1928. Type: Myanmar (Burma), Martaban, *Kurz 1665* (holotype CAL0000012094!).

— *Lespedeza sericophylla* Collett & Hemsl., J. Linn. Soc., Bot. 28: 45. 1890; Prain in King, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 66: 374. 1897.— *Campylotropis sericophylla* (Collett & Hemsl.) Schindl. in Fedde, Repert. Spec. Nov. Regni Veg. 11: 428. 1912. Type: Myanmar (Burma), Shan hills, Toungyi, *Collett 13* (holotype K K000894914!).

— *Campylotropis sessilifolia* Schindl. in Fedde, Repert. Spec. Nov. Regni Veg. 11: 427. 1912. Type: Myanmar (Burma), South Shan hills, Toungyi, *Robertson 54* (holotype K K000894917!).

— *Lespedeza henryi* sensu Gagnep. in Lecomte & Gagnep., Fl. Indo-Chine 2: 520. 1920; Craib, Fl. Siam. 1(3): 433. 1928, non Schindl. 1912.— *Campylotropis henryi* sensu Thuan in Thuan *et al.*, Fl. Cambodge, Laos & Vietnam 23: 144. 1987, non Schindler, 1912. Fig. 1E.–F.

Shrub, 0.8–2 m tall. *Stems* erect, multi-angular, greenish-brown to blackish-brown, densely appressed-hairy. *Leaves*: petioles 0.2–3.5 cm long, sulcate with adaxial wings, appressed-hairy, angled; rachis 1–13 mm long; stipules triangular, 4–7 × 0.5–1.2 mm, outside appressed-hairy, persistent; leaflet obovate or obovate-oblong, subcoriaceous; terminal leaflets 0.6–6.2 × 0.4–3 cm, lateral leaflets 0.5–5.7 × 0.4–3 cm, apex emarginate, rounded or truncate and mucronate, base rounded or slightly cordate, margins entire; upper surface green, glabrous; lower surface, light green, densely appressed-hairy; lateral veins 7–12 pairs; petiolules 1–3 mm long, densely appressed-hairy. *Inflorescences* axillary raceme or terminal panicle, 2–10 cm long, densely flowered; peduncle 0.2–3 cm long, patent-hairy and densely glandular-hairy; bract triangular 1–4.5 × 0.5–1.2 mm, patent-hairy; bracteoles narrowly triangular, 1–3 × 0.1–0.5 mm, patent-hairy; pedicels 3–11 mm long, patent-hairy and densely glandular-hairy. *Calyx* reddish-brown, patent-hairy and glandular-hairy; tube 2.5–3.5 mm long; dorsal lobe ovate-triangular, 4–4.8 × 2–3.5 mm, bifid or not; lateral lobes ovate-triangular, 4–5 × 2–2.2 mm long, overlapping other

lobes; lowest lobe triangular, 3.5–5 × 1.5–1.8 mm. *Corolla* light purple; standard obovate, 9.2–14 × 8–10 mm, apex acute or obtuse, claw 1–2 mm long, auricle 0.1–0.3 mm long; wings oblong, 9–12 × 4–5 mm long, claw 2.4–3 mm long, auricle 0.4–1 mm long, apex rounded; keel boat-shaped, 9–13 × 3–3.8 mm, apex acute, claw 2.4–3.8 mm long, auricle 0.3–0.7 mm long. *Stamens* 10–16 mm long, staminal tubes 7.5–12 mm long, free part of filaments 1.5–4 mm long; anthers oblong, 0.5–0.6 × 0.2–0.3 mm. *Pistils* 11–17 mm long, ovary 2.6–3.5 × 0.7–1 mm long, patent-hairy; style 7.4–14 mm long, glabrous. *Pods* obliquely ovate, 5–10 × 4–5 mm, dark brown, apex acuminate, densely patent-hairy and glandular-hairy; fruiting stalks up to 14 mm long. *Seeds* reniform, 1.5–4.6 × 1–3 mm, blackish-brown.

Thailand.— NORTHERN: Mae Hong Son [Doi Pha Daeng, 26 Dec. 2012, *Norsaengsri 10025* (QBG); Huai San, 5 Feb. 2014, *Norsaengsri 10815* (QBG)]; Chiang Mai [Doi Chiang Dao, 26 Mar. 1991, *Banziger 918* (CMU, L), *ibid.*, 29 Feb. 1940, *Garret 1158* (E, K, L, P), *ibid.*, 28 Nov. 1913, *Kerr 2862* (K), *ibid.*, 3 Mar. 1979, *Koyama et al. s.n.* (BKF), *ibid.*, 28 Jan. 1996, *Maxwell 96-116* (BKF, CMUB, L), *ibid.*, 21 Dec. 1931, *Put 4484* (E, K), *ibid.*, 14 Jan. 2018, *Sattaphorn & Leeratiwong 89* (PSU), *ibid.*, 15 Jan. 2018, *Sattaphorn & Leeratiwong 91* (PSU), *ibid.*, 27 Oct. 1979, *Shimizu et al. T-21090* (BKF), *ibid.*, 17 Feb. 1958, *Smitinand 4252* (L), *ibid.*, 6 Dec. 1959, *Smitinand 6243* (BKF), *ibid.*, 16 Feb. 1958, *Sørensen et al. 1243* (C)]; Chiang Rai [Doi Tung, 2 April 2011, *Bult 1161* (BKF, CMUB), *ibid.*, 21 Apr. 2008, *Maxwell 08-95* (CMUB, QBG, L), *ibid.*, 14 Feb. 2012, *Norsaengsri & Tathana 8966* (QBG), *ibid.*, 28 Mar. 2012, *Norsaengsri & Tathana 9268* (QBG), *ibid.*, 17 Feb. 1992, *Pooma 649* (BKF, CMUB); Mae Sai, 16 Feb. 1993, *Banziger 1079* (CMUB, L)]; Tak [Doi Hua Mot, 22 Dec. 1993, *Herb. trip. 778* (BCU), *ibid.*, 14 Dec. 2003, *Mattapha 508* (KKU), *ibid.*, 14 Jan. 2004, *Mattapha 573* (KKU), *ibid.*, 11 Feb. 1987, *Paisooksantivatana y2049-87* (BK), *ibid.*, 23 Jan. 2017, *Sattaphorn 78* (PSU); Kaeng Soi, 20 Nov. 1920, *Kerr 4635* (BK, K)].

Distribution.— Myanmar, China, Laos.

Ecology.— In open, or on partly shaded rugged limestone, or deciduous forest, alt. 800–2250 m. Flowering: December to March. Fruiting: January to April.

Vernacular.— Thua khao hin pun (ถั่วเขาคินปูน)

Note.— *Campylotropis decora* is distinguished by having densely patent hairs mixed with glandular hairs throughout the peduncle, and ovate-triangular overlapping calyx lobes which are distinctly longer than the calyx tube. From field observations, specimens at Doi Chiang Dao, Chiang Mai province, had thicker leaflets than other collections.

**4. *Campylotropis harmsii*** Schindl. in Fedde, Repert. Spec. Nov. Regni Veg. 11: 342. 1912; P.Y.Fu, Bull. Bot. Res., Harbin 7(4): 28. 1987; P.Y.Fu, Fl. Reipubl. Popularis Sin. 41: 97. 1995; Iokawa & H. Ohashi, J. Jap. Bot. 77(5): 255. 2002; X.F.Gao, in Inst. Bot. Kunming. Acad. Sin., Fl. Yunnan. 10: 556. 2006; Iokawa & H. Ohashi, J. Jap. Bot. 83(1): 44. 2008; P.Huang *et al.* in Z.Y.Wu *et al.*, Fl. China 10: 296. 2010.— *Lespedeza harmsii* (Schindl.) H.Lév., Cat. Pl. Yun-Nan: 158. 1916; Craib, Fl. Siam. 1(3): 433. 1928. Type: China, Yunnan, Szemao, *Henry 9803D* (lectotype **K** K000894861! designated by Iokawa & Ohashi (2008); isoelectotype **E** E00025802!). Fig. 1G–H.

Shrub, 0.5–4 m tall. *Stems* terete, shortly zigzag lateral branches, blackish-brown, patent-hairy. *Leaves*: petioles 4–14 mm long, densely appressed-hairy; rachis 1–9 mm long; stipules ovate-triangular, 4–7 × 1–2 mm, outside appressed-hairy; leaflets transversely elliptic, chartaceous; terminal leaflets 0.8–3.5 × 0.5–2 cm, lateral leaflets 0.6–2.8 × 0.4–1.5 cm, apex acute and mucronate, base cuneate, margins entire; upper surface dark green, pilose; lower surface light green, densely pilose, midrib and lateral vein 5–8 pairs; petiolules 1.2–1.7 mm long, densely appressed-hairy. *Inflorescences* axillary raceme, 2–8 cm long, laxly flowered; peduncles 3–9 mm long, densely patent-hairy and sparsely glandular-hairy; bracts ovate triangular, 1–2.2 × 0.3–1 mm, patent-hairy; bracteoles ovate-triangular, 1–1.2 × 0.2–0.3 mm, appressed-hairy; pedicels 4–13 mm long, densely patent-hairy. *Calyx* reddish-brown, densely patent-hairy; tube 2–3 mm long; dorsal lobe triangular, 3–3.5 × 3–4 mm; lateral lobes triangular, 4–4.2 × 1.2–1.5 mm; lowest lobe narrow triangular, 4.5–5 × 1–1.2 mm. *Corolla* pinkish-purple to white; standard elliptic-oblong, 10–11 × 7–7.5 mm, apex acute, claw 1.2–2 mm long, auricle 0.2–0.3 mm long, inflexed; wings oblong, 10–11 × 5–5.5 mm, apex rounded, slightly upward, claw 2–2.5 mm long,

auricle 0.5–1 mm long; keel 9–10 × 2.8–3 mm, claw 2.5–3.5 mm long, auricle 0.3–0.5 mm long. *Stamens* 9.5–13 mm long, staminal tubes 7–11 mm long, free part of filaments 2–3 mm long; anthers oblong, 0.2–0.5 × 0.1–0.3 mm. *Pistils* 11–14 mm long; ovary 3–3.5 × 0.8–1 mm, densely pilose; styles 7–10 mm long, pilose. *Pods* ovate-oblong, 8–20 × 2.3–6 mm, brown, densely pilose, apex acuminate; fruiting stalks 7–13 mm. *Seeds* reniform, 4.5–8 × 3–3.5 mm, brown.

Thailand.— NORTHERN: Chiang Mai [Doi Chiang Dao, 4 Dec. 2012, *Chamchumroon et al.* V.C. 1685 (**BKF**), *ibid.*, 7 Jan. 1975, *Geesink et al.* 8137 (**BKF**, **C**, **K**, **L**, **P**), *ibid.*, 6 Nov. 1922, *Kerr* 6592 (**BK**, **K**), *ibid.*, 1 Dec. 1984, *Koyama et al.* T-39775, *ibid.*, 28 Nov. 2005, *Norsaengsri* 274 (**QBG**), *ibid.*, 30 Nov. 2005, *Norsaengsri* 277 (**QBG**), *ibid.*, 19 Dec. 2014, *Saisorn* 347 (**KKU**), *ibid.*, 14 Jan. 2018, *Satthaphorn & Leeratiwong* 88 (**PSU**), *ibid.*, 30 Nov. 2005, *Sawai* 985 (**KKU**)]; Nan [Doi Phu Kha, 27 Feb. 1921, *Kerr* 4960 (**BK**, **K**)].

Distribution.— China.

Ecology.— In open, limestone ridge, evergreen forest, alt. 1200–2250 m. Flowering: December to January. Fruiting: December to January.

Vernacular.— Thua khao bai khon (ถั่วเขาคาบขน).

Note.— *Campylotropis harmsii* is different from other Thai *Campylotropis* species by having shortly zigzag lateral branches and pilose hairs on both leaf surfaces.

**5. *Campylotropis parviflora*** (Kurz) Schindl. in Fedde, Repert. Spec. Nov. Regni Veg. 11: 342. 1912; C.Y.Wu *et al.*, Index Fl. Yunnan. 1: 575. 1984; P.Y.Fu, Bull. Bot. Res., Harbin 7(4): 50. 1987; Thuan in Thuan *et al.*, Fl. Cambodge, Laos & Vietnam 23: 146. 1987; P.Y.Fu, Fl. Reipubl. Popularis Sin. 41: 123. 1995; X.F.Gao, in Inst. Bot. Kunming. Acad. Sin., Fl. Yunnan. 10: 558. 2006.— *Lespedeza parviflora* Kurz, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 42: 231. 1873; Kurz, Forest Fl. Burma 1: 380. 1877; Collett & Hemsl., J. Linn. Soc., Bot. 28: 45. 1891; Prain in King, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 66: 377. 1897; H.Lév., Cat. Pl. Yun-Nan: 158. 1916; Gagnep. in Lecomte & Gagnep., Fl. Indo-Chine 2: 522. 1920; Craib, Fl. Siam. 1(3): 433. 1928.— *Campylotropis cytisoides* Miq. f. *parviflora* (Kurz) Iokawa & H. Ohashi, J.

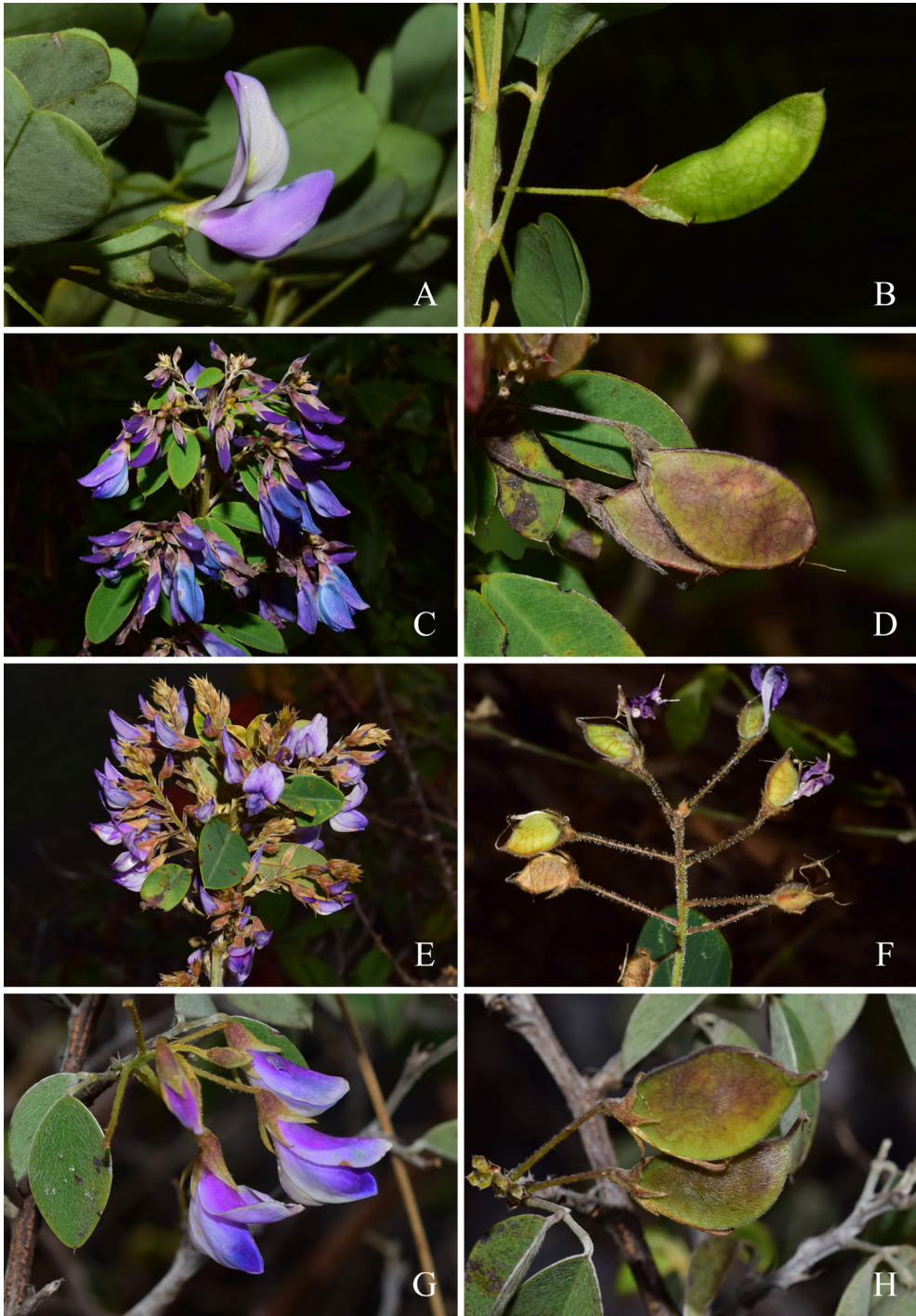


Figure 1. A–B: *Campylotropis bonii* Schindl.; C–D: *C. capillipes* (Franch.) Schindl. subsp. *prainii* (Collett & Hemsl.) Iokawa & Ohashi; E–F: *C. decora* (Kurz) Schindl.; G–H: *C. harmsii* Schindl.



Jap. Bot. 77(4): 212. 2002; Iokawa & H. Ohashi, J. Jap. Bot. 83(1): 44. 2008, **syn. nov.** Type: Myanmar (Burma), Martaban, *Mason 34* (holotype CAL 0000012096!). Fig. 2A–B.

Shrub, 0.3–2 m tall. *Stems* erect, multi-angular, brown to dark brown, appressed-hairy. *Leaves*: petioles 0.4–5.5 cm long, sparsely appressed-hairy; rachis 1–10 mm long; stipules triangular-linear, 5–10 × 0.5–1 mm, outside appressed-hairy; leaflets narrowly ovate to elliptic, subcoriaceous; terminal leaflets 1.3–5 × 0.5–1.6 cm, lateral leaflets 0.9–3.8 × 0.3–1.6 cm, apex acute or rounded and mucronate, base rounded or cuneate, margins entire; upper surface dark green, glabrous or slightly appressed-hairy mainly on midrib; lower surface pale green to grey, shortly appressed-hairy; lateral veins 7–12 pairs; petiolules 1.5–2 mm long, densely appressed-hairy. *Inflorescences* axillary raceme or terminal panicle, 8.5–11 cm long, densely flowered; peduncles 5.2–6 cm long, densely patent-hairy and sparsely glandular-hairy; bracts triangular, 1–1.2 × 0.2–0.3 mm, appressed-hairy, reddish-brown, usually caducous; bracteoles setaceous, 0.5–1 mm long, densely appressed-hairy; pedicels 1.5–4 mm long, appressed-hairy and sparsely glandular-hairy. *Calyx* green, densely appressed-hairy; tube 1–2 mm long; dorsal lobe narrowly triangular to setaceous, 1.5–2 × 0.5–0.6 mm, with or without 2 teeth; lateral lobes narrowly triangular to setaceous 1.5–1.8 × 0.3–0.4 mm; lowest lobe narrowly triangular to setaceous, 1.5–2 × 0.5–0.6 mm. *Corolla* pinkish-white to creamy-white with green blotches on both surface of standard; standard elliptic-oblong, 5.5–6 × 2.5–3 mm, apex acute, claw 1–1.2 mm long, auricle absent; wings oblong, 5–6 × 2–2.2 mm, apex rounded, slightly upward, claw 1.4–1.5 mm, auricle 0.5–0.6 mm long; keel 5.5–6 × 1.4–1.5 mm, claw 1–1.2 mm long, auricle 0.3–0.5 mm long. *Stamens* 6–7 mm long, staminal tubes 4.5–5 mm long, free part of filaments 2–3 mm long; anthers oblong, 0.4–0.5 × 0.3–0.4 mm. *Pistils* 6–7 mm long; ovary 2–3 × 0.5–0.7 mm, densely appressed-hairy; styles 4–5 mm long, appressed-hairy at base. *Pods* obliquely obovate, 6.5–9 × 4–5 mm, dark brown, arranging mainly one side of rachis, apex acuminate, patent-hairy; fruiting stalks 3–5 mm. *Seeds* reniform, 2–4.5 × 1.5–2.5 mm, brown.

Thailand.—NORTHERN: Mae Hong Son [Ban Huai Hi, 1 May 2014, *Norsaengsri 11116* (QBG); Doi Pui, 16 Dec. 2007, *Tanaka et al. HN8480*

(QBG); Kiew Lom, 12 Dec. 2007, *Tanaka et al. HN8196* (QBG); Mae Sariang, 8 July 1968, *Larsen et al. 2237* (K); Mountain pass between Pai and Pang Mapha along road no. 1095, 13 Dec. 1998, *Konta et al. 4470* (BKF); Muang Sroi Waterfall, 17 Jan. 1983, *Koyama et al. T-32675* (QBG), *ibid.*, 8 Feb. 2013, *Norsaengsri 10245* (QBG)]; Chiang Mai [12 Nov. 1911, *Kerr 1587B* (E, P); Ban Au Tam, 21 Jan. 2015, *Pongkamornkul 4552* (QBG); Ban Gong Por Nue, 26 Jan. 2016, *Pongkamornkul 5590* (QBG), 27 Jan. 2016, *Pongkamornkul 5649* (QBG); Ban Huay Bon, 13 Jan. 1988, *Paisooksantivatana et al. y 2217-88* (BK); Ban Mae Sa Ngin, 17 Nov. 2015, *Pongkamornkul 5155* (QBG); Ban Pak Tang Muzer, 28 Mar. 2015, *Pongkamornkul 4628* (QBG); Ban Pong Khrai, 9 Feb. 2006, *Glamwaewwong 2253* (QBG); Doi Ang Khang, 30 Jan. 1999, *Larsen & Larsen KL47264* (AAU); Doi Chiang Dao, 20 Nov. 1990, *Banziger 768* (CMU), *ibid.*, 27 Feb. 2003, *Chamchumroon & Sup V.C.1944* (BKF), *ibid.*, 19 Jan. 1991, *Maxwell 91-80* (CMU, L), *ibid.*, 27 Jan. 1996, *Maxwell 96-111* (BKF, CMUB), *ibid.*, 29 Dec. 1955, *Pleunchit 1046* (BKF), *ibid.*, 19 Dec. 1931, *Put 4398* (BCU, K), *ibid.*, 14 Jan. 2018, *Sattaphorn & Leeratiwong 86* (PSU), *ibid.*, 15 Jan. 2018, *Sattaphorn & Leeratiwong 92* (PSU); Doi Inthanon National Park, 11 Jan. 1994, *Fukuoka & Koyama T-62083* (BKF), *ibid.*, 3 Jan. 1975, *Geesink et al. 8049* (K, L), *ibid.*, 6 Feb. 1998, *Konta & Phengkklai 4033* (BKF), *ibid.*, 17 Dec. 1998, *Konta et al. 4651* (BKF), *ibid.*, 3 Jan. 1975, *Koyama et al. T-39663* (BKF), *ibid.*, Nov. 1968, *Phengkklai & Smitinand 6047* (BKF), *ibid.*, 26 July 1988, *Phengkklai et al. 6981* (BKF), *ibid.*, 17 Dec. 1965, *Takawa et al. T2463* (BKF, P), *ibid.*, 15 Apr. 1970, *Worawoat 93* (BKF); Doi Pha Hom Pok, 25 Feb. 1958, *Sørensen et al. 1630* (C); Doi Pui, 8 Jan. 1969, *Nooteboom 636* (BKF, K, L), *ibid.*, 11 Jan. 1979, *Paisooksantivatana 94-79* (BK, CMUB), *ibid.*, 2 Mar. 1974, *Sadakorn 314* (BK), *ibid.*, 13 Jan. 2018, *Sattaphorn & Leeratiwong 85* (PSU); Doi Sutep, 5 Mar. 1966, *Chermisrivathana 457* (BK), *ibid.*, 10 Feb. 1926, *Collins 1223* (BK, K, US), *ibid.*, 1 Jan. 1905, *Hosseus 202* (C, E, K, L, P), *ibid.*, 25 Jan. 1910, *Kerr 951* (K, L, P), *ibid.*, 12 Nov. 1911, *Kerr 1507* (K), *ibid.*, 22 Dec. 1920, *Kerr s.n.* (BK, P), *ibid.*, 26 Dec. 1987, *Maxwell 87-1643* (CMU, L), *ibid.*, 10 Mar. 1988, *Maxwell 88-321* (BKF, CMU, L), *ibid.*, 10 Jan. 1969, *Nooteboom 710* (L), *ibid.*, *Schultze & Pattanavibul 053/037-05* (WAG), *ibid.*,



5 Mar. 1966, *Sukku* 70 (**BKF**), *ibid.*, 8 Feb. 1958, *Sørensen et al.* 876 (**C, E**), *ibid.*, 15 Apr. 1958, *Sørensen et al.* 2762 (**C, L**), *ibid.*, 16 Apr. 1958, *Sørensen et al.* 2775 (**C**), *ibid.*, 19 Jan. 1967, *Umpai* 349 (**BK**); Doi Kio Lom, 18 Jan. 2002, *Chayamarit et al.* 3140 (**BKF**); Doi Sahng Liang, 16 Dec. 1997, *Maxwell* 97-1494 (**BKF, CMUB**); Huay Mae Mae, 24 Jan. 1996, *Na Nakorn et al.* 5657 (**QBG**); Khun Wang Highland, 11 Jan. 1986, *Paisooksirivathana y1746-86* (**BK**); Mae Chaem, 7 Dec. 1998, *Maxwell* 98-1438 (**CMUB, L**); Mae Dad Noi, 25 Jan. 2010, *Norsaengsri & Intamusik* 6345 (**QBG**); Mae Rim, 19 Dec. 2000, *Glamwaewwong* 25 (**QBG**), *ibid.*, 18 Dec. 2001, *Glamwaewwong* 121 (**QBG**), *ibid.*, 8 Jan. 1983, *Koyama et al.* T-32097 (**BKF**), *ibid.*, 9 Jan. 1990, *Maxwell* 90-47 (**CMU, E**), *ibid.*, 18 Jan. 1994, *Na Nakorn et al.* 406 (**QBG**), *ibid.*, 21 Dec. 1995, *Na Nakorn et al.* 5511 (**QBG**), *ibid.*, 20 Jan. 1996, *Na Nakorn et al.* 5559 (**QBG**), *ibid.*, Jan. 1992, *Phengkklai et al.* 9007 (**BKF**), *ibid.*, 21 Dec. 1978, *Pradit & Munpanid* 539 (**AAU**), *ibid.*, 22 Mar. 2017, *Satthaphorn* 79 (**PSU**); *ibid.*, 26 Nov. 1951, *Smitinand* 150 (**BKF, P**), *ibid.*, 1 Jan. 1998, *Srisanga & Puff* 6 (**QBG**), *ibid.*, 19 Jan. 2015, *Sudjit et al.* 3 (**QBG**); Mae Sae, 27 Jan. 1977, *S.N.* (**BKF**); Mae Sanam, 26 Dec. 1978, *Niyomdham et al.* 143 (**BKF, K, L**); Mae Soi Valley, 4 Jan. 1991, *Maxwell* 91-22 (**CMU, L**); Mae Taeng, 3 Dec. 1977, *Santisuk* 1448 (**C, K**); Mae Taman Reforest Unit, 28 Nov. 1984, *Koyama et al.* T-39663 (**BKF**); Mae Wang, 18 Dec. 1998, *Konta et al.* 4715 (**BKF**), *ibid.*, 20 Feb. 2004, *Maxwell* 04-91 (**CMUB, L**); Mae Ya Mae Kang, 29 Dec. 1913, *Garret* 103 (**BK, C, E, K, L, P**); Mai Muang Nao Arboretum, 25 Dec. 2001, *Sankamethawee* 384 (**BKF, CMUB, L**); Om Koi, 30 Nov. 2013, *Pongkamornkul* 3791 (**QBG**), *ibid.*, 12 Jan. 1988, *Santisuk* 6664 (**BKF**); Pake Same Village, 28 Dec. 2000, *Pongkamornkul* 587 (**QBG**); Pha Dok Siao Waterfall, 25 Dec. 2015, *Pisuttimarn* 413-1 (**KKU**); Chiang Rai [Doi Luang National Park, 28 Oct. 1997, *Maxwell* 97-1252 (**CMUB, L**); Khun Jae National Park, 1 Jan. 1998, *Maxwell* 98-12 (**BKF, CMUB, L**); Khun Korn Waterfall, 12 Jan. 1997, *KK* 26 (**BCU**); Mae Fah Luang, 1 Feb. 2006, *Maxwell* 06-95 (**CMUB, L**); Mae Tameo Village, 2 Mar. 1989, *Bragg* 63 (**CMU**); Lamphun [Doi Khun Tan National Park, 27 Dec. 1993, *Maxwell* 93-1564 (**CMUB, L**); Lampang [Jae Sawn National Park, 3 Dec. 1995, *Maxwell* 95-1256 (**BKF, CMUB, L**); Tak [Mae Ra Mard, 24 Dec. 2002, *Niyomdham &*

*Puudjaa* 7062 (**BKF**); Thung Yai Naresuan East Wildlife Sanctuary, 22 Dec. 2011, *Watthana & La-onsri* 4095 (**BKF**); NORTH-EASTERN: Phetchabun [Nam Nao National Park, 25 Dec. 1982, *Koyama et al.* T-31666 (**BKF**), *ibid.*, *Sawai* 446 (**KKU**); Loei [Na Haew, Nhu Tong Kao, 25 Apr. 1994, *BGO staffs.n.* (**QBG**); Phu Kradueng, 21 Mar. 1958, *Sørensen et al.* 2383 (**C, BKF**); Phu Suan Sai, 10 Dec. 1996, *BGO Staff* 74 (**QBG**); Phu Ruea National Park, 5 Dec. 2004, *Sawai & Rob* 832 (**KKU**); EASTERN: Chaiyaphum [Between Nam Phrom and Thunkamang, 13 Dec. 1971, *Beusekom et al.* 4208 (**BKF, C, K, L, P**); Khonsan, Dec. 1994, *Wangwasit* 64 (**BK**), *ibid.*, Dec. 1994, *Wangwasit* 65 (**BK**); Phu Khiao, 8 Nov. 1984, *Murata et al.* T-50138 (**BKF**); SOUTH-WESTERN: Kanchanaburi [Ban Pilok, 19 Feb. 1967, *Chermsirivathana* 640 (**BK**), *ibid.*, 10 Dec. 1969, *Chermsirivathana* 1687 (**BK**); Huai Ban Kau, 11 Nov. 1971, *Beusekom et al.* 3670 (**BKF, K, L**).

Distribution.— Myanmar, China, Laos, Vietnam.

Ecology.— In open, partly shaded areas on limestone mountains and dry evergreen forest, alt. 600–1800 m. Flowering: November to March. Fruiting: November to March.

Vernacular.— Lueat nai (เลือดไน), hing men (หิ้งเม่น).

Note.— According to Iokawa & Ohashi (2002), *Campylotropis cytisoides* f. *parviflora* was established as distinct from the typical form, *C. cytisoides* f. *cytisoides*, by using the density of glandular hairs, the length and the texture of leaflets and the length of inflorescences. From specimen investigation of both forms, we have found additional characters to distinguish between the two forms. *Campylotropis cytisoides* f. *parviflora* also differs from the typical form by having a pinkish-white to creamy-white corolla (vs. purplish-blue), the 1–2 mm long calyx tube (vs. 2–3 mm), the 5.5–6 mm long standard (vs. 7.5–9 mm) and being sparsely short appressed-hairy on the lower surface of leaflets (vs. densely long appressed-hairy). Therefore, we here reinstate this taxon to species level, *C. parviflora*.

**6. *Campylotropis pinetorum*** (Kurz) Schindl. in Fedde, Repert. Spec. Nov. Regni Veg. 11: 429. 1912; Schindl. in Fedde, Repert. Spec. Nov. Regni Veg. 20: 285. 1924; Thuan in Thuan *et al.*, Fl. Cambodge,

Laos & Vietnam 23: 147. 1987; Iokawa & H. Ohashi, *J. Jap. Bot.* 77(5): 277. 2002; X.F. Gao, in *Inst. Bot. Kunming. Acad. Sin., Fl. Yunnan*. 10: 555. 2006; P. Huang *et al.* in *Z.Y. Wu et al., Fl. China* 10: 298. 2010.—*Lespedeza pinetorum* Kurz, *J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist.* 42: 230. 1873; Kurz, *Forest Fl. Brit. Burma* 1: 381. 1877; Prain in King, *J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist.* 66: 375. 1897; Gagnep. in Lecomte & Gagnep., *Fl. Indo-Chine* 2: 524. 1920; Craib, *Fl. Siam.* 1(3): 433. 1928. Type: Myanmar (Burma), Martaban, *Kurz 1637* (holotype CAL 0000012101!). Fig. 2C–D.

Shrub, 0.4–1.5 m tall. *Stems* erect, multi-angular, brown, densely yellowish-velutinous. *Leaves*: petioles 1.8–2.8 cm long, velutinous; rachis 3–6 mm long or indistinct; stipules triangular, 7–9 × 2.5–4 mm, outside velutinous, persistent; leaflets narrowly elliptic, subcoriaceous; terminal leaflets 5.5–9 × 1.4–4.6 cm, lateral leaflets 4.8–7.7 × 1.3–3.3 cm, apex acute, base cuneate, margins entire; upper surface light green, finely appressed-hairy, especially on veins; lower surface pale green, densely ascending velutinous, mature leaflets with scattered black spots; lateral veins 7–12 pairs; petiolules 1.5–2 mm long, velutinous. *Inflorescences* axillary raceme, 3–6 cm long, densely flowered; peduncles 0.5–1.5 cm long, velutinous and sparsely glandular-hairy; bracts triangular, 5–8 × 2–3 mm, patent-hairy; bracteoles setaceous, ca 1 mm long, patent-hairy, early caducous; pedicels 1.5–2 mm long, patent-hairy. *Calyx* reddish-brown, patent-hairy; tube 2–2.5 mm long; dorsal lobes triangular, 2.5–3 × 1.8–2 mm, with or without 2 long teeth, lateral lobes triangular, 2.5–3 × 1–1.1 mm, lowest lobe narrowly triangular, 2.8–3 × 0.7–1 mm. *Corolla* pinkish-white to creamy-white; standard obovate-oblong, 7.5–8 × 6–7 mm, apex rounded, claw 1.5–2 mm long, auricle absent; wings spatulate, 5.3–5.5 × 2.5–3.2 mm, apex rounded, claw 2.5–2.7 mm long, auricle 0.8–1 mm long; keel 6–6.5 × 2.5–3 mm, claw 2.8–3 mm long, auricle 0.3–0.5 mm long. *Stamens* 8–8.5 mm long, staminal tubes 4–6 mm long, free part of filaments 2–2.5 mm long; anthers oblong, 0.3–0.4 × 0.1–0.2 mm. *Pistils* 8.5–9 mm long; ovary 1.5–2 × 0.7–0.8 mm, densely patent-hairy; styles 6.5–7 mm long, densely patent-hairy. *Pods* obliquely ovate, 5–6 × 2.5–3 mm, brown, apex rounded and mucronate, densely patent-hairy; fruiting stalks 2–3 mm long. *Seeds* oblong or reniform, swollen, 2.6–2.8 × 1.3–1.5 mm, reddish-brown.

Thailand.—NORTHERN: Chiang Mai [Doi Ang Khang, 2 Feb. 2007, *Srisanga et al.* 2956 (CMUB, QBG)]; Doi Inthanon National Park, 14 Feb. 2001, *Chayamarit et al.* 2397 (BKF), *ibid.*, 12 Feb. 1998, *Konta et al.* 4245 (BKF), *ibid.*, 18 Feb. 1998, *Konta et al.* 4371 (BKF), *ibid.*, 20 Dec. 1998, *Konta et al.* 4915 (BKF), *ibid.*, 31 Dec. 1989, *Maxwell 89-1614* (CMU, L), *ibid.*, 18 Feb. 1998, *Niyondham 5322* (BKF), *ibid.*, 11 Feb. 1998, *Phengkklai et al.* 11002 (BKF), *ibid.*, 16 Mar. 2004, *Pornpongrungrueng 459* (KKU), *ibid.*, 13 Jan. 2018, *Sattaphorn & Leeratiwong 84* (PSU), *ibid.*, 7 Jan. 1998, *Srisanga et al.* 94 (AAU, BKF, QBG); Doi Mon Chong, 1 Jan. 1997, *BGO Staff 8346* (QBG); Doi Pui, Mar. 1997, *Chayamarit & Phathanacharoen 701* (BKF), *ibid.*, Mar. 1997, *Chayamarit & Phathanacharoen 669* (BKF), *ibid.*, 8 Feb. 1979, *Pradit 681* (C), *ibid.*, 24 Feb. 1975, *Sadakorn 513* (BK), *ibid.*, 5 Feb. 2015, *Srisanga et al.* 3870 (QBG); Doi Sutep, *Cockerell s.n.* (US), *ibid.*, 8 Jan. 1911, *Kerr 1645* (BK, C, K, L, P), *ibid.*, 23 Jan. 1988, *Maxwell 88-67* (AAU, BKF, CMU, L), *ibid.*, 10 Jan. 1969, *Nooteboom 711* (BKF, C, K, L), *ibid.*, 9 Feb. 1958, *Sørensen et al.* 891 (C, BKF), *ibid.*, 8 Jan. 1959, *Sørensen et al.* 6589 (C, E), *ibid.*, 19 Jan. 1967, *Umpai 361* (BK); Kawng Sang, 22 Jan. 1964, *Hansen et al.* 10877 (C, K, L)]; Chiang Rai [Doi Chang, 17 Feb. 1968, *Hansen & Smitinand 12620* (AAU, BKF, C, E, K, L, P)]; Phayao [Doi Luang National Park, 10 Feb. 2016, *Muangyen 702* (QBG)]; Nan [Khun Sathan National Park, 27 Jan. 2013, *Norsaeangsri 10110* (QBG)]; Uttaradit [Phu Miang-Phu Thong Wildlife Sanctuary, 27 Jan. 2011, *Rom Klao Botanical Garden 0159/2554* (QBG)]; Phu Soi Dao National Park, 8 Feb. 2010, *Norsaeangsri 6482* (QBG)]; Phitsanulok [Phu Soi Dao National Park, 9 Feb. 2000, *Suksathan 2313* (QBG)]; Kamphaeng Phet [Mae Wong National Park, 3 Jan. 1999, *Bult 207* (BKF, QBG)]; NORTH-EASTERN: Loei [Phu Kradueng National Park, 10 Jan. 1960, *Abbe & Smitinand 9427* (BKF), *ibid.*, 10 Feb. 1931, *Kerr 20063* (K, L)]; Phu Luang Wildlife Sanctuary, 27 Nov. 1987, *Dee 995* (BKF)]; Phu Ruea National Park, 16 Jan. 1967, *Smitinand 10153* (BKF), *ibid.*, 13 Dec. 1966, *Umpai 333* (BK)].

Distribution.—Myanmar, Laos, Vietnam.

Ecology.—In open, grassy areas, hill evergreen forest, lower montane forest, alt. 1000–2250 m. Flowering: November to March. Fruiting: January to March.

Vernacular.— Thua khao (ถั่วเข่า), thua doi (ถั่วตอย), thua pa (ถั่วป่า), ka sam pik (กาสามปึก).

Note.— *Campylotropis pinetorum* resembles *C. parviflora* in having a pinkish-white to creamy-white corolla. However, the former has black spots on the upper leaf surface, velutinous hairs on the lower leaf surface and pods less than or equal to 6 mm long, while the latter has no black spots on the upper leaf surface, appressed hairs on the lower leaf surface and pods more than 6 mm long.

**7. *Campylotropis sulcata*** Schindl. in Engl., Bot. Jahrb. Syst. 54 (1): 65. 1916; C.Y.Wu *et al.*, Index Fl. Yunnan. 1: 576. 1984; P.Y.Fu, Bull. Bot. Res., Harbin 7(4): 51. 1987; P.Y.Fu, Fl. Reipubl. Popularis Sin. 41: 126. 1995; Iokawa & H. Ohashi, J. Jap. Bot. 77(6): 326. 2002; X.F.Gao, in Inst. Bot. Kunming. Acad. Sin., Fl. Yunnan. 10: 554. 2006; Iokawa & H. Ohashi, J. Jap. Bot. 83(1): 54. 2008; P.Huang *et al.* in Z.Y.Wu *et al.*, Fl. China 10: 300. 2010.— *Lespedeza sulcata* (Schindl.) Craib. Fl. Siam. 1(3): 434. 1928. Type: China, Yunnan, *Bon s.n.* (holotype P P03089818!).

— *Campylotropis rockii* Schindl. in Fedde, Repert. Spec. Nov. Regni Veg. 22: 270. 1926; C.Y.Wu *et al.*, Index Fl. Yunnan. 1: 576. 1984; P.Y.Fu, Bull. Bot. Res., Harbin 7(4): 29. 1987; P.Y.Fu, Fl. Reipubl. Popularis Sin. 41: 100. 1995; X.F.Gao, in Inst. Bot. Kunming. Acad. Sin., Fl. Yunnan. 10: 553. 2006. Type: China, Yunnan, Simao, Ganlanba as west of Mekong, Salween water divide, upper Kan-lan-chai, *Rock 7059* (holotype US, *n.v.*).

— *Campylotropis purpurascens* Ricker in Rehder *et al.*, J. Wash. Acad. Sci. 36: 39. 1946. Type: China, Yunnan, Hila, Shunning, *Yü 17571* (holotype A, *n.v.*; isotypes E E00025717!, US 00288564!). Fig. 2E–F.

Shrub, 1–2 m tall. *Stems* erect, multi-angular, dark brown, densely patent-hairy. *Leaves*: petioles 0.4–2.9 cm long, sulcate, densely sericeous; rachis 1–6 mm long; stipules triangular-linear, 8–10 × 0.6–1 mm, outside appressed-hairy, persistent; leaflets elliptic-oblong or obovate-elliptic, subcoriaceous; terminal leaflets 2–6.5 × 0.4–2.8 cm, lateral leaflets 1.5–4.5 × 0.3–2.3 cm, apex acute or retuse and mucronate, base cuneate, margins entire; upper surface dark green, appressed-hairy; lower surface light green, densely sericeous, midrib adaxially

sunken, 7–12 pairs; petiolules 1–3 mm long, densely sericeous. *Inflorescences* axillary raceme or terminal panicle, 2.5–16 cm long, densely flowered; peduncles 1.2–2 cm long, densely patent-hairy and sparsely glandular-hairy; bracts triangular, 3.5–4.5 × 0.4–0.5 mm, appressed-hairy, reddish-brown usually caducous before anthesis; bracteoles triangular, 0.5–1 × 0.2–0.3 mm, appressed-hairy; pedicels 1–2 mm long, densely patent-hairy, young flowers subsessile. *Calyx* reddish-brown, appressed-hairy; tube 1.5–1.8 mm long; dorsal lobe triangular, 2.2–3 × 1.8–2 mm, with or without 2 teeth; lateral lobes triangular, 2–2.2 × 0.8–1 mm, lowest lobe triangular 2.2–3 × 0.7–1 mm. *Corolla* light to dark purple; standard elliptic, 8.5–11 × 5–6.5 mm, apex acute, claw 0.8–1 mm long, auricle absent; wings oblong, 8–9.5 × 3–4 mm, slightly falcate, apex rounded, claw 1.5–2 mm long, auricle 0.5–1 mm long; keel 9.5–11 × 2.5–3 mm, claw 1.5–2.5 mm long, auricle 0.5–1 mm long. *Stamens* 8–10 mm long, staminal tubes 6–8 mm long, free part of filaments 2.5–3 mm long, upward; anthers ovate-oblong, 0.3–0.4 × 0.2–0.3 mm. *Pistils* 8–12 mm long; ovary 2–2.5 × 0.4–0.5 mm, densely patent-hairy; styles 6.5–9.5 mm long, densely patent-hairy. *Pods* obliquely ovate, 4–7 × 2–4 mm, dark brown, apex acuminate, densely short patent-hairy, calyx and style persistent; fruiting stalks 1–5 mm long. *Seeds* reniform, 1.2–1.5 × 0.5–1 mm, blackish-brown.

Thailand.— NORTHERN: Mae Hong Son [Doi Laem Rang, 27 Dec. 2012, *Norsaengsri 10061* (QBG); Nong Khao Klang (Karen) Village, 29 Oct. 2007, *Maxwell 07-680* (QBG)]; Chiang Mai [Doi Chiang Dao, 12 Nov. 2011, *Clark 235* (QBG), *ibid.*, 2 Nov. 1922, *Kerr 6509* (BK, E, K), *ibid.*, 4 Nov. 1995, *Maxwell 95-1067* (BKF, CMUB, L), *ibid.*, 27 Jan. 1996, *Maxwell 96-101* (BKF, CMUB, L), *ibid.*, 19 Dec. 2015, *Pisuttimarn 410-1* (KKU), *ibid.*, 17 Oct. 1994, *Pooma 873* (BKF, CMUB), *ibid.*, 11 Nov. 2016, *Sattaphorn 75* (PSU), *ibid.*, 14 Jan. 2018, *Sattaphorn & Leeratiwong 87* (PSU), *ibid.*, 17 Dec. 2003, *Sawai 508* (KKU), *ibid.*, 11 Dec. 1987, *Smitinand s.n.* (BKF), *ibid.*, 7 Nov. 1997, *Triboun 698* (BK)]; Chiang Rai [Khun Jae National Park, 23 Nov. 1997, *Maxwell 97-1416* (BKF, CMUB, L), *ibid.*, 1 Jan. 1998, *Maxwell 98-4* (BKF, CMUB, L)]; Phitsanulok [Phu Hin Rong Kla National Park, 1 Oct. 1990, *Chantaranothai et al. 90/515* (KKU), *ibid.*, 9 Oct. 1987, *Sridith 53* (BCU),



ibid., 30 Oct. 1987, *Sridith 76* (BCU), ibid., 29 Oct. 2001, *Wathana & Suksathan 1543* (AAU, CMUB, QBG); EASTERN: *Chaiyaphum* [Phu Khiao, 8 Nov. 1984, *Murata et al. T-41784* (BKF)].

Distribution.— China.

Ecology.— In open, rugged limestone, mixed deciduous forest, scrub forest, alt. 850–2000 m. Flowering and fruiting: October to January. Fruiting: October to January.

Vernacular.— *Thua doi khon yao* (ถั่วดอยขนยาว).

Note.— *Campylotropis sulcata* is distinct in having a multi-angular stem, patent hairs on the peduncle and light to dark purple petals. The species may resemble *C. decora* in some aspects, e.g. multi-angular stems, obovate-elliptic leaflets and the peduncle with patent hairs, however it differs from the latter in having sericeous hairs on the lower surface of leaflets (vs. appressed hairs), without glandular hairs on the peduncle (vs. with patent hairs mixed with glandular hairs), bracts which are more than 2 mm long (vs. less than or equal to 2 mm long) and standard petal without auricles.

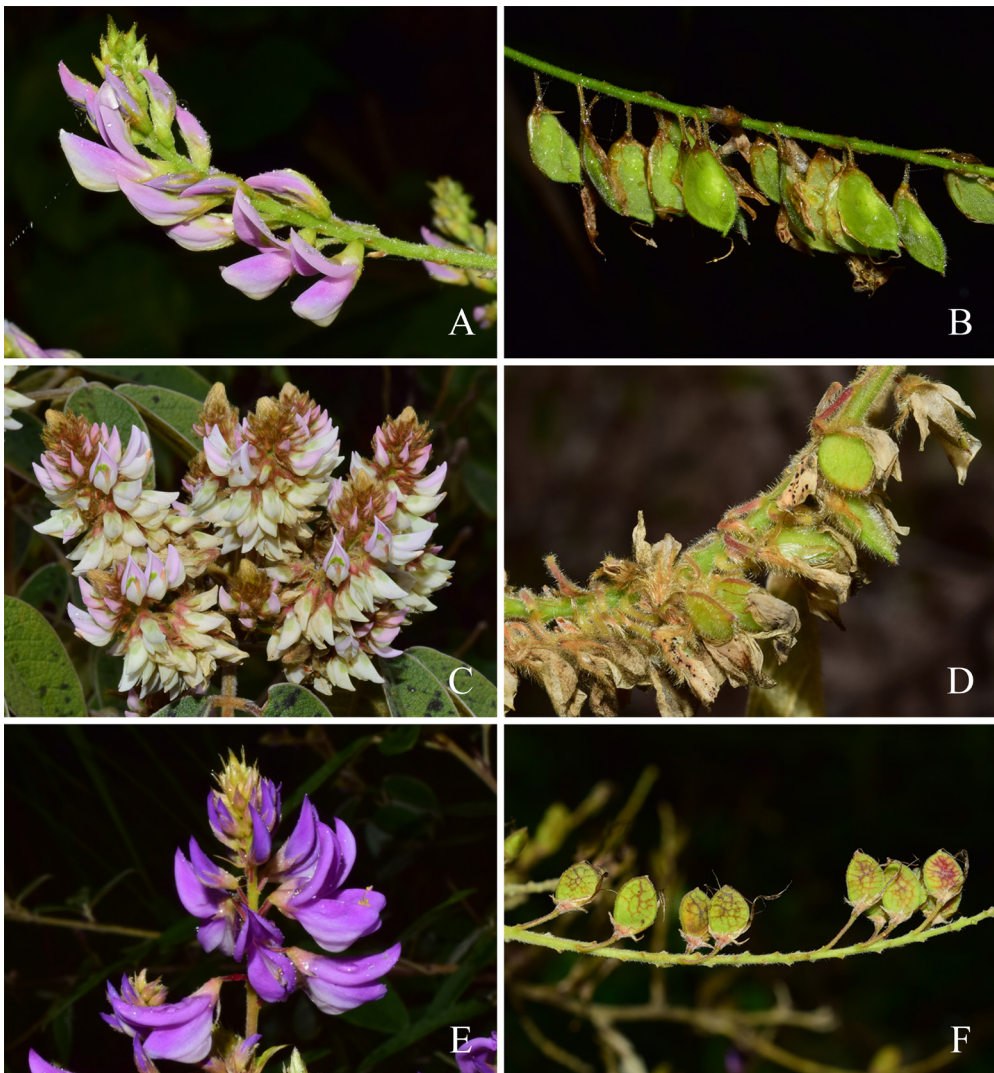


Figure 2. A–B: *Campylotropis parviflora* (Kurz) Schindl.; C–D: *C. pinetorum* (Kurz) Schindl.; E–F: *C. sulcata* Schindl.

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