

## The Genus *Indigofera* L. (Leguminosae) in Thailand

SAWAI MATTAPHA<sup>1</sup> AND PRANOM CHANTARANOTHAI<sup>2\*</sup>

<sup>1</sup>Department of Biology, Faculty of Science, Udon Thani Rajabhat University, Udon Thani 41000, THAILAND

<sup>2</sup>Applied Taxonomic Research Center, Department of Biology, Faculty of Science, Khon Kaen University, Khon Kaen 40002, THAILAND

\* Corresponding author. E-mail: pranom@kku.ac.th

Received: 7 December 2011; Accepted: 28 August 2012

**ABSTRACT.**— An account of the 30 species (32 taxa) of *Indigofera* L. found in Thailand is presented, with keys, descriptions, cited specimens, a line drawing, distribution and photographs. *I. kasinii* Boonyamalik is placed in synonymy of *I. lacei*. *I. laxiflora* is lectotypified.

**KEY WORDS:** *Indigofera*, lectotype, synonym, taxonomy, Thailand

### INTRODUCTION

*Indigofera* L. is the largest genus of the tribe Indigofereae, family Leguminosae-Papilionoideae. The genus contains around 700 species found in the tropics and subtropics of the Old and New World (Polhill & Raven, 1981). The genus was first described by Linnaeus in 1753 based on the three species of *I. tinctoria*, *I. hirsuta* and *I. glabra*. Later, the first one was selected as the lectotype of the genus by Fawcett & Rendle (1920). Three revisions of the genus have recently been published. De Kort & Theijsse (1984) revised the genus for the whole of S.E. Asia, Sanjappa (1985) for Burma (Myanmar) and Thuân et al. (1987) for Indo-China. Some species of the economically important *Indigofera* species are *I. arrecta*, *I. suffruticosa* and *I. tinctoria*, especially the last one is widely used in the traditional manufacture of the dye indigo.

In connection with a revision of the genus for the Flora of Thailand, we found quite a number of unnamed specimens of the genus. The only and latest checklist of the genus for Thailand is that of Craib

(1928). In his treatment, he recognized 22 species. The aim of this paper is to describe and provide keys for the 30 species (32 taxa) found in Thailand.

### MATERIALS AND METHODS

The revision is based on the study of herbarium specimens from the following herbaria: AAU, BCU, BK, BKF, BM, C, CMU, E, K, KKU, L, P, PSU, QBG, SING and TCD (The abbreviations follow Thiers, 2011) plus the Biology Herbarium at Chiang Mai University, which is here abbreviated to BH-CMU. Field observations were carried out throughout Thailand and ecological data and location were also recorded.

### RESULTS AND DISCUSSION

#### Note on Morphology

Habit ranges from prostrate shrubs to large shrubs or treelets. Indumentum is present in all species, consisting of T-shaped hairs (medifixed hairs or biramous hairs) with short or long arms throughout both vegetative and reproductive parts. Some

species, e.g. *I. squalida* and *I. trifoliata*, have both disc-shaped glandular and T-shaped hairs on the lower surface of the leaflets, while other species have both gland-tipped and T-shaped hairs along the stem, twigs and on the surfaces of leaflets or pods, such as *I. colutea* and *I. scabrida*, or they some have both simple and T-shaped hairs along the twigs, such as *I. emmae*.

The leaves are usually compound (trifoliolate, imparipinnate), sometimes simple, such as in *I. linifolia*, *I. nummulariifolia* and *I. squalida*, or are unifoliolate as in *I. caloneura*. Stipules are present and caducous. Stipels are absent in *I. colutea*, *I. dusua* and *I. glabra*, whilst in all *Indigofera* species the rachis is grooved above. The arrangement of leaflets is mostly opposite, subopposite or a very few alternating in the lower or middle part of the rachis in several species. However, a few species are markedly alternate, viz. *I. hendecaphylla* var. *hendecaphylla* and var. *siamensis* and *I. linnaei*.

The inflorescence is racemose in the axils of the leaves and its length varies considerably. A short raceme with a few flowers is found in *I. glabra* and *I. linnaei* whereas a long raceme, about 1 to 2 times as long as the subtending leaf, with very dense and many flowers is found in *I. lacei*, *I. laxiflora* and *I. nigrescence*. The bract subtends a flower in axillary raceme. The bracteole or a bract-like scale attaching to a pedicel is absent. The flower is a papilionaceous form. The calyx is cup-shaped with minute teeth or slightly truncate lobes. The length of the calyx lobes is as long as or shorter than the calyx tube in most species but longer than the calyx tube in *I. caudata*, *I. hirsuta*, *I. linifolia* and *I. trita* subsp. *subulata* var. *scabra*. The corolla is caducous during anthesis and is

variable in colour, e.g. greenish, pink, purplish or reddish, and sometimes the colour of each petal varies slightly within a species. The standard petal is always larger than the others, sessile or with a short claw, and is usually covered by T-shaped hairs on the back but totally glabrous in e.g. *I. atropurpurea*. The wing petals are as long as or shorter than keel petals and always with a ciliate margin. The keel petals of most species have a lateral or a sac-like pocket on its lamina around the middle, except for *I. aralensis*. The stamens are diadelphous (9+1). The anther has an apiculate connective in most species but is lacking in *I. aralensis*. The pods vary in shape, being crested or with four ridges in *I. trifoliata* and *I. trita* subsp. *subulata* var. *scabra*, and falcate or sickle-shaped in *I. nummulariifolia* and *I. suffruticosa*. The size of pods varies considerably in most Thai *Indigofera*. The direction of pods, as fixed on inflorescences, is mostly drooping or spreading but is upright in *I. galegoides*. The dehiscence of pods is found in many species but the indehiscence is found in *I. galegoides*, *I. nummulariifolia*, *I. tinctoria* and *I. zollingeriana*.

## TAXONOMIC TREATMENT

### INDIGOFERA

L., Sp. Pl.: 751. 1753; Benth. & Hook.f., Gen. Pl. 1: 494. 1865; Baker in Hook.f., Fl. Brit. Ind. 2: 92. 1876; Gagnep., Fl. Indo-Chine. 2: 422. 1916; Hutch., Gen. Fl. Pl. 1: 400. 1964; J.B. Gillett, Pl. Trop. E. Afr., Leg. Pap. 1: 212. 1971; Polhill in Polhill & Raven, Adv. Legume Syst.: 289. 1981; de Kort & G. Thijssse, Blumea 30: 89. 1984. Lectotype: *I. tinctoria* L., selected by Fawcett & Rendl, 1920.

Treelike, shrub or prostrate shrub. *T-shaped hairs*: appressed to spreading with subequally or very unequally long arms, sometimes mixed with disc-shaped glandular hairs or gland-tipped hairs. *Leaves*: simple, unifoliolate, trifoliolate to imparipinnately compound, alternate or spiral, stipulate; petioles pulvinate; rachis grooved above. *Leaflets*: opposite, subopposite or alternate, the upper most of leaflets larger than others; midrib grooved above and raised below; lateral veins indistinct, somewhat invisible; stipels usually present, caducous. *Inflorescences*: racemose, axillary; bracts very caducous; bracteoles absent. *Calyx*: cup-shaped with distinct 5 lobes or minute teeth to slightly

truncate. *Corolla*: papilionaceous; standard larger than others, sessile or with a short claw; wing petals as long as or shorter than keel petals, margin always ciliate; keel petals with a lateral pocket or a sac-like pocket, on its lamina around the middle. *Stamens*: diadelphous (9+1), alternately shorter or longer; anthers with an apiculate connective, and tufted hairs at base or apex. *Ovary*: superior with 1-many ovules, glabrous or hairy. *Pods*: cylindrical, globose to subglobose, rarely moniliform or ridged, straight or falcate, dehiscent, rarely indehiscent; endocarp septate between seeds. *Seeds*: globose, elliptic or cubic, shiny.

#### KEY TO THE SPECIES

1. Leaves simple or unifoliolate ..... 2
1. Leaves imparipinnate, with 3 or more leaflets ..... 5
2. Leaves simple (stipellae absent) ..... 3
2. Leaves unifoliolate (stipellae present) ..... **4. *I. caloneura***
3. Ovary with 1-2 ovule(s) ..... 4
3. Ovary with 5-6 ovules ..... **24. *I. squalida***
4. Pods falcate, echinate ..... **20. *I. nummulariifolia***
4. Pods globose or subglobose, not echinate ..... **18. *I. linifolia***
5. Leaves trifoliolate; lower surface of leaflets with disc-shaped glandular hairs ..... **27. *I. trifoliata***
5. Leaves with more than 3 leaflets; if with 3 leaflets, lower surface of leaflets without disc-shaped glandular hairs ..... 6
6. Leaflets distinctly alternate ..... 7
6. Leaflets opposite, subopposite or rarely a few alternating 3-4 pairs in lower or middle part of rachis ..... 8
7. Pods less than 5 mm long ..... **19. *I. linnaei***
7. Pods more than 15 mm long ..... **13. *I. hendecaphylla***
8. Gland-tipped hairs present ..... 9
8. Gland-tipped hairs absent ..... 10
9. Standard obovate, 4-4.5 mm long ..... **7. *I. colutea***
9. Standard orbicular, 6-7 mm long ..... **22. *I. scabrida***
10. Both surfaces of leaflets with slightly symmetric T-shaped hairs or glabrous ..... 11
10. Either lower or upper surface of leaflets with asymmetric T-shaped hairs ..... 25
11. Racemes much longer, *ca.* 1 to 2 times as long as the subtending leaf ..... 12
11. Racemes slightly longer, as long as or less than the subtending leaf ..... 13

## KEY TO THE SPECIES (Continue)

12. Leaflets 9-19; racemes with lax flowers .....	17. <i>I. laxiflora</i>
12. Leaflets 23-35; racemes with dense and numerous flowers .....	16. <i>I. lacei</i>
13. Pods distinctly curved .....	25. <i>I. suffruticosa</i>
13. Pods straight, cylindric .....	14
14. Twigs with T-shaped hairs and simple hairs .....	10. <i>I. emmae</i>
14. Twigs with T-shaped hairs only .....	15
15. Standard totally glabrous .....	3. <i>I. atropurpurea</i>
15. Standard hairy on the back .....	16
16. Leaflets 3-12 mm long .....	17
16. Leaflets 15-50 mm long .....	18
17. Pedicels 3-8 mm long; ovary glabrous .....	8. <i>I. cylindracea</i>
17. Pedicels 2-3 mm long; ovary hairy .....	29. <i>I. wightii</i>
18. Leaflets 7-19 .....	19
18. Leaflets 23-47 .....	24
19. Ovary glabrous .....	20
19. Ovary sparsely or densely hairy .....	22
20. Pods ascending or upright .....	11. <i>I. galeoides</i>
20. Pods spreading .....	21
21. Standard 3-7 mm long .....	15. <i>I. kerrii</i>
21. Standard 10-12 mm long .....	5. <i>I. cassioides</i>
22. Standard 5-6 mm long; leaflets with indistinctly reticulate veins .....	23
22. Standard 8-11.5 mm long; leaflets with distinctly reticulate veins .....	21. <i>I. reticulata</i>
23. Leaflets 13-15; raceme with dense flowers; ovary sparsely hairy .....	2. <i>I. arrecta</i>
23. Leaflets 7-11; raceme with lax flowers; ovary densely hairy .....	26. <i>I. tinctoria</i>
24. Shrub; pods dehiscent .....	23. <i>I. sootepensis</i>
24. Treelet; pods indehiscent .....	30. <i>I. zollingeriana</i>
25. Calyx lobes as long as or shorter than tube .....	26
25. Calyx lobes much longer than tube .....	27
26. Lateral pocket on keel petals present .....	9. <i>I. dosua</i>
26. Lateral pocket on keel petals absent .....	1. <i>I. aralensis</i>
27. Raceme with 2-4 flowers .....	12. <i>I. glabra</i>
27. Raceme with many flowers .....	28
28. Pods rhomboid in cross-section .....	28. <i>I. trita</i> subsp. <i>subulata</i> var. <i>scabra</i>
28. Pods rounded in cross-section .....	29
29. Leaflets 2-4 cm long; corolla pink .....	14. <i>I. hirsuta</i>
29. Leaflets 7-9 cm long; corolla white .....	6. <i>I. caudata</i>

**1. *Indigofera aralensis*** Gagnep., Not. Syst. 3: 197. 1914 & Fl. Indo-Chine 2: 436. 1916; de Kort & G. Thijssse, Blumea 30(1): 109. 1984; Thuân, Dy Phon & Niyomdham, Fl. Cambodge, Laos & Vietnam 23: 85. 1987. Type: Cambodia, Samrong Tong, Mt. Aral, *Pierre* 998 (holotype P!; isotypes K!, L!, SING!, US digital image!). Figs. 1 & 2A.

Shrub to large shrub 1–5 m high; twigs with both asymmetric and slightly symmetric T-shaped hairs. *Leaves*: imparipinnate, alternate; petioles (5–) 7–10 mm long; stipules free or sometimes connate when young, lanceolate, 9–13 by 2–2.5 mm, caducous; rachis up to 30 cm long. *Leaflets*: 7–21 (–75), opposite-subopposite, sometimes alternating at the lower or middle part of rachis; petiolules 1–1.5 mm long; stipels narrowly triangular to linear, 1–1.5 mm long, caducous; lamina oblong, (15–) 35–50 by (5–) 10–16 mm, apex acute, with mucro *ca.* 0.5 mm long, base rounded, margin hairy; upper surface with both asymmetric and slightly symmetric T-shaped hairs; lower surface with asymmetric T-shaped hairs; lateral veins 8–10 pairs. *Racemes*: 4–7 cm long, hairy; bracts triangular, 6–7 by 1 mm. *Pedicels*: 2–3.5 mm long, hairy. *Calyx tube*: 1.5–2 mm long; lobes triangular 1–1.5 by 1–1.5 mm. *Corolla*: pinkish; standard ovate or elliptic to slightly oblong, 17–20 by 8–9 mm, apex acute, base cuneate, margin ciliate, densely hairy on the back, glabrous inside; wings oblong, 10–12 by 2.5–3.5 mm, apex acute, base oblique, margin entire or ciliate at apex; keel 19–20 by 3–3.5 mm, apex acute, base attenuate, margin ciliate, glabrous outside and hairy at apex, glabrous inside; lateral pocket absent. *Staminal tube*: 15–16 mm long; anthers 1–1.5 by 0.5–0.7 mm, without apiculate connective, with tufted hairs at base. *Ovary*: densely hairy, with 12–

14 ovules. *Pods*: cylindric, straight, dehiscent, 4–5 cm, hairy. *Seeds*: oblong, 2.5–3 by 2 mm, yellowish, shiny.

**Thailand**.— NORTH-EASTERN: Sakon Nakhon and Mukdahan; EASTERN: Ubon Ratchathani.

**Distribution**.— Cambodia and Vietnam.

**Ecology**.— Dipterocap forest, 500–700 m. Flowering: March–April.

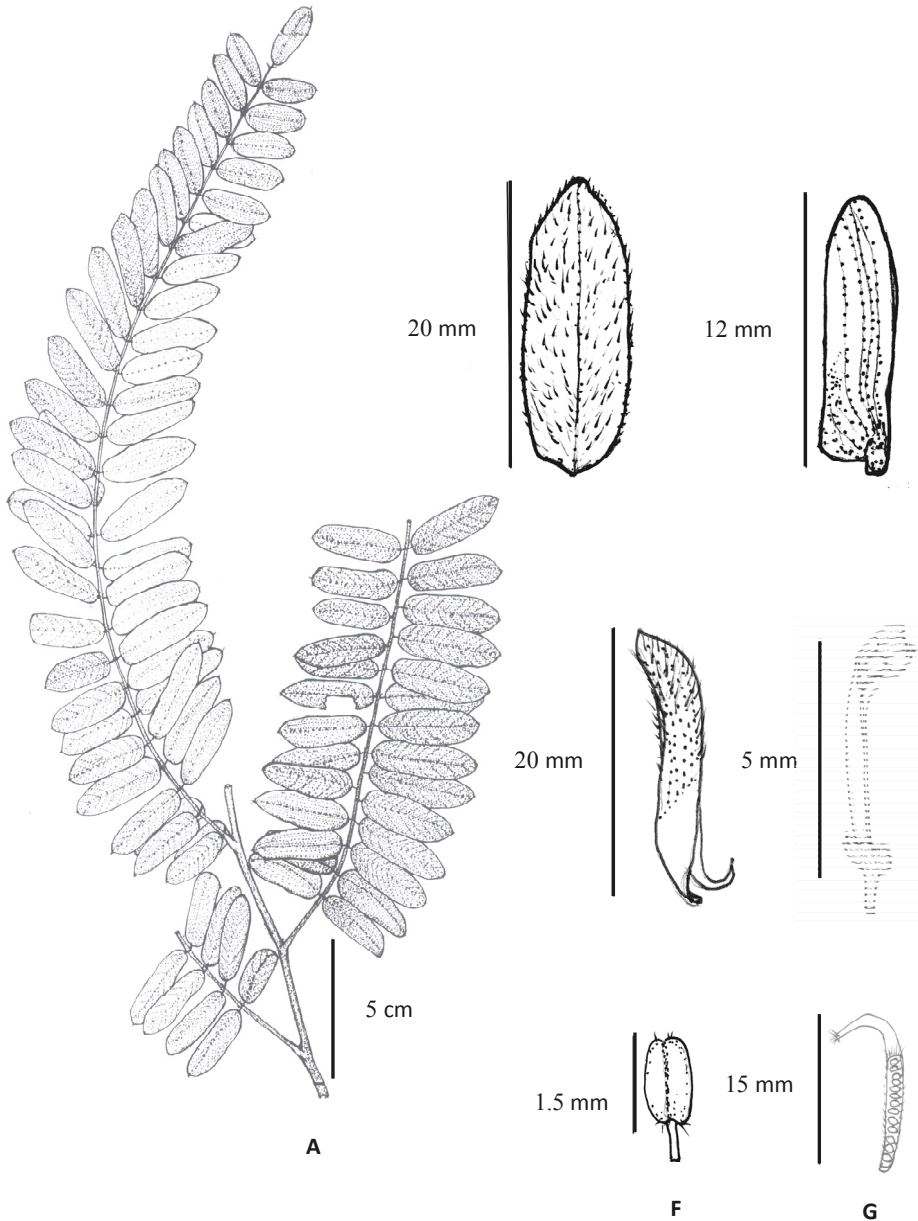
**Vernacular**.— Kram dong (ครามดง), Khram pa bai tang (ครามป่าใบตาง).

**Specimens examined**.— *J. Leeratiwong* 99-51 (KKU), 99-78 (KKU); *P. Pudjaa* 1418 (BKF-2 sheets); *Sawai* 939 (KKU), 941 (KKU), 1022 (KKU), 1023 (KKU) & 1044 (KKU).

**Notes**.— *I. aralensis* differs from the other members of this genus in lacking a lateral pocket on keel petals and also an apiculate connective of stamen.

**2. *Indigofera arrecta*** Hochst. ex A. Rich., Tent. Fl. Abyss. 1: 184. 1847, *non* Benth. ex Harv., 1862; Gillett in Hutch., Fl. W. Trop. Afr. 1, 2: 541. 1958 & Fl. Trop. E. Afr., Legum. 3, Pap. 1: 307. 1971; Backer & Bakh.f., Fl. Java 1: 592. 1964; Thuân, Dy Phon & Niyomdham, Fl. Cambodge, Laos & Vietnam 23: 90. 1987; Schrire, Kew Bull. 53(3): 666. 1998. Type: Ethiopia, Tigray Region, Adoam (Adua), 7 Oct. 1842, *Schimper* 1923b (holotype P; isotypes K!, L!, MO). Fig. 2B.

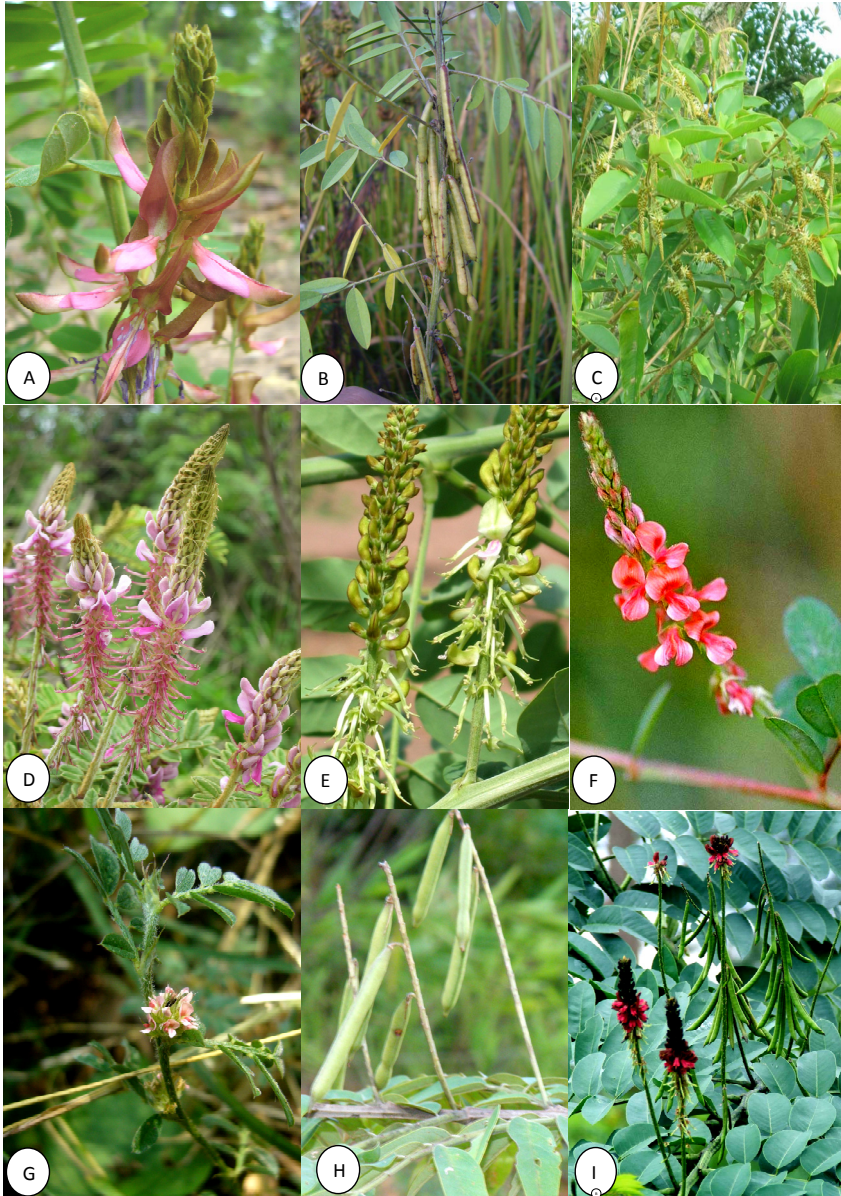
*I. umbonata* Welw. ex. Baker in Oliver, Fl. Trop. Afr. 2: 98. 1871. Type: Angola, Pungo Andongo, between Caghui and Calunga, *Welwitsch* 2038 (holotype LISU). *I. scopa* de Wild. & T. Durand, Ann., Mus. Congo, Sér. 3, Bot. 1: 60. 1901. Type: Zaïre, Lower Katanga, Lusanga, *Dewèvre* 1027b (holotype BR).



**FIGURE 1.** *I. aralensis*: (A) Leaflets in fruit, (B) standard, (C) wing, (D) keel without a lateral pocket, (E) stamens, (F) anther without apiculate, and (G) ovary. Drawn by S. Mattapha.

Shrub 1–2 m high; twigs with sparsely slightly symmetric T-shaped hairs. *Leaves*: imparipinnate, spiral; petioles angular, 2–2.5 mm long; stipules lanceolate, 5–7 mm long; rachis 7–9 cm long. *Leaflets*: 13–15,

opposite; petiolules 1.5–2 mm long, hairy; stipels lanceolate, *ca.* 1 mm long; lamina elliptic to lanceolate, 2–4 by 0.7–1.5 cm, apex acuminate, base cuneate, margin entire; both surfaces with slightly symmetric



**FIGURE 2.** (A) *Indigofera aralensis*, (B) *I. arrecta*, (C) *I. caloneura*, (D) *I. dosua*, (E) *I. galegoides*, (F) *I. hendecaphylla* var. *hendecaphylla*, (G) *I. linnaei*, (H) *I. sootepensis* subsp. *acutifolia*, and (I) *I. zollingeriana*.

T-shaped hairs; lateral veins 4–6 pairs. *Racemes*: 4–7 cm long; bracts lanceolate 1.5–2 mm long, apex acute, margin serrate, densely hairy outside, glabrous inside. *Pedicels*: 1.5–2 mm long. *Calyx tube*: ca. 1 mm long; lobes ca. 1 mm long, densely

hairy outside, glabrous inside. *Corolla*: pinkish; standard elliptic, 5–6 by 3.5–4 mm, apex apiculate, base obtuse, margin ciliate, hairy on the back, glabrous inside; wings oblong, 4–5 by 1 mm, apex obtuse, base auriculate, margin ciliate, sparsely hairy

outside, glabrous inside; claw *ca.* 0.5 mm long; keel 4–5 by 2 mm, apex obtuse, base truncate, margin ciliate, densely hairy outside, glabrous inside; claw *ca.* 0.5 mm long; lateral pocket *ca.* 1 mm long. *Staminal tube*: 3.5–4 mm long, glabrous; filament 0.5–1 mm long; anthers *ca.* 1 mm long, with an apiculate connective. *Ovary*: sparsely hairy, with 7–10 ovules; style 1.5–2 mm long, glabrous. *Pods*: cylindric, straight, drooping, 20–25 mm long, dehiscent. *Seeds*: 1.5–2 by 1.5 mm, glabrous.

**Thailand.**— NORTH-EASTERN: Phetchabun.

**Distribution.**— Vietnam and Sumatra.

**Ecology.**— Open areas. Flowering: May–July.

**Vernacular.**— Kram nauk (ครามนอก).

**Specimens examined.**— *Sawai* 945 (KKU).

**Notes.**— *I. arrecta* is very similar to *I. tinctoria* but differs by having 13–15 leaflets, a shorter staminal tube and inflorescences with dense flowers along the stem. This species is native to Africa and probably escaped from cultivation.

**3. *Indigofera atropurpurea*** Buch.-Ham. ex Horn., Hort. Hafn. Suppl.: 152. 1819; Miq., Fl. Ind. Bat. 1(1): 311. 1855; Ali, Bot. Notis. 3: 573. 1958 & Fl. W. Pakistan 100: 84. 1977; Collett & Army, Fl. Siml. 1: 122. 1980; de Kort & G. Thijssse, Blumea 30(1): 110. 1984; Sanjappa, Reinwardtia 10(2): 215. 1985. Type: cultivated in the Hortus at Copenhagen; *Hornemann* s.n. (C).

*I. atropurpurea* Buch.-Ham. ex Roxb., [Hort. Beng.: 57. 1814, *nom. nud.* ex]; Fl. Ind. 3: 381. 1832. Type: cultivated in Calcutta.

*I. atropurpurea* Buch.-Ham. ex DC., Prodr. 2: 225. 1825; Roxb., Fl. Ind. 3: 381. 1832; Wall., Cat. no. 5463 A, B, C (K-W!).

*I. halmintonii* Grah. in Wall., Cat. no. 5465 (K-W!), *nom. nud.*

Shrub 3–5 m high; twigs with sparsely slightly symmetric T-shaped hairs. *Leaves*: imparipinnate, alternate; stipules narrowly triangular, 4–5 by 0.5–0.6 mm; petioles 3–8 cm, sparsely hairy; rachis 10–14 cm long, sparsely hairy. *Leaflets*: 11–13, opposite or subopposite; petiolules 2.5–3.5 mm long, densely hairy; stipels lanceolate, 2–2.5 mm long; lamina elliptic, 4.5–6.5 (–8) by 1.5–3 cm, apex acute to cordate, with apiculate apex 1–1.5 mm long, base cuneate, margin entire; both surfaces with slightly symmetric T-shaped hairs; lateral veins 7–12 pairs. *Racemes*: (13–) 25–40 cm long, hairy; bracts narrowly triangular, 5–7 by *ca.* 1 mm, hairy. *Pedicels*: 1.5–2 mm long, hairy. *Calyx tube*: 1.5–2 mm long; lobes broadly triangular, *ca.* 1 by 1–1.5 mm, apex acute, margin ciliate, densely hairy outside, glabrous inside. *Corolla*: dark purple to reddish; standard elliptic to orbicular, 9–10 by 7–8 mm, apex obtuse or emarginate, base obtuse, margin entire, totally glabrous both outside and inside; wings narrowly obovate, 7–9 by 2.5–3 mm, apex cuneate, base oblique, margin entire, ciliate at the upper part; keel 8–9 by 2.5–3 mm, apex acute, base attenuate, margin ciliate, sparsely hairy around the base of lateral pocket, glabrous inside; lateral pocket *ca.* 1 mm long. *Staminal tube*: 6–7 mm long; filament 1–1.5 mm long; anthers 0.5–0.7 by *ca.* 0.5 mm, with an apiculate connective, hairy at base. *Ovary*: glabrous, with 8–11 ovules. *Pods*: cylindric, straight, 3.5–5 cm long, glabrescent, dehiscent. *Seeds*: 2.5–3 by *ca.* 1.5 mm.

**Thailand.**— NORTHERN: Tak.

**Distribution.**— Sri Lanka, India, Nepal, Bangladesh, Myanmar, China and Vietnam.

**Ecology.**— Roadsides, 500–1,000 m. Flowering: October–November.



**Vernacular.**— Kham dok muang (ครามดอกม่วง).

**Specimens examined.**— Sawai 955 (KKU).

**Notes.**— *I. atropurpurea* is known only from one collection in Thailand. This species is characterized by having an acute to cordate apex of the leaflets and dark purple to reddish and glabrous flowers.

**4. *Indigofera caloneura*** Kurz, J. Asiat. Soc. Bengal 42(2): 229. 1874; Baker in Hook.f., Fl. Brit. Ind. 2: 93. 1876; Kurz, Forest Fl. Burma 1: 360. 1877; de Kort & G. Thijssse, Blumea 30(1): 112, Fig. 3. 1984; Thuân, Dy Phon & Niyomdham, Fl. Cambodge, Laos & Vietnam 23: 67. 1987; Sanjappa, Reinwardtia 10(2): 218. 1985. Type: Myanmar, Kurz 2124 (K, CAL). Fig. 2C.

*I. oblonga* Craib, Bull. Misc. Inform., Kew 1914: 6. 1914 & Fl. Siam. Enum. 1(3): 379. 1928; Gagnep., Fl. Indo-Chine 2: 440. 1916. Type: Thailand, Doi Nang Keo, *A.F.G. Kerr* 2524 (BM!, E!, K!, TCD!).

Shrub 1–3 m high; twigs with densely asymmetric T-shaped hairs. *Leaves*: unifoliolate, alternate; petioles 1–1.7 cm long, densely hairy; stipules linear to narrowly triangular, 4–8 by 1 mm, apex acuminate, margin entire, densely hairy outside, glabrous inside; petiolules 3–5 mm long; stipels linear to narrowly triangular, 2–6 by 0.5 mm, apex acuminate; lamina ovate to broadly ovate, 11–14 (–25) by 5 – (8–13) cm, apex acute with mucro *ca.* 2 mm long, base obtuse, margin entire; upper surface glabrous; lower surface densely hairy, with asymmetric T-shaped hairs; lateral veins 19–25 pairs. *Racemes*: (8–) 15–20 cm long, densely hairy; bracts triangular, 3–5 mm long, hairy outside, glabrous inside, apex acuminate. *Pedicels*: 1.5–2 mm long, densely hairy. *Calyx tube*: 1.5–2 mm long;

lobes triangular, 0.5–1.5 by 0.5–1 mm, apex acute, margin hairy, hairy outside, glabrous inside. *Corolla*: creamy white; standard broadly ovate to orbicular, 8–10 by 7–8 mm, apex obtuse or retuse, base rounded, margin entire, densely hairy outside, glabrous inside; wings oblong to slightly obovate, 5–6.5 by 2.5–3 mm, apex rounded, base oblique, margin ciliate, densely hairy, glabrous inside; claw 0.5–1 mm long; keel ovate, 8–10 by 2.5–3 mm, base oblique, margin ciliate, densely hairy outside, glabrous inside. *Staminal tube*: 7–8 mm long; anthers *ca.* 0.5 by 0.5 mm, with an apiculate connective and tufted hairs at base. *Ovary*: glabrous, with 10–15 ovules. *Pods*: cylindric, straight, slightly curved at apex, densely hairy, 4–5 cm long, dehiscent. *Seeds*: *ca.* 2 by 1.5 mm, glabrous, shiny.

**Thailand.**— NORTHERN: Mae Hong Son, Chiang Mai, Chiang Rai, Lumphun and Tak; NORTH-EASTERN: Phetchabun and Loei.

**Distribution.**— Myanmar and Vietnam.

**Ecology.**— Open areas, dry dipterocarp, mixed deciduous and open evergreen forests, alt. 1,000–1,100 m. Flowering: May–July.

**Vernacular.**— Mai mue (ไม้มื้อ), Kham pa (ครามป่า)(Chiang Mai); Chui-a-Muea (จุชอาเหมื้อ), Chui-a-mi (จุชอาหมี่), Si-la-no (สีลานอเกื้อ) (Karen-Chiang Mai).

**Specimens examined.**— *Adisai* 785 (BK); *J. Barham* 13 (K); *BjØrland & Schumacher* 337 (C); *Boonchoo* 754 (BCU, BK, K); *K. Bunchuai* 1487 (C); *N. Fukuoka* T-62515 (BKF); *H.B.G. Garrett* 1251 (E, K, TCD); *R. Geesink, D. Phanichaphol & T. Santisuk* 5801 (AAU, BKF, C, E, K); *Kasem* 139 (BK); *A.F.G. Kerr* 5171 (AAU, BK); *Khantchai* 553 (BKF) & 939 (BKF); *F. Konta, C. Phengkklai & S. Khao-Iam* 10857

(BKF); *H. Koyama, T. Santisuk, T. Shimizu, H. Toyokuni & T. Yamara* T-20647 (BKF); *H. Koyama, H. Terao & T. Wongprasert* T-32364 (BKF); *H. Koyama, H. Terao & T. Wongprasert* T-32235 (BKF); *K. Larsen & S.S. Larsen* 34123 (AAU, BKF, K); *K. Larsen, S.S. Larsen, I. Nielsen & T. Santisuk* 31501 (AAU, BKF, K); *K. Larsen, T. Santisuk & E. Warncke* 1912 (AAU, C, E, K), 1956 (AAU), 2044 (AAU) & 2863 (AAU, E); *S.S. Larsen, C. Tange & D. Sookchaloem* 46944 (AAU); *J.F. Maxwell* 91-423 (E, CMU), 91-644 (AAU, E, CMU), 93-572 (BH-CMU), 94-872 (BKF, BH-CMU), 94-984 (BKF, BH-CMU), 95-224 (BKF, BH-CMU), 95-351 (BH-CMU), 95-456 (BKF, BH-CMU), 96-569 (BKF), 96-869 (BH-CMU), 97-1260 (BKF, BH-CMU), 98-561 (BKF, BH-CMU); 98-624 (BKF, BH-CMU), 00-98 (BH-CMU) & 04-545 (CMU); *R. Namwong* s.n. (BKF 3161); *W. Nanakorn & S. Watthana* 9522 (QBG); *I.C. Nielsen, R. Pooma, N. Koonkhunyhod & M. Poopath* 1793 (AAU), 1800 (AAU); *Y. Paisooksantivatana* y1779-86 (BK); *W. Pongamornkul* 580 (QBG); *Prayad* 683 (BK); *Put* 4457 (BM, K); *J. Sadakorn* 228 (BK); *W. Sankamethawee* 165 (BH-CMU) & 404 (BH-CMU); *T. Santisuk* s.n. (BKF 044997), (BKF 69776) & (BKF 085619); *Sawai* 461 (KKU), 476 (KKU) & 1024 (KKU); *Saemyarm* 123 (QBG); *T. Shimizu, H. Toyokuni, H. Koyama, T. Yamara & T. Santisuk* T-20647 (BKF, C) & T-20715 (BKF); *T. Smitinand & F. Floto* 5925 (BKF); *Th. Sørensen, K. Larsen & B. Hansen* 3287 (C); 5213 (BKF, C, K); *BGO. Staff* 14 (QBG), 1399 (QBG), 1405 (QBG), 1923 (QBG), 4766 (QBG), 6610 (QBG) & 9396 (QBG); *S. Sutheesorn* 2975 (BK); *A. Suwantad* s.n. (BKF 4017); *C.F. van Beusekom & C. Phengklai* 1095 (AAU, C, E, K); *J.E. Vidal, Y. Vidal & C. Niyomdham* 6281 (AAU, BKF); *Winit* 1311 (BK, BKF,

K); *T. Wongprasert* s.n. (BKF-2 sheets); *S.N.* (BKF 907) & *S.N.* (BKF 4039).

**Notes.**— *I. caloneura* is a very distinct species that is characterized by its unifoliolate leaf and ovate to broadly ovate leaflets. The species is morphologically close to *I. brunoniana* Grah. ex Wall., which is confined to Myanmar. It is distinguished by the upper surface of leaflet being glabrous and that it has asymmetric T-shaped hairs underneath.

**5. *Indigofera cassioides*** Rottler ex DC., Prodr. 2: 225. 1825; Ali, Bot. Notis. 111(3): 569. 1958; de Kort & G. Thijssse, Blumea 30(1): 113. 1984; Thuân, Dy Phon & Niyomdham, Fl. Cambodge, Laos & Vietnam 23: 86. 1987; Sanjappa, Reinwardtia 10(2): 219. 1985. Type: India, Nilgiry hills, *Leschenault* 31 (holotype G-DC; isotype P).

*I. violacea* Roxb., [Hort Beng.: 57. 1814, *nom. nud. ex*] Fl. Ind. 3: 380. 1832. Type: plant in Botanical garden at Calcutta.

*I. elliptica* Roxb., [Hort Beng.: 57. 1814, *nom. nud. ex*] Fl. Ind. 3: 380. 1832; Kurz, Forest Fl. Burma 1: 360. 1877; Craib, Fl. Siam. Enum. 1(3): 377. 1928. Type: ?Ic. Roxb. (K).

*I. arborea* Roxb., [Hort Beng.: 57. 1814, *nom. nud. ex*] Fl. Ind. 3: 381. 1832. Type: Ic. Roxb. ined. 1626 (K).

*I. puchella* Roxb., [Hort. Beng.: 57. 1814, *nom. nud. ex*] Fl. Ind. 3: 382. 1832; Miq., Fl. Ind. Bat. 1(1): 311. 1855; Baker in Hook.f, Fl. Brit. Ind. 2: 101. 1879; Gagnep., Fl. Indo-Chine 2: 430. 1916; Craib, Fl. Siam. Enum. 1(3): 380. 1928; Ali, Bot. Notis. 3: 570. 1958. Type: Ic. Roxb. ined. 389 (K).

*I. purpurascens* Roxb., [Hort. Beng.: 57. 1814, *nom. nud. ex*] Fl. Ind. 3: 383. 1832. Type: Ic. Roxb. ined. 1899 (K).

Shrub 1–2 m high; twigs sparsely slightly symmetric T-shaped hairs. *Leaves*: imparipinnate, alternate; petioles 20–25 mm long; stipules narrowly triangular, 2–5 by 0.5–1 mm; rachis 10–15 cm long. *Leaflets*: 15–21, opposite–subopposite, sometimes a few alternating at the lower part of rachis; petiolules 3–4 mm long, densely hairy; stipels linear, *ca.* 0.5 mm long; lamina rounded or elliptic, 25–28 by 15–20 mm, apex rounded or emarginate, with mucro *ca.* 0.5 mm long, base rounded, margin entire; both surfaces with slightly symmetric T-shaped hairs; lateral veins 10–11 pairs. *Racemes*: 5–10 cm long, the basal part having sterile bracts; bracts 2–4 by 1.5–2 mm, apex acuminate, margin ciliate, densely hairy outside, glabrous inside. *Pedicels*: 1.5–2 mm long, densely hairy. *Calyx tube*: *ca.* 2 mm long; lobes *ca.* 2 by 1 mm, apex acute, margin ciliate, densely hairy outside, glabrous inside. *Corolla*: pink; standard elliptic, 10–12 by 6–7 mm, apex rounded or emarginate, margin ciliate, glabrous somewhat sparsely hairy on the back, glabrous inside; wings oblong, 10 by 2–3.5 mm, apex rounded, base oblique, margin ciliate; keel 10–11 by 3 mm, base attenuate, margin ciliate; lateral pocket *ca.* 1 mm long. *Staminal tube*: 8–9 mm long; anthers with an apiculate connective. *Ovary*: glabrous, with 11–12 ovules. *Pods*: cylindric, straight, 3–5 cm long, dehiscent. *Seeds*: *ca.* 2 by 1.5 mm, glabrous.

**Thailand.**— NORTHERN: Mae Hong Son, Chiang Mai, Lumphun, Lumpang, Tak and Phitsanulok; NORTH-EASTERN: Loei, Nong Khai, Sakon Nakhon, Nakhon Phanom; SOUTH-WESTERN: Kanchanaburi.

**Distribution.**— India, Myanmar, China, Taiwan and Vietnam.

**Ecology.**— Open savanna, mixed deciduous and disturbed dry dipterocarp forests, alt. 1,000 m. Flowering: June–August.

**Vernacular.**— Siat khrua (เสียดเครือ) (Loei); Khram doi (ครามดอย) (Northern).

**Specimens examined.**— *Adisai* 168 (BK-2 sheets); *D. Bunpheng* 380 (BKF-2 sheets); *P. Chantaranothai*, *D. Middleton*, *J. Parnell* & *D. Simpson* 966 (K, TCD-2 SHEETS); *D.J. Collins* 1239 (K); *K. Gram*, *C. Syrach* & *K. Larsen* 26 (C); *A.F.G. Kerr* 1006 (TCD), 1665 (BM, K, TCD), 5086 (AAU, BK-2 sheets, BM, K), 8501 (BM, BK, C, E, K, TCD) & 10220 (BK, BM, K); *B. Hansen*, *G. Seidenfaden* & *T. Smitinand* 10981 (BKF, C, K) & 11055 (BKF, C, K); *E. Hennipman* 3479 (BKF, C, K); *C.C. Hosseus* 362 (BM, C, E); *A. Inditbahnyahmohn* 19 (BH-CMU); *F. Konta* & *C. Phengkklai* 3991 (BKF); *H. Koyama*, *H. Terao* & *T. Wongprasert* T-31132 (BKF); *M.C. Lakshnakara* 1531 (BK); *J. Leeratiwong* 98-63 (KKU) & 99-37 (KKU); *B. Leltant* & *C. Niyomdham* 42 (AAU); *J.F. Maxwell* 89-299 (BKF, CMU), 89-1126 (CMU), 89-1572 (CMU), 90-83 (E, CMU), 91-1035 (E, BH-CMU), 94-615 (BH-CMU), 97-64 (BKF), 97-1040 (BKF), 99-7 (BH-CMU), 00-95 (BH-CMU) & 04-57 (BH-CMU); *W. Nanakorn* 324 (QBG); *C. Niyomdham* 37A (BK, BKF-2 sheets); *Y. Paisooksantivatana* y1779-86 (BK); *C. Phengkklai* 3190 (BKF-2 sheets); *C. Phengkklai*, *F. Konta* & *S. Khao-Iam* 10857 (BKF); *S. Phengnaren* s.n. (C); *N. Piakkaew* 72 (KKU-5 sheets) & 79 (KKU); *W. Pongamornkul* 584 (QBG); *Prayad* 683 (BK); *P. Sangkhachand* 56 (BK); *W. Saemyarm* 123 (QBG); *Sawai* 1000 (KKU); *T. Smitinand* 8435 (BKF); *Th. Sørensen*, *K. Larsen* & *B. Hansen* 1332 (C-2 sheets, E), 6982 (C); *BGO. Staff* 7 (QBG) & 11 (QBG);

*T. Wongprasert* 16 (BKF-2 sheets, K); *C. Yonebayashi* 93057 (BKF).

**Notes.**– *I. cassioides* is easily recognized by having the sterile bracts at the basal part of racemes. Its leaves are fallen or with a few young leaves on twigs during blooming.

**6. *Indigofera caudata*** Dunn, Gard. Chron. 11: 210. 1902; de Kort & G. Thijssse, *Blumea* 30(1): 143. 1984; Thuân, Dy Phon & Niyomdham, Fl. Cambodge, Laos & Vietnam 23: 73. 1987; K. Larsen & S.S. Larsen, Thai Forest Bull. (Bot.) 23: 43, f. 27. 1995. Type: China, Yunnan, Szemao, *Henry* 12166a, 12166b (K!, US digital image!).

Shrub 1–2 m high, with patent, brownish, simple hairs. *Leaves*: imparipinnate, alternate; petioles 2–5 cm long, hairy; stipules narrowly triangular, 4–6 mm long, apex acuminate, margin hairy, densely hairy outside; rachis 5–10 cm long. *Leaflets*: 7–11, opposite; petiolules 2.5–3 mm long, hairy; stipels lanceolate, 2–4 mm long, hairy; lamina broadly ovate to elliptic, 7.5–9 by 2.5–4 cm, apex acute with mucro 1.5–2 mm long, base cuneate, margin hairy; upper surface glabrous; lower surface glaucous with asymmetric T-shaped hairs; lateral veins 8–10 pairs. *Racemes*: 15–32 cm long; bracts lanceolate, ca. 4 mm long, hairy outside. *Pedicels*: 1–1.5 mm long, hairy. *Calyx tube*: ca. 1 mm long; lobes triangular, 4–5 mm long, apex acute, margin ciliate, densely hairy outside. *Corolla*: white; standard 7–8 by 4–5 mm, apex obtuse or emarginate, margin ciliate, densely hairy outside, glabrous inside; wings 5–6 by 2 mm, apex acute, margin ciliate, hairy outside; keel ca. 8 by 5 mm, margin ciliate, densely hairy outside; lateral pocket 1–1.5 mm long. *Staminal tube*: 6–7 mm long; filament ca. 1.5 mm long; anthers with an

apiculate connective. *Ovary*: densely hairy, with 10–15 ovules. *Pods*: cylindric, straight with curved, mucronate apex, 5–6 mm long, hairy, dehiscent. *Seeds*: cubic, ca. 2.5 by 1.5 mm, glabrous.

**Thailand.**– NORTHERN: Nan.

**Distribution.**– China and Laos.

**Ecology.**– Evergreen forest, alt. 500–800 m. Flowering: June–August.

**Vernacular.**– Khram chao (ครามเช้า).

**Specimens examined.**– *K. Larsen, S.S. Larsen, T. Nørgaard, K. Pharsen, P. Puddjaa & W. Ueachirakan* 44450 (AAU, BKF) & 44487 (AAU, BKF, PSU); *P. Puudjaa* 94 (BKF-2 sheets); *Somkid* 139 (BKF).

**Notes.**– The species is easily recognized by having a calyx lobe that is much longer than the tube and white corolla.

**7. *Indigofera colutea*** (Burm.f.) Merr., Philipp. J. Sc. 19: 355. 1921; Ali, Bot. Notis. 111(3): 548. 1958; Backer & Bakh.f., Fl. Java 1: 590. 1963; de Kort & G. Thijssse, *Blumea* 30(1): 115. 1984; Thuân, Dy Phon & Niyomdham, Fl. Cambodge, Laos & Vietnam 23: 73. 1987; Sanjappa, *Reinwardtia* 10(2): 220. 1985.

*Galega colutea* Burm.f, Fl. Ind.: 172. 1768. Type: India, Plukenet, Phytographia, Herb. Sloane vol. 95: 185 (BM!).

*I. viscosa* Lam., Encyc. Méth., Bot. 3: 247. 1789; Baker in Hook.f., Fl. Brit. Ind. 2: 95. 1876; Kurz, J. Asiat. Soc. Bengal 46: 269. 1876. Type: not located.

Shrub 10–80 cm high, with both asymmetric T-shaped and gland-tipped hairs throughout. *Leaves*: imparipinnate, alternate; petioles 7–13 mm long; with densely gland-tipped hairs; stipules

lanceolate, 3–4 mm long, apex acuminate, hairy; rachis 20–35 mm long. *Leaflets*: 3–13, opposite or subopposite; petiolules *ca.* 0.5 mm long, hairy; stipels absent; lamina elliptic or obovate, rarely oblong; (5–) 7–10 by 3–4.5 mm, apex mucronate, base cuneate to obtuse, margin entire with gland-tipped hairs; upper surface with asymmetric T-shaped hairs; lower surface with both slightly symmetric T-shaped and gland-tipped hairs; lateral veins indistinct, covered with hairs. *Racemes*: 2–6 cm long, hairy; bracts lanceolate to triangular, *ca.* 2 mm long, apex acute, margin entire, hairy outside, glabrous inside. *Pedicels*: 0.5–1 mm long, densely hairy. *Calyx tube*: *ca.* 1 mm long; lobes lanceolate, 2–2.5 by 0.5 mm, apex acuminate, margin ciliate, with gland-tipped hairs outside, glabrous inside. *Corolla*: pink; standard obovate, 4–4.5 by 3–3.5 mm, apex obtuse, base cuneate, margin entire, gland-tipped hairs at middle on the back, glabrous inside; wings spatulate, 3–4.5 by 1–2 mm, glabrous, apex obtuse, base oblique, margin entire, glabrous both sides; keel 4–5 by 2 mm, apex obtuse, base attenuate, margin ciliate, glabrous both sides; lateral pocket *ca.* 0.5 mm long. *Staminal tube*: 2.5–3 mm long; filament *ca.* 0.5 mm long; anthers *ca.* 0.2 by 0.2 mm, with an apiculate connective. *Ovary*: with gland-tipped hairs, 7–12 ovules. *Pods*: cylindric, straight, 14–20 mm long, with gland-tipped hairs, dehiscent. *Seeds*: quadrangular, 1–1.5 by 1 mm, glabrous.

**Thailand.**— NORTHERN: Mae Hong Son and Chiang Mai.

**Distribution.**— Sri Lanka, India, Myanmar and Vietnam.

**Ecology.**— Open areas, roadsides; alt. 400–600 m. Flowering: October–December.

**Vernacular.**— Khram tom (ครามต้อม).

**Specimens examined.**— *K. Larsen & S.S. Larsen* 34283 (AAU, BKF, K); *J.F. Maxwell* 96-1319 (BKF, BH-CMU); *Sawai* 987 (KKU); *S.N.* (BKF).

**Notes.**— *I. colutea* bears a strong superficial resemblance in gland-tipped hairs throughout to *I. scabrida* Dunn. However, *I. colutea* differs by its smaller size of the leaflets and shorter inflorescences. This species is distinguished by having both T-shaped and gland-tipped hairs throughout.

**8. *Indigofera cylindracea*** Grah. ex Baker, Fl. Brit. Ind. 2: 99. 1876; Prain, J. Asiat. Soc. Bengal 66(2): 357. 1897; Craib, Fl. Siam. Enum. 1: 377. 1928; Ali, Bot. Notis. 111(3): 568. 1958. Type: Nepal, 1821, *Wallich* 5482, except the top left specimen (holotype K-W!, isotypes BM!, CAL, K!).

Shrub 30–60 cm high; twigs with asymmetric T-shaped hairs. *Leaves*: imparipinnate, spiral; stipules lanceolate, *ca.* 2 cm long, hairy; petioles 5–7 mm long, hairy. *Leaflets*: 9–17, opposite; petiolules *ca.* 1 mm long, hairy; stipels linear *ca.* 2 mm long, hairy; lamina elliptic, upper most leaf obovate, 10–12 by 4–5 mm, apex obtuse, retuse to emarginated, with apiculate *ca.* 1 mm long, base obtuse, margin hairy; both surfaces with asymmetric T-shaped hairs; lateral veins 4–7 pairs. *Racemes*: 2–10 cm long, hairy; bracts linear 1–2 mm long. *Pedicels* 3–5 mm long, 7–8 mm long in fruit, sparsely hairy. *Calyx tube*: *ca.* 1.5 mm long; lobes triangular, 1–1.5 by *ca.* 0.5 mm, hairy outside, glabrous inside. *Corolla*: pink; standard 5–6 by 4–4.5 mm, hairy outside; wings *ca.* 5.5 by 1 mm; keel *ca.* 5 by 1 mm. *Staminal tube*: 6–7 mm long; filament *ca.* 1 mm long; anthers with an apiculate connective. *Ovary*: glabrous; style *ca.* 2 mm

long. *Pods*: cylindric, straight, glabrescent, dehiscent. *Seeds*: unknown.

**Thailand.**— NORTHERN: Chiang Mai; NORTH-EASTERN: Loei.

**Distribution.**— India, Nepal and Myanmar.

**Ecology.**— Mixed deciduous, pine, bamboo and hill evergreen forests, alt. 1,000–2,100 m. Flowering: September–November.

Vernacular.— Khram doi (ครามดอย)(General).

**Specimens examined.**— *Kasin* 245 (BCU, BK); *A.F.G. Kerr* 5586 (BK); *K. Larsen, T. Santisuk & E. Warncke* 2041 (AAU, C); *G. Murata* T-14910 (C); *Put* s.n. (BK).

**Notes.**— *I. cylindracea* has a distinctive long fruiting pedicel 7–8 mm long. The species has T-shaped hairs only whereas *I. emmae* has both T-shaped and simple hairs.

**9. *Indigofera dosua*** Buch.-Ham. ex D. Don, Prodr. Fl. Nepal.: 244. (Feb.) 1825; Baker in Hook.f., Fl. Brit. Ind. 2: 102. 1876; Gagnep., Fl. Indo-Chine 2: 435. 1916; Ali, Bot. Notis. 111(3): 562. 1958; Collett & Army, Fl. Siml. 1: 123. 1980; de Kort & G. Thijssse, Blumea 30(1): 117. 1984; Thuân, Dy Phon & Niyomdham, Fl. Cambodge, Laos & Vietnam 23: 76. 1987; Sanjappa, Reinwardtia 10(2): 221. 1985. Type: Indonesia, Sumba, *Buchanan-Hamilton* s.n. (BM). Fig. 2D.

*I. tomentosa* Grah. in Wall., Cat. no. 5487, nom. nud. (K-W!).

*I. dosua* var. *tomentosa* Baker in Hook.f., Fl. Brit. Ind. 2: 102. 1876; Gagnep., Fl. Indo-Chine 2: 435. 1916. Type: *Wallich* 5487 (K-W!).

*I. polyphylla* DC., Prodr. 2: 227. 1825. Type: *Wallich* s.n. (G-DC, L microfiche).

*I. stachyodes* Lindl., Bot. Reg. 29: t. 14. 1843; Craib, Fl. Siam. Enum. 1(3): 381. 1928. Type: Plate 14 in Lindl., 1846

Shrub 0.5–3 m high; twigs with densely asymmetric T-shaped hairs. *Leaves*: imparipinnate, alternate; petioles 3–5 mm long, densely hairy; stipules narrowly triangular, 8–11 mm long, apex attenuate, margin ciliate; rachis (6–) 10–16 cm long. *Leaflets*: 24–37, opposite with a few alternating at the lower part of rachis; petiolules 0.5–1 mm long, densely hairy; stipels absent; lamina oblong, 15–18 by 3–5 mm, apex obtuse with mucro ca. 0.5 mm long, base rounded, margin hairy; both surfaces with densely asymmetric T-shaped hairs; lateral veins indistinct. *Racemes*: (9–) 15–25 cm long, densely hairy; bracts triangular, 8–10 by 1.5 mm, apex acuminate, margin ciliate. *Pedicels*: ca. 1.2 mm long, densely hairy. *Calyx tube*: 1–1.5 mm long; lobes triangular, ca. 1 by 1–1.5 mm, apex acute, margin ciliate. *Corolla*: pink; standard broadly ovate, 8–11 by 6–7 mm, apex acute to emarginate, base obtuse, margin ciliate, densely hairy on the back, glabrous inside; wings irregular ligulate, 7–8 by 3–3.5 mm, apex obtuse, base oblique, margin ciliate, hairy outside at base, glabrous inside; keel 7–8 by 3–3.5 mm, base attenuate, margin ciliate, glabrous inside; lateral pocket 1.5–2 mm long. *Staminal tube*: 7–8 mm long; anthers with an apiculate connective. *Ovary*: densely hairy or glabrescent, with 7–9 ovules. *Pods*: cylindric, straight, 2.5–3 cm, densely hairy, dehiscent. *Seeds*: 1.5–2 by 1.5–2, shiny.

**Thailand.**— NORTHERN: Mae Hong Son, Chiang Mai and Lumpang; NORTH-EASTERN: Phetchabun and Loei.

**Distribution.**— India, China, Myanmar and Vietnam.

**Ecology.**— Evergreen and hill evergreen forests, alt. 800–1200 m. Flowering: May–November.

**Vernacular.**— Thua din (ถั่วดิน) (Loei),

Khram pa (ครามป่า) (Chiang Mai).

**Specimens examined.**— *Adisai* 811 (BK); *D. Bunpheng* 380 (BKF); *P. Chantaranothai*, *J. Parnell*, *D. Simpson* & *K. Sridit* 90/164 (KKU); *Ch. Charoenphol*, *K. Larsen* & *E. Warncke* 4619 (AAU, BKF); *N. Fukuoka* T-63803 (BKF); *E. Hennipman* 3276 (K); *Kasin* 49 (BK-2 sheets); *A.F.G. Kerr* 1381 (BM, K, TCD) & 5592 (BK, BM, K); *Khantchai* 1317 (BKF); *F.H.W. Kerr* 91 (TCD); *F. Konta*, *C. Phengklai* & *S. Khao-Iam* 4666 (BKF); *K. Larsen*, *S.S. Larsen*, *T. Nørgaard*, *K. Pharsen*, *P. Puddjaa* & *W. Ueachirakan* 44921 (AAU); *K. Larsen*, *T. Santisuk* & *E. Warncke* 2486 (AAU, E, K); *J.F. Maxwell* 87-1114 (BKF, CMU), 87-1609 (BKF, CMU-P), 92-578 (BH-CMU), 92-841 (CMU), 95-1168 (BKF, CMU), 96-1364 (BH-CMU), 98-697 (BKF, CMU) & 98-840 (BKF, BH-CMU); *G. Murata*, *K. Iwatsuki*, *Ch. Charoenphol* & *C. Phengklai* T-15362 (BKF); *G. Murata*, *K. Iwatsuki* & *C. Phengklai* T-15276 (BKF); *G. Murata* & *C. Phengklai* T-40379 (BKF) & T-42320 (BKF); *G. Murata*, *C. Phengklai*, *S. Mitsuta*, *T. Yahara*, *H. Nagamasu* & *N. Natasan* T-42904 (BKF) & T-43107 (BKF); *D. Nakhon* 221 (BKF) & s.n. (BKF 3128); *I.C. Nielsen*, *R. Pooma*, *N. Khoonkhunhod* & *M. Poopath* 1721 (TCD); *O. Pachmit* 5 (BH-CMU); *C. Phengklai et al.* 6314 (BKF) & 6536 (AAU, BKF); *S. Phusomsaeng et al.* 90 (BKF, K); *R. Pooma* 59 (BKF) & 340 (BKF, BH-CMU); *Put* 381 (BK, K); *T. Rotjanadirok* 1 (BH-CMU); *P. Sangkhachand* 1084 (BK) & 2111 (BK); *T. Santisuk* s.n. (BKF 085583); *Sawai* 460 (KKU), 489 (KKU), 513 (KKU), 980 (KKU) & 1053 (KKU); *T. Shimizu*, *H. Toyokuni*, *H. Koyama*, *T. Yahara* & *T. Santisuk* T-18617 (BKF), T-18622 (BKF),

T-21141 (BKF), T-21189 (BKF) & T-22848 (BKF); *T. Smitinand*, *M.E.D. Poore* & *R.G. Robbins* 7802 (BKF); *Soradej* 14 (BKF); *P. Srisanga*, *C. Trisonthi* & *C. Puff* 1002 (QBG); *Th. Sørensen*, *K. Larsen* & *B. Hansen* 4051 (BKF, E); *T. Smitinand* 1924 (BKF); *BGO. Staff* 7041 (QBG); *P. Suksathan* 1096 (QBG) & 1390 (QBG); *H. Takahashi* & *M.N. Tamura* T-63311 (AAU, BKF); *M.N. Tamura*, *S. Khao-Iam*, *W. Boonsawat* & *J.F. Maxwell* T-60728 (BKF); *C.F. van Beusekom* & *C. Phengklai* 1345 (AAU, K); *S. Watthana* 1288 (QBG); *S.N.* (BK).

**Notes.**—*I. dosua* is characterized by being densely hairy on the twigs, both surfaces of leaflets and rachis of racemes, no stipels, both surfaces of the leaflets with asymmetric T-shaped hairs, very densely flowered racemes, and the calyx lobes are as long as the calyx tube.

**10. *Indigofera emmae*** de Kort & G. Thijssse, *Blumea* 30(1): 130. 1984. Type: Myanmar, Chin hills, *Dickson* 8536, (L digital image!).

Shrub 30–90 cm high; twigs with both slightly T-shaped hairs and simple hairs. *Leaves*: imparipinnate, alternate; petioles 7–12 mm long, hairy; stipules narrowly triangular, (2–) 3–5 by 1.5–2 mm, apex acuminate, margin ciliate; rachis 2–4 cm long, hairy. *Leaflets*: 9–13, opposite; petiolules 1–1.5 mm long, hairy; stipels linear ca. 1 mm long; lamina elliptic (11–) 15–20 by 7–10 mm, apex obtuse, with mucro ca. 1 mm long, base obtuse, margin entire; both surfaces with asymmetric T-shaped hairs; lateral veins indistinct. *Racemes*: 3–5 mm long, hairy; bracts triangular, 1.5–2 mm long, apex acute, margin ciliate. *Pedicels*: 2–3 mm long, hairy. *Calyx tube*: 1.5–2 mm long; lobes

triangular 1.5–2.5 by *ca.* 0.5 mm, apex acute, margin ciliate, densely hairy outside, glabrous inside. *Corolla*: pink, blue or red; standard elliptic to orbicular, 8–9.5 by 6–6.5 mm, apex apiculate, base attenuate, margin ciliate, densely hairy on the back, glabrous inside; wings oblong to ligulate, 7–8 by 1.5–2 mm, apex obtuse, base oblique, margin ciliate, hairy outside, glabrous inside; *ca.* claw 0.5 mm long; keel 7–8 by 2.5–3 mm, apex acute, base attenuate, margin ciliate, hairy outside, glabrous inside; lateral pocket *ca.* 1 mm long. *Staminal tube*: 6–8 mm long; filament 1–1.5 long; anthers *ca.* 1 by 0.5 mm, with an apiculate connective, with tufted hairs at base. *Ovary*: glabrescent, with 7–10 ovules. *Pods*: spreading to ascending. *Seeds*: unknown.

**Thailand.**—NORTHERN: Chiang Mai.

**Distribution.**—India and Myanmar.

**Ecology.**—Open area in pine and hill evergreen forests. Flowering: June–August.

**Vernacular.**—Khram doi (ครามดอย).

**Specimens examined.**—*A.F.G. Kerr* 5586 (BM, K); *Put* 416 (BM); *J. Sasakorn* 558 (BK); *S. Watthana* 1257 (QBG).

**Notes.**—*I. emmae* is similar to *I. reticulata* Franch. in the shape and size of the leaflets but differs by having two types of hairs, simple and T-shaped hairs, throughout the twigs.

**11. *Indigofera galegoides*** DC., Prodr. 2: 225. 1825; Baker in Hook.f., Fl. Brit. Ind. 2: 100. 1876; Kurz, Forest Fl. Burma 1: 360. 1877; Gagnep., Fl. Indo-Chine 2: 432. 1916; Backer & Bakh.f., Fl. Java 1: 592. 1963; de Kort & G. Thijssse, Blumea 30(1): 118. 1984; Thuân, Dy Phon & Niyomdham, Fl. Cambodge, Laos & Vietnam 23: 87. 1987; Sanjappa, Reinwardtia 10(2): 222. 1985; Huang & Ohashi, Fl. Taiwan 3: 296. 1993.

Type: Sri Lanka, 1823, *Leschenault* s.n. (G-DC, L microfiche!). Fig. 2E.

*I. finlaysoniana* Grah. ex Ridl., Fl. Malay Penins. 1: 581. 1922. Type: *Wallich* 5488 (K-W!).

*I. uncinata* Roxb., [Hort Beng.: 57. 1814, *nom. nud.* ex] Fl. Ind. 3: 382. 1832; Craib, Fl. Siam. Enum. 1: 382. 1928. Type: *Ic.* Roxb. ined. 2331 (K).

Shrub 1–2 m high; twigs with densely slightly symmetric T-shaped hairs. *Leaves*: imparipinnate, spiral; petioles 2.5–3 cm long; stipules narrowly triangular, 3–4 by 0.5–1 mm; rachis (5.5–) 6.5–10 cm long. *Leaflets*: (7–) 11–15, opposite; petiolules 2–3 mm long; stipels 0.5–1 mm long; lamina oblong–oblanceolate or broadly elliptic, (2.5–) 4–6 by (1–) 2–2.5 cm, apex acute, with apiculate, base rounded, margin entire or slightly serrate; both surfaces with slightly symmetric T-shaped hairs; lateral veins 8–15 pairs. *Racemes*: (4–) 8–11 cm long; bracts narrowly triangular, 1.5–2 by 1 mm. *Pedicels*: *ca.* 1.5 mm long. *Calyx*: cup-shaped, 1.5–2 mm long; lobes narrowly triangular, 0.5–1 by 0.5–1 mm, hairy outside, glabrous inside. *Corolla*: creamy–white; standard ovate or orbicular, 6.5–8 by 6–7 mm, brownish hairs outside, glabrous inside; wings oblanceolate, 4–5 by 1.5–2 mm, brownish hairs outside, glabrous inside; keel 5–6 by 2.5 mm, margin ciliate, brownish hairs outside, glabrous inside; lateral pocket *ca.* 1 mm long. *Staminal tube*: 5–6 mm long; anthers *ca.* 1 mm long, with an apiculate connective. *Ovary*: glabrous, *ca.* 16 ovules. *Pods*: cylindric, ascending or upright, 50–70 mm long with 2–3 mm diam., indehiscent. *Seeds*: *ca.* 3 by 2 mm, glabrous.

**Thailand.**—NORTHERN: Mae Hong Son, Chiang Mai, Phayao, Tak and Phitsanulok;



NORTH-EASTERN: Phetchabun, Loei, Sakon Nakhon and Khon Kaen; EASTERN: Chaiphum and Nakhon Ratchasima; SOUTH-WESTERN: Kanchanaburi, Phetchaburi and Prachuap Khiri Khan; CENTRAL: Saraburi and Nakhon Nayok; SOUTH-EASTERN: Prachin Buri and Chon Buri; PENINSULAR: Ranong and Surat Thani.

**Distribution.**— Sri Lanka, India, Myanmar, China, Taiwan, Cambodia and Vietnam.

**Ecology.**— Mixed deciduous forest and roadsides, alt. 170-1,000 m. Flowering: May-July.

**Vernacular.**— Cha khram (ชะคราม) (Central); Cha khram (ชำคราม) (Sukhothai).

**Specimens examined.**— *Aasa* 3984 (BKF); *P. Bunma* 8 (K); *P. Chantaranothai*, *J. Parnell*, *D. Simpson* & *K. Sridit* 90/164 (KKU); *C. Chermisrivathana* 778 (BK); *D.J. Collins* 306 (E, K, TCD) & 1022 (BK, K); *L.E. Garcia* 409 (BKF); *R. Geesink*, *T. Hattink* & *C. Phengklai* 6918 (AAU, BKF) & 7593 (AAU, BKF, C, K); *Kasin* 446 (BK); *A.F.G. Kerr* 4403 (AAU, BK, BM, K), 6603 (AAU), 10175 (BK, BM, K, TCD), 12337 (AAU), 12359 (AAU, BK, BM, K) & 14686 (BK, BM, C, K, TCD); *K. Larsen* 8351 (C), 8728 (C-3 sheets), 10091 (AAU, BKF, C); *K. Larsen* & *S.S. Larsen* 10614 (BKF), 34031 (AAU-2 sheets, BKF, K), 34310 (BKF, K) & 34356 (AAU, BKF, C, K); *K. Larsen*, *S.S. Larsen*, *I. Nielsen* & *T. Santisuk* 31539 (AAU, BKF), 31684 (AAU, BKF, C), 31852 (AAU, BKF); *K. Larsen*, *T. Santisuk* & *E. Warncke* 3290 (E); *K. Larsen*, *T. Santisuk* & *E. Warncke* 3333 (AAU, E); *K. Larsen*, *T. Smitinand* & *E. Warncke* 811 (AAU, BKF), 1126 (AAU, BKF) & 3290 (AAU, BKF, C, K); *J. Leeratiwong* 98-35 (KKU); *A. Marcan* 354 (BM); *J.F. Maxwell* 73-294 (BK), 74-832 (AAU, BK), 87-842 (BKF, CMU), 91-925

(E), 92-266 (E, BH-CMU), 93-1026 (BH-CMU), 93-1369 (BH-CMU), 94-615 (BH-CMU), 97-1140 (BH-CMU) & 98-7 (BKF, BH-CMU); *G. Murata* T-17037 (AAU, BKF); *B. Nasongkhla et al.* 249 (BCU); *C. Niyomdham* 5108 (BKF-2 sheets) & 5771 (BKF); *Y. Paisooksantivathana* y1192-82 (BK); *C. Phengklai et al.* 12573 (BKF); *S. Phengnaren* 425 (C, K); *N. Piakkaew* 26 (KKU); *R. Pooma*, *K. Phattarahirankanok*, *S. Sirimongkol* & *M. Poopath* 4223 (BKF); *Pradit* 390 (BK); *D. Praphat* 149 (BKF); *Prayad* 444 (BK); *P. Puudjaja* 1135 (BKF); *Put* 107 (AAU, C, E, BK, BM, K); *J. Sadakorn* 335 (BK); *Sawai* 859 (KKU), 860 (KKU) & 1026 (KKU); *T. Smitinand* & *H. Sleumer* 1350 (BKF, K); *BGO. Staff* 683 (QBG); *S. Towised* 0001 (BCU); *C.F. van Beusekom* & *C. Phengklai* 117 (AAU, E, K); *S.N.* (BKF 99036).

**Notes.**— *Indigofera galegoides* is easily distinguished from the others by the characteristic that its pods are upright when mature and indehiscent.

**12. *Indigofera glabra* L.**, Sp. Pl.: 751. 1753; Ali, Bot. Notis. 111(3): 571. 1958; de Kort & G. Thijssse, Blumea 30(1): 119. 1984; Sanjappa, Reinwardtia 10(2): 223. 1985; Thuân, Dy Phon & Niyomdham Fl. Cambodge, Laos & Vietnam 23: 80. 1987. Type: Sri Lanka, Herb. Hermann vol. 3: 27, no. 274 (BM!).

*I. pentaphylla* Murr., Syst. Veg., ed. 13: 564. 1774; Baker in Hook.f., Fl. Brit. Ind. 2: 95. 1876; Gagnep., Fl. Indo-Chine 2: 440. 1916. Type: *Linnaeus* 923-12 (LINN).

Shrub ca. 30 cm high; twigs ascending, with asymmetric T-shaped hairs. Leaves: imparipinnate, spiral; petioles 2–3 mm long, hairy; stipules ovate, 3–4 by ca. 1 mm, apex acuminate, margin ciliate, hairy outside, glabrous inside; rachis 4–5 mm long.

*Leaflets*: 3–5, opposite or subopposite; petiolules *ca.* 0.5 mm long, hairy; stipels linear *ca.* 0.5 mm long, sometimes absent; lamina orbicular or ovate, 4–8 by 4–5 mm, apex obtuse, margin entire; both surfaces with asymmetric T-shaped hairs; lateral veins indistinct. *Racemes*: 1–1.5 cm long, with 2–4 flowers; bracts triangular, *ca.* 1.5–2 by 0.5–1 mm, apex acute, margin entire, hairy outside, glabrous inside. *Pedicels*: 0.5–1 mm long. *Calyx tube*: *ca.* 0.5 mm long; lobes triangular, *ca.* 1.5 by 1 mm, apex acute, margin entire, hairy outside, glabrous inside. *Corolla*: 2–3 mm long; standard hairy on the back; wings almost glabrous; keel 4–4.5 mm long, with a lateral pocket. *Staminal tube*: *ca.* 3 mm long, glabrous; anthers with an apiculate connective. *Ovary*: glabrous, with 8–10 ovules. *Pods*: cylindric, 1.5–2 cm long, dehiscent. *Seeds*: *ca.* 1 by 1 mm, glabrous.

**Thailand.**— SOUTH-WESTERN; Prachuap Khiri Khan.

**Distribution.**— Sri Lanka, India, Myanmar and Vietnam.

**Ecology.**— Open areas on beach. Flowering: October–November.

**Vernacular.**— Khram kliang (ครามเกลี้ยง).

**Specimens examined.**— *A.F.G. Kerr* 13441 (BK, BM).

**Notes.**— This very distinct species is known only from a single collection in Thailand with very poor flowers in short racemes. The species is easily recognized by having (i) very asymmetric T-shaped hairs on both surfaces of the leaflets, (ii) a few-flowered raceme and (iii) the calyx lobes are longer than the tube.

**13. *Indigofera hendecaphylla*** Jacq., *Collectanea* 2: 358. 1788 & *Icon. Pl. Rar.* 3 (fascicle 3): t. 570. 1789. Type: West

Africa, ‘Guinea’, cult., Vienna, collector unknown (holotype W).

*I. hendecaphylla* sensu Poir. in Lam., *Encycl. Suppl.* 3: 147. 1813, et sensu auct. mult., sphalm. *I. hendecaphylla* Jacq.

*I. spicata* sensu auct. mult., pro parte, *I. spicata* Forssk. sensu stricto excl.

### KEY TO THE VARIETIES

1. Staminal tube 4–5 mm long; pods 20–30 mm long var. **hendecaphylla**

1. Staminal tube 3–3.5 mm long; pods 20–22 mm long var. **siamensis**

var. **hendecaphylla** Fig. 2F.

Prostrate shrub; twigs with densely slightly symmetric T-shaped hairs; petioles 1–3 mm long, densely hairy. *Leaves*: imparipinnate, alternate; stipules lanceolate, 5–10 mm long, apex acuminate, margin entire, sparsely hairy outside, glabrous inside; rachis 1–3.5 mm long. *Leaflets*: 5–11, alternate; petiolules 1–2 mm long, densely hairy; stipels lanceolate, *ca.* 0.5 mm long; lamina obovate–oblong (6–) 15–20 by 4–8 mm, apex obtuse, with apiculate *ca.* 0.5 mm long or emarginate, base obtuse, margin entire; upper surface glabrous; lower surface with densely slightly symmetric T-shaped hairs; lateral veins indistinct. *Racemes*: 3–7 (–13) cm long; bracts ovate to triangular, 1–2 by 0.5 mm, apex acute, margin ciliate, hairy outside, glabrous inside. *Pedicels*: 1–1.5 mm long, densely hairy. *Calyx tube*: *ca.* 1 mm long; lobes 2–3 by 0.5–1 mm, apex acute, margin entire. *Corolla*: pink; standard obovate to orbicular, 5.5–6 by 6–6.5 mm, apex obtuse, base cuneate, margin entire, glabrous outside, except at the upper part, glabrous inside; wings obovate, irregular, 5–6 by 2–3 mm, apex obtuse, base oblique,

margin entire, glabrous both outside and inside; claw *ca.* 0.5 mm long; keel 5–6 by 2 mm, apex obtuse, margin entire, base attenuate, glabrous both outside and inside; lateral pocket *ca.* 1 mm long. *Staminal tube*: 4–5 mm long; filament 0.5–1 mm long; anthers *ca.* 0.5 by 0.5 mm, with an apiculate connective, tufted hairs at base. *Ovary*: densely hairy, with 7–10 ovules. *Pods*: cylindric, 2–3 cm long, dehiscent. *Seeds*: oblong, 2–2.5 mm long with 1.5–2 mm diam., glabrous.

**Thailand.**— NORTHERN: Mae Hong Son, Chiang Mai and Lumpang.

**Distribution.**— India, Sri Lanka, Myanmar, China, Taiwan, Cambodia, Vietnam, Sumatra and Philippines.

**Ecology.**— Open areas along roadsides. Flowering: November–February.

**Vernacular.**— Khram khrua (ครามเครือ), Cha pak chi (เจ้าผักชี) (Chiang Mai).

**Specimens examined.**— *B. Amaranarat* 575 (BH-CMU); *A.F.G. Kerr* 6394 (BK, BM, E, K, TCD); *C. Kertkusol* 18 (CMU); *J.F. Maxwell* 87-1245 (BKF, CMU), 97-782 (BKF, BH-CMU) & 98-1078 (BKF, BH-CMU); *C. Niyomdham, M. Sangtho & B. Sangkachand* 96 (BKF, K); *Noimao* s.n. (SN 210551); *W. Sankamethawee* 305 (BH-CMU); *Sawai* 436 (KKU) 988 (KKU); *S. Srapatet* 58 (BH-CMU); *Y. Paisooksantivatana* y35280 (BK); *C. Phengkai, M. Tamura, C. Niyomdham & B. Sangkachand* 4067 (BKF, K); *W. Pongamornkul* 142 (QBG), 162 (QBG); *BGO. Staff* 4222 (BCU) & 7692 (QBG); *S. Tsugaru* T-61722 (BKF); *M.N. Tamura* T-60269 (BKF).

**Notes.**— This taxon is very distinct in having an alternate leaflet arrangement. Du Puy et al. (1993) separated *I. spicata* and *I. hendecaphylla* from the *I. spicata* complex. The former species is confined to Africa,

Yemen, Madagascar and the Mascarenes whereas the latter is more widespread in the Old World tropics and subtropics to the Pacific Islands.

var. **siamensis** (Hoss.) Gagnep., Fl. Indo-Chine 2: 439. 1916.

*I. siamensis* Hoss., Fedde Rep., Nov. Sp. 4: 291. 1907; Craib, Fl. Siam. Enum. 1: 380. 1928. Type: Thailand, Nakon Sawan, Wang Djoa, *Hosseus* 120 (B†, BM!, K!, P!).

*I. spicata* var. *siamensis* (Hoss.) de Kort & G. Thijssse, Blumea 30(1): 133. 1984.

Prostrate shrub; twigs with slightly symmetric T-shaped hairs. *Leaves*: imparipinnate, alternate; petioles 0.5–4 mm long; stipules triangular, 3–4 by 0.5–1 mm, apex acuminate, margin hairy, keeled with hairs outside, glabrous inside; rachis 8–12 mm long. *Leaflets*: 3–6, alternate; petiolules 0.5–1 mm long; stipels triangular, 0.3–0.5 mm long; lamina mostly linear, somewhat obovate to oblong, 9–15 by 4–6 mm, apex obtuse with apiculate, base cuneate or obtuse, margin entire, upper surface glabrous, lower surface hairy with slightly symmetric T-shaped hairs; lateral veins indistinct. *Racemes*: 3–6 cm long, hairy; bracts ovate, 2.5–3 by *ca.* 1 mm, apex acuminate, margin ciliate, hairy outside, glabrous inside. *Pedicels*: 0.5–1 mm long. *Calyx tube*: *ca.* 1 mm long; lobes 3–4 by *ca.* 1 mm, apex acuminate, margin ciliate at base, hairy outside, glabrous inside. *Corolla*: pink; standard ovate to orbicular, 5–5.5 by 4.5–5 mm, apex retuse, with apiculate, base cuneate, hairy outside, glabrous inside; wings spathulate or obovate, asymmetric, apex obtuse, base oblique, margin entire, glabrous both outside and inside; keel *ca.* 5 by 1 mm; lateral pocket *ca.* 0.5 mm long, margin

ciliate, glabrous both outside and inside. *Staminal tube*: 3–3.5 mm long, glabrous; filament 0.5–1 mm long; anthers *ca.* 0.5 by 0.4 mm, with an apiculate connective. *Ovary*: hairy, with 8–10 ovules; style *ca.* 1 mm long. *Pods*: cylindric, 20–22 mm long, dehiscent. *Seeds*: cubic, *ca.* 1 by 1 mm, glabrous.

**Thailand.**— NORTHERN: Chiang Mai and Nakhon Sawan; NORTH-EASTERN: Sakon Nakhon and Khon Kaen; EASTERN: Chaiyaphum, Nakhon Ratchasima and Buri Ram; SOUTH-WESTERN: Ratchaburi and Phetchaburi.

**Distribution.**— Vietnam.

**Ecology.**— Alt. 30–640 m. Flowering: July–October.

**Vernacular.**— Khram khrua (ครามครือ) (Chiang Mai); Sanonok (โสนนอก) (Nakhon Sawan).

**Specimens examined.**— *A.F.G. Kerr* 3344 (BM, E, K), 5981 (BK, BM, E, K, TCD) & 9029 (BK, BM, E, K, TCD); *K. Larsen, S.S. Larsen, I. Nielsen & T. Santisuk* 31887 (AAU, BKF, K); *J. Leeratiwong* 99–84 (KKU, PSU); *A. Marcan* 1782 (BM); *G. Murata, C. Phengklai, S. Mitsuta, H. Nagamasu & N. Nantasan* T-37435 (BKF); *S. Phengnaren* 673 (BKF); *T. Smitinand & H. Sleumer* 8358 (K); *P. Puudjaa* 1131 (BKF); *Put* 3947 (BK, BM) & 4050 (AAU, BK, BM, E, K); *N. Piakkaew* 31 (KKU-4 sheets); *Sawai* 1017 (KKU).

**Notes.**— The differences between the two varieties, based on the Thai material, are summarized in Table 1.

**14. *Indigofera hirsuta* L., Sp. Pl.: 751. 1753; Baker in Hook.f., Fl. Brit. Ind. 2: 98. 1876; Gagnep., Fl. Indo-Chine 2: 429. 1916; Craib, Fl. Siam. Enum. 1(3): 378. 1928; Backer & Bakh.f., Fl. Java 1: 591. 1963;**

Collett & Army, Fl. Siml. 1: 121. 1980; de Kort & G. Thijssse, Blumea 30(1): 120. 1984; Thuân, Dy Phon & Niyomdham, Fl. Cambodge, Laos & Vietnam 23: 74. 1987; Huang & Ohashi, Fl. Taiwan 3: 296. 1993. Type: Sri Lanka, Herb. Hermann vol. 1: 60, no. 272 (BM!).

*I. ferruginea* Schum. & Thunn., Beskr. Guin. Pl.: 370. 1829. Type: Ghana, Gold coast, *Thonning* 35 (C).

Shrub *ca.* 1 m high; twigs with densely asymmetric T-shaped hairs. *Leaves*: imparipinnate, spiral; petioles 1–2 cm long; stipules lanceolate, 10–17 by 0.5 mm, apex acuminate, margin villous, densely hairy outside, glabrous inside; rachis 2–6 cm long, densely hairy. *Leaflets*: 5–7, opposite; petiolules 2–3 mm long, densely hairy; stipels lanceolate, 1–3 mm long; lamina elliptic or obovate, 2–4 by 1–2 cm, apex rounded or obtuse, with apiculate *ca.* 0.5 mm long, base cuneate, margin villous; both surfaces with asymmetric T-shaped hairs. *Racemes*: 10–25 cm long, densely hairy; bracts lanceolate or narrowly triangular, 3.5–4 mm long, apex acuminate, margin villous, densely hairy outside, glabrous inside. *Pedicels*: 1.5–2 mm long, with asymmetric T-shaped hairs. *Calyx tube*: *ca.* 0.5 mm long; lobes lanceolate, 2.5–3 mm long, apex acuminate, margin villous, densely hairy outside, glabrous inside. *Corolla*: pink; standard orbicular, 4 by 2.5–3 mm, apex obtuse, base cuneate, margin villous, densely hairy on the back, glabrous inside; wings *ca.* 4.5 by 1 mm, apex obtuse, margin ciliate, densely hairy outside at the lower part, glabrous inside; claw *ca.* 0.5 mm long; keel *ca.* 5 by 1.5 mm; lateral pocket *ca.* 1 mm long, apex rounded, base attenuate, margin ciliate, glabrescent outside, glabrous inside. *Staminal tube*: *ca.* 4 mm long; filament 0.5–1 mm long;

TABLE 1. Morphological comparison between var. *hendecaphylla* and var. *siamensis*

Characters	var. <i>hendecaphylla</i>	var. <i>siamensis</i>
Leaflet arrangement	alternate, very rarely opposite to subopposite	alternate
Leaflet no.	5–11	3–6
Leaflet shape	obovate to oblong	mostly linear, obovate to oblong
Lamina size (mm)	(6–) 15–20 by 4–8	9–15 by 4–6
Inflorescence	thick	slender
Flower size (mm)	5.5–6 by 6–6.5	5–5.5 by 4.5–5
Staminal tube length (mm)	4–5	3–3.5
Pod length (mm)	20–30	20–22

anthers 0.3–0.4 mm long, with an apiculate connective. *Ovary*: hairy, with 5–8 ovules. *Pods*: cylindric, straight, 14–16 mm long, densely hairy, dehiscent. *Seeds*: ca. 1 by 1 mm, smooth.

**Thailand.**— NORTHERN: Mae Hong Son, Chiang Mai, Phrae, Tak, Sukhothai and Phitsanulok; NORTH-EASTERN: Sakon Nakhon, Kalasin and Khon Kaen; EASTERN: Chaiyaphum, Nakhon Ratchasima, Buri Ram, Si Sa Ket and Ubon Ratchathani; SOUTH-WESTERN: Phetchaburi and Prachuap Khiri Khan. CENTRAL: Lop Buri, Ang Thong and Krung Thep Maha Nakhon; SOUTH-EASTERN: Prachin Buri and Chon Buri; PENINSULAR: Surat Thani and Songkhla.

**Distribution.**— Sri Lanka, India, Myanmar, China, Taiwan, Cambodia and Vietnam.

**Ecology.**— Open areas, paddy fields, roadsides, ca. 1,000 m. Flowering: November–January.

**Vernacular.**— Khram khon (ครามขน).

**Specimens examined.**— *J. Barham* 1 (K); *T. Boonkird* 51 (BK) & 61 (BK); *B. Boonyah* 27 (BH-CMU); *R.P. Bon* 6156 (BKF); *P. Chantanothai et al.* s.n. (KKU); *A. Chuttananon* 12 (BH-CMU); *H.B.G. Garrett* 1358 (K) & 1359 (K); *C. Glamwaewwong* 35 (QBG); *M. Greijmas*

209 (BKF, BH-CMU); *Jaray* 151 (BK); *Kasem* 234 (BK); *Kasin* 16 (BK-2 sheets); *A.F.G. Kerr* 2138 (BM, C, TCD), 8052 (BK, BM, K), 9342 (BK, BM, K, TCD) & 11078 (AAU, BK, BM, E, K); *K. Kertsawang* 23 (QBG); *K. Larsen* 10622 (AAU, C, E, K); *K. Larsen, S.S. Larsen, A.S. Barfod, W. Nanakorn, W. Ueachirakan & W. Sirirugsa* 40929 (AAU); *K. Larsen, S.S. Larsen, I. Nielsen & T. Santisuk* 32500 (AAU); *K. Larsen, S.S. Larsen, T. NØrgaard, K. Pharsen, P. Puudjaa & W. Ueachirakan* 44194 (AAU); *K. Larsen, T. Smitinand & E. Warncke* 1123 (AAU, BKF), 1319 (AAU); *A. Marcan* 1038 (BM, C) & 1820 (BM); *J.F. Maxwell* 72-332 (BK), 86-886 (BKF, CMU, PSU), 89-1230 (CMU-P), 89-1269 (CMU-P), 90-724 (CMU-P), 94-1089 (BKF, BH-CMU) & 03-222 (BH-CMU); *G. Murata, C. Phengklai, S. Mitsuta, N. Nagamasu & N. Nantasan* T-37280 (BKF), T-37372 (BKF), T-37902 (BKF) & T-37932 (BKF); *G. Murata, K. Iwatsuki & C. Phengklai* T-14810 (AAU, BKF, C); *W. Napeerong* 14 (BH-CMU); *Y. Paisooksantivatana* y504-81 (BK) & y161186 (BK); *M. Panatkool* 226 (BH-CMU); *Parikarn & Prayad* 59 (BK) & 91 (BK); *C. Phengklai & T. Smitinand* 6040 (AAU); *R. Pooma* 314 (BKF, BH-CMU) & 970 (BKF); *R. Pooma, K. Phattarahirankanok,*

*S. Sirimongkol* & *M. Poopath* 4560 (BKF); *Put* 474 (BK, BM, K) & 2607 (BK, BM, C-2 sheets, E, K, TCD); *K. Pyramarn* 1731 (QBG); *Sawai* 1043 (KKU); *T. Shimizu, H. Toyokuni, H. Koyama, T. Yahara* & *C. Niyomdham* T-21676 (BKF); *T. Shimizu, H. Toyokuni, H. Koyama, T. Yahara* & *T. Santisuk* T-18387 (BKF); *P. Sirirugsa* 188 (PSU) & 686 (PSU); *P. Sohtcheunjai* 21 (BH-CMU); *Th. Sørensen, K. Larsen* & *B. Hansen* 4586 (BKF, C, E); *BGO. Staff* 13 (QBG), 1519 (QBG), 1731 (BCU, QBG), 7653 (QBG) & 7746 (QBG); *S. Sutheesorn* 2164 (BK) & 3446 (BK); *Tippan* 316 (BK); *Umpai* 13 (BK); *S. Watthana* 184 (QBG); *R. Wenner* 37 (BH-CMU); *S.N.* (QBG 11759) (QBG).

**Notes.**— *I. hirsuta* appears very distinct from all Thai species in its asymmetric T-shaped hairs, and the calyx lobes are much longer than the tube. This species is widely distributed throughout the country.

**15. *Indigofera kerrii*** de Kort & G. Thijssse, *Blumea* 30(1): 121. 1984. Type: Thailand, Tak, Kaeng Soi, Mae Ping Rapids, *A.F.G. Kerr* 4632 (holotype BM!; isotype BK!).

Shrub 30–60 cm high; twigs with slightly symmetric T-shaped hairs. *Leaves*: imparipinnate, alternate; petioles 6–9 cm long; stipules lanceolate, 2–2.5 mm long. *Leaflets*: 13–19, opposite, turning black when dry; petiolules *ca.* 1 mm long; stipels linear, *ca.* 1 mm long; lamina ovate or elliptic, 1.5–2 by 1–1.5 cm, apex emarginated, with apiculate, base obtuse or rounded, margin entire, both surfaces with slightly symmetric T-shaped hairs; lateral veins indistinct. *Racemes*: 5–10 cm long, silvery when dry; bracts narrowly triangular, 3–4 by *ca.* 0.5 mm. *Pedicels*: 2–2.5 mm long. *Calyx tube*: *ca.* 1 mm long; lobes narrowly triangular, 0.5–1 by 0.5–0.7

mm, hairy outside, glabrous inside. *Corolla*: creamy white, caducous; standard 3.5–4 by 3–3.5 mm, apex obtuse, base attenuate, margin entire, hairy on the back, glabrous inside; wings oblong, 2.5–3 by *ca.* 0.5 mm, apex obtuse, base oblique, margin entire, hairy outside, glabrous inside; keel 4–4.5 by 1–1.5 mm, hairy outside, glabrous inside; lateral pocket *ca.* 0.7 mm long. *Staminal tube*: 3–4 mm long; anthers *ca.* 0.5 by 0.5 mm, with an apiculate connective. *Ovary*: glabrous, with 4–6 ovules; style sparsely hairy. *Pods*: slightly moniliform, with blotches between the seeds, 30–35 mm long, dehiscent. *Seeds*: globose.

**Thailand.**— NORTHERN: Chiang Mai and Tak; NORTH-EASTERN: Phetchabun.

**Distribution.**— Endemic to Thailand.

**Ecology.**— Bamboo forest, alt. 300–500 m. Flowering: June–August.

**Vernacular.**— Khram mo kha (ครามหมอดาร์) (Northern).

**Specimens examined.**— *K. Bunchuai* 1506 (BKF); *N. Fukuoka* T-62080 (BKF); *F. Konta, C. Phengkklai* & *S. Khao-Iam* 4827 (BKF); *Sawai* 448 (KKU), 649 (KKU), 705 (KKU) & 1001 (KKU); *BGO. Staff* 4366 (QBG); *H. Takahahi* T-63038 (BKF).

**Notes.**— *I. kerrii* is distinguished by its leaflets turning black when dry, and a slightly moniliform pod with blotches between the seeds. The racemes are silvery when dry and the flowers are early caducous.

**16. *Indigofera lacei*** Craib, *Bull. Misc. Inform., Kew* 1910: 382. 1910 & *Fl. Siam. Enum.* 1: 378. 1928; de Kort & G. Thijssse, *Blumea* 30(1): 122. 1984. Type: Myanmar, Maymyo Plateau, 1,050 m, *Lace* 4268 (holotype K!).

*Indigofera kasinii* Boonyamalik, Thai Forest Bull. (Bot.) 16: 207. 1986, *synon. nov.* Type: Thailand, Chiang Mai, Ban Pha Mon, alt. 1,900 m., *J.E. Vidal* 5268 (holotype P!); *B. Na Songkhla et al.* 281 (paratype BCU!-2 sheets).

Shrub 1–4 m high; twigs with slightly symmetric and asymmetric T-shaped hairs. *Leaves*: imparipinnate, alternate; petioles 0.5–1.5 mm long, densely hairy; stipules linear, 7–10 mm long; rachis 6–11 long. *Leaflets*: (23–) 31–35, opposite or subopposite; lamina elliptic or narrowly ovate, 10–14 by 6–7 mm, apex apiculate, base obtuse or cuneate, margin entire, both surfaces with slightly symmetric and scattered asymmetric T-shaped hairs; lateral veins 15–17 pairs. *Racemes*: 15–25 cm long; bracts linear, 3–5 mm long. *Pedicels*: 4–5 mm long, hairy. *Calyx tube*: 1.5–2 mm long; lobes triangular, *ca.* 1 by 1 mm, apex acute, margin ciliate, hairy outside, glabrous inside. *Corolla*: dark pink to reddish; standard obovate or elliptic, 9–10.5 by 5–6.5 mm, apex acute, base obtuse, margin entire, hairy on the back, glabrous inside; wings oblong, 8.5–9.5 by 1.5–2.5 mm, apex obtuse or acute, base truncate, margin entire, hairy at base, glabrous inside; keel 8–9.5 by 1.5–2 mm, apex acute, margin ciliate, hairy at the upper part, glabrous inside; lateral pocket *ca.* 1 mm long. *Staminal tube*: 6–7 mm long; filament 1–1.5 mm long; anthers *ca.* 1 by 0.5 mm, with an apiculate connective. *Ovary*: glabrous, with 6–9 ovules; style 3–4 mm long. *Pods*: cylindrical, straight, 2.5–4 cm long, glabrous, dehiscent. *Seeds*: cylindrical, 2.5–3 mm long, glabrous.

**Thailand.**— NORTHERN: Mae Hong Son, Chiang Mai, Chiang Rai, Lumpang.

**Distribution.**— Myanmar and India.

**Ecology.**— Bamboo and hill evergreen forests, alt. 600–1,300 m. Flowering: August–October.

**Vernacular.**— Khram khao (ครามขาว), Khram kasin (ครามกลืน) (Chiang Mai); Ta-klu-mi (ตะกภูมิ) (Karen-Chiang Mai).

**Specimens examined.**— *H. Banziger* 827 (CMU); *K. Bunchuai* 1386 (BKF); *H.B.G. Garrett* 1056 (BKF, E, K, TCD); *A.F.G. Kerr* 3080 (BM, E, K) & 6478 (BK, BM, K, TCD); *F. Konta & C. Phengkklai* 4031 (BKF); *H. Koyama & C. Phengkklai* T-39164 (BKF); *K. Larsen & S.S. Larsen* 34199 (AAU, BKF, K-2 sheets); *J.F. Maxwell* 87-1288 (AAU, BKF, CMU), 90-1349 (CMU), 92-45 (E, BH-CMU), 92-569 (AAU, BH-CMU), 93-1333 (BH-CMU), 95-676 (BKF, BH-CMU), 96-122 (BKF, BH-CMU) & 97-1040 (BH-CMU); *G. Murata, K. Iwatsuki & C. Phengkklai* T-14910 (BKF) & T-14945 (BKF); *W. Pongamornkul* s.n. (QBG); *Put* 4497 (BK, BM, E, K, TCD); *Sawai* 291 (KKU), 462 (KKU), 485 (KKU), 487 (KKU), 982 (KKU) & 1050 (KKU); *Serm* 43 (QBG); *T. Shimizu, H. Toyokuni, H. Koyama, T. Yahara & C. Niyomdham* T-20387 (BKF) & T-21029 (BKF); *T. Smitinand* 12083 (BKF-2 sheets); *B. Na Songkhla et al.* 281 (BCU); *Th. Sørensen, K. Larsen & B. Hansen* 4646 (BKF); *BGO. Staff* 190 (QBG), 1252 (BCU, QBG), 1388 (QBG), 4303 (BCU, QBG), 4522 (QBG) & 4825 (QBG); *S. Sutheesorn* 2310 (BK); *Winit* 795 (BKF, K).

**Notes.**— Pyramarn (1986) distinguished *I. kasinii* from *I. lacei* by the vegetative and pollen morphology but we examined the types of two species and also the material from the type locality of *I. kasinii* and found that they are conspecific. Therefore, *I. kasinii* is placed as a synonym of *I. lacei*. The species is obviously different from the others by the racemes being as long as the

subtending leaf with numerous leaflets, and the seeds are cylindrical and glabrous.

**17. *Indigofera laxiflora*** Craib, Bull. Misc. Inform., Kew 1912: 148. 1912 & Fl. Siam. Enum. 1: 379. 1928.; Gagnep., Fl. Indo-Chine 2: 432. 1916. Type: Thailand, Chiang Mai, Doi Suthep, *A.F.G. Kerr* 1388 (lectotype BM!, selected here; isolectotypes BK!, C!, E!, K!, TCD!).

Shrub 1–2 m high; twigs with slightly symmetric T-shaped hairs. *Leaves*: imparipinnate, spiral; petioles 10–20 mm long, hairy; stipules lanceolate or narrowly triangular, *ca.* 3 by 0.5 mm, apex acuminate, margin ciliate, hairy outside, glabrous inside; rachis 5–13 cm long, hairy. *Leaflets*: 9–15, opposite; petiolules *ca.* 1 mm long; stipels linear *ca.* 1 mm long, hairy; lamina elliptic, 2.5–4 by 1–2 cm, apex acute with mucro *ca.* 1 mm long, base cuneate, margin hairy, both surfaces with slightly symmetric T-shaped hairs; lateral veins 6–8 pairs. *Racemes*: 15–30 cm long, glabrescent. *Pedicels*: 4–5 mm long; bracts triangular, 2–0.5 mm. *Calyx tube*: 1–1.5 mm long; lobes *ca.* 1 by 1 mm, apex acute, margin dentate, densely hairy outside, glabrous inside. *Corolla*: pink; standard 9–10 by 6–7 mm, apex emarginate, base cuneate, margin ciliate, densely hairy on the back, glabrous inside; wings obovate or spatulate, 10 by 3–4 mm, apex obtuse, base attenuate, margin ciliate, densely hairy outside, glabrous inside; keel 10 by 3.5–4 mm, apex obtuse, base attenuate, margin ciliate; lateral pocket *ca.* 1.5 mm long, hairy outside, glabrous inside. *Staminal tube*: 8–10 mm long, glabrescent; filament 0.5–1 mm long; anthers *ca.* 1 by 0.5 mm, with an apiculate connective. *Ovary*: sparsely hairy, with 13–15 ovules; style 3–4 mm long. *Pods*: cylindrical, 3.5–5 cm long, sparsely hairy,

dehiscent. *Seeds*: cubic, 2.5–3 mm long, glabrous.

**Thailand.**– NORTHERN: Mae Hong Son, Chiang Mai and Lumphun; SOUTH-WESTERN: Kanchanaburi.

**Distribution.**– Endemic to Thailand.

**Ecology.**– Bamboo and hill evergreen forests, alt. 600–1,500 m. Flowering: August–October.

**Vernacular.**– Khram dok hang (ครามดอกหาง) (General).

**Specimens examined.**– *L.Q. Bao* 4 (BH-CMU); *K. Bunchuai* 107 (BKF); *H.B.G. Garrett* 739 (AAU, E, K); *A.F.G. Kerr* 1388 (BK, BM, E, K, TCD), 1978 (BK, TCD) & 6479 (BK, E, TCD); *J.F. Maxwell* 88-901 (BKF, CMU), 89-1334 (E, CMU), 93-1002 (BKF, BH-CMU), 95-650 (BKF, BH-CMU) & 97-1305 (BH-CMU); *O. Petrmitr* 114 (BKF), 452 (BKF); *Sawai* 488 (KKU); *T. Shimizu, H. Toyokani, H. Koyama T. Yahara & C. Niyomdham* T-22080 (BKF, BH-CMU); *T. Shimizu, H. Toyokuni, H. Koyama, T. Yahara & T. Santisuk* T-20779 (BKF); *Th. Sørensen, K. Larsen & B. Hansen* 4646 (BKF, C) & 4876 (C, E); *BGO. Staff* 1389 (BCU, QBG), 4502 (QBG) & 4548 (QBG).

**Notes.**– *I. laxiflora* is characterized by having lax flowers on the rachis of the inflorescences, and inflorescences are much longer than their subtending leaves. Craib (1912) described the species based on two collections, *Kerr* 1388 and *Kerr* 1978. The former collection is in good condition and, therefore, is selected as the lectotype.

**18. *Indigofera linifolia*** (L.f.) Retz., Obs. 4: 29. 1786; Baker in Hook.f., Fl. Brit. Ind. 2: 92. 1876; Gagnep., Fl. Indo-Chine 2: 425. 1916; Craib, Fl. Siam. Enum. 1(3): 379. 1928; Backer & Bakh.f., Fl. Java 1: 590.



1963; de Kort & G. Thijssse, *Blumea* 30(1): 123. 1984; Sanjappa, *Reinwardtia* 10(2): 224. 1985; Thuân, Phon & Niyomdham, *Fl. Cambodge, Laos & Vietnam* 23: 71. 1987; Huang & Ohashi, *Fl. Taiwan* 3: 301. 1993.

*Hedysarum linifolium*, L.f., *Suppl.*: 331. 1781. Type: India, *Linnaeus* 921-5 (LINN, K microfice!).

*I. roxburghii*, Tausch, *Flora* 14: 671. 1831. Type: Plate 195 in Roxb., *Pl. Corom.* 2: 1798.

Shrublet *ca.* 30 cm high; twigs with densely sysmetric T-shaped hairs. *Leaves*: simple, alternate; petioles 0.5–1 mm long, densely hairy; stipules lanceolate, 2–3 by 0.5 mm, apex acuminate, margin ciliate, densely hairy outside, glabrous inside; lamina lanceolate, obovate to oblong, 10–25 by 3–5 mm, apex acuminate, with mucro *ca.* 0.5 mm long, base cuneate, margin entire, both surfaces with slightly symmetric T-shaped hairs. *Racemes*: 2–7 mm long, with 3–6 flowers; bracts lanceolate, 0.5–1.5 by *ca.* 0.5, apex acuminate, margin ciliate. *Calyx tube*: 0.5–1 mm long; lobes lanceolate, 2–2.5 by *ca.* 0.5 mm, apex acuminate, margin ciliate, densely hairy outside, glabrous inside. *Corolla*: pink; standard orbicular or elliptic, *ca.* 2.5 by 2 mm, apex with mucro *ca.* 0.5 mm long, base cuneate, margin ciliate, densely hairy on the back, glabrous inside; wings oblong, *ca.* 2 by 0.5 mm, apex obtuse, base cuneate, margin entire, glabrous both outside and inside; keel 2.5–3 by *ca.* 0.5 mm, apex obtuse, margin entire; claw *ca.* 0.5 mm long; lateral pocket 0.1–0.2 mm long. *Staminal tube*: *ca.* 2 mm long; filament *ca.* 0.5 mm long; anthers 0.1–0.2 mm long, with an apiculate connective. *Ovary*: densely hairy, with 1–2 ovule(s); style *ca.* 2 mm long, glabrous. *Pods*: globose or

subglobose, hairy, dehiscent. *Seed(s)*: 1–2, globose, shiny.

**Thailand.**— NORTHERN: Chiang Mai and Tak; NORTH-EASTERN: Loei; SOUTH-WESTERN: Kanchanaburi; CENTRAL: Saraburi; SOUTH-EASTERN: Chanthaburi.

**Distribution.**— Sri Lanka, India, Myanmar, China, Taiwan, Cambodia and Vietnam.

**Ecology.**— Open areas and roadsides, alt. 0–1,100 m. Flowering: August–September.

**Vernacular.**— Khram bai thab (ครามใบแอบ).

**Specimens examined.**— *Boonak* 536 (BCU, BK); *Ch. Charoenphol*, K. Larsen & E. Warncke 4914 (AAU, BKF, C); *C. Chermisrivattana* 800 (BK); *A.F.G. Kerr* 8029 (BK, BM, E, K) & 19772 (AAU, BK, BM, C, E, K); *K. Larsen* 8308 (C, E, K); *J.F. Maxwell* 71-40 (AAU, BK), 72-585 (AAU, BK), 05-725 (BH-CMU) & s.n. (AAU); *O. Petrmitr* 594 (BH-CMU); *C. Phengkklai et al.* 13218 (BK); *K. Ryramarn* 1389 (QBG); *B. Sangkhachand* 1615 (BKF, E); *Sawai* 990 (KKU) & 1027 (KKU); *C.F. van Beusekom*, *R. Geesink*, *C. Phengkklai* & *Wongwan* 4001 (BKF, C).

**Notes.**— Characteristics of *I. linifolia* are; a simple leaf, its leaves vary in shape and size, short racemes, early caducous flowers at anthesis and globose to subglobose pods with 1–2 seed(s).

**19. *Indigofera linnaei*** Ali, *Botis.* 3: 549. 1958; Backer & Bakh.f., *Fl. Java* 1: 591. 1963; de Kort & G. Thijssse, *Blumea* 30(1): 125. 1984; Sanjappa, *Reinwardtia* 10(2): 225. 1985; Thuân, Dy Phon & Niyomdham, *Fl. Cambodge, Laos & Vietnam* 23: 77. 1987. Type: India, Coromandel, Herb. Sloane vol. 95: 186 (holotype BM!). Fig. 2G.

*I. enneaphylla* L., *Mant.* 2: 272. 1771, nom illeg. & *Append.*: 571. 1771; Roxb., *Fl.*

Ind. 3: 376. 1832; Baker in Hook. f., Fl. Brit. Ind. 2: 94. 1876; Gagnep., Fl. Indo-Chine 2: 423. 1916; Craib, Fl. Siam. Enum. 1(3): 378. 1928.

*I. caespitosa* Wight in Wall., Cat. no. 5447 (K-W!), *nom. nud.*

Prostrate shrub; twigs with slightly symmetric and asymmetric T-shaped hairs. *Leaves*: imparipinnate, alternate; petioles 1–3 mm long, densely hairy; stipules triangular, 3–4 by 2 mm, apex aristate, 1–2 mm long; base hairy outside, glabrous inside; rachis (7–) 10–15 mm. *Leaflets*: 5–11, alternate; petiolules 0.5–1 mm long, densely hairy; stipels triangular, *ca.* 0.5 mm long, apex acute, caducous; lamina obovate or elliptic, 10–14 by 3.5–5.5 mm, apex rounded or emarginated, with mucro 0.1–0.2 mm long, margin entire; upper surface with asymmetric T-shaped hairs; lower surface with both sparsely asymmetric and slightly symmetric T-shaped hairs; lateral veins indistinct. *Racemes*: 3–5 mm long, with dense flowers, hairy; bracts broadly ovate, *ca.* 2 by 1.5 mm, apex acute, margin entire, glabrous outside, hairy inside. *Pedicels*: 0.1–0.2 mm long, densely hairy. *Calyx*: cup-shaped, 1–1.5 mm long; lobes lanceolate to triangular, *ca.* 2 by 1 mm, apex acuminate, margin ciliate, densely hairy outside, glabrous inside. *Corolla*: pink; standard obovate, 3–4 by 3 mm, apex rounded or emarginate, base oblique, margin entire, glabrous both outside and inside; claw 0.1–0.2 mm long; wings 3–3.5 by 1 mm, apex rounded, base oblique, margin entire, glabrous both outside and inside; keel 3–3.5 by 1 mm, apex rounded, margin entire or slightly ciliate, glabrous both outside and inside. *Staminal tube*: *ca.* 2 mm long; filament *ca.* 0.1 long; anthers *ca.* 0.1 by 0.1 mm, glabrous with an apiculate connective. *Ovary*: densely hairy, with two ovules.

*Pods*: subglobose, tufted on the rachis of the racemes, 3–3.5 mm long, densely hairy, dehiscent. *Seeds*: 1–1.5 by 1 mm, glabrous, lustrous.

**Thailand.**– NORTHERN: Nakhon Sawan; EASTERN: Chaiphaphum; SOUTH-WESTERN: Kanchanaburi, Phetchaburi and Prachuap Khiri Khan; CENTRAL: Chai Nat; SOUTH-EASTERN: Chon Buri.

**Distribution.**– Sri Lanka, India, Myanmar and Vietnam.

**Ecology.**– Roadsides, alt. 0–400 m. Flowering: October–November.

**Vernacular.**– khram luey (ครามเล็ก).

**Specimens examined.**– *Adisai* 986 (BK); *C. Phengkklai, M. Tamura, C. Niyomdham & B. Sangkachand* 4249 (BKF, K); *H.M.B. Burkill* 1253 (BKF, K); *A.F.G. Kerr* 4266 (BK, C, E, K, TCD); *K. Larsen & S.S. Larsen* 33726 (AAU, K) & 34037 (AAU, BKF); *K. Larsen, S.S. Larsen, I. Nielsen & T. Santisuk* 31721 (AAU, BKF, K); *J.F. Maxwell* 92-426 (BH-CMU, E) & 05-724 (BH-CMU); *Y. Paisooksantivatana* y771-82 (BK) & y1358-83 (BK); *Sawai* 989 (KKU); *S. Sutheesorn* 3170 (BK); *C.F. van Beusekom, R. Geesink, C. Phengkklai & B. Wongwan* 3999 (BKF, C, K); *S.N.* 8029 (BK 210516).

**Notes.**– *I. linnaei* is distinct in the leaflet arrangement being markedly alternate. The racemes are very short with very dense flowers and the pods are tufted on the rachis of racemes with subglobose shape.

**20. *Indigofera nummulariifolia*** [nummularrifolia] (L.) Liver ex Alston, Trim. Handb. Fl. Ceylon 6, Suppl.: 72. 1931; de Kort & G. Thijssse, Blumea 30(1): 128. 1984; Thuân, Phon & Niyomdham, Fl. Cambodge, Laos & Vietnam 23: 70. 1987.

*Hedysarum nummulariifolium* L., Sp. Pl.: 746. 1753. Type: Sri Lanka, Herb. Hermann vol. 3: 10, no. 282 (holotype BM!).

*I. echinata* Willd., Sp. Pl. 3: 1222. 1804; Roxb., Fl. Ind, 3: 370. 1832; Baker in Hook.f., Fl. Brit. Ind. 2: 92. 1876; Gagnep., Fl. Indo-Chine 2: 425. 1916. Type: India, Herb. Willdenow, collector unknown *S.N.* (B, L microfiche).

Shrub 20–30 cm high; twigs with asymmetric T-shaped hairs. *Leaves*: simple, alternate; petioles 0.5–1 mm long, hairy; stipules lanceolate or narrowly triangular, *ca.* 1.5 by 0.5 mm, apex acuminate, margin ciliate, hairy outside, glabrous inside; lamina orbicular, 15–17 by 11–12 mm, apex obtuse, with apiculate *ca.* 0.5 mm long, base obtuse; both surfaces with slightly symmetric T-shaped hairs; lateral veins 4–5 pairs. *Racemes*: 2–4 cm long, hairy; bracts lanceolate or narrowly triangular, *ca.* 3 mm long. *Pedicels*: 0.5–1 mm long. *Corolla*: standard ovate, *ca.* 3 by 1.5 mm, hairy on the back, glabrous inside; wings oblong; keel obovate, *ca.* 3.5 mm long. *Staminal tube*: 2–2.5 mm long; anthers with an apiculate connective. *Ovary*: hairy, with 1–2 ovule(s). *Pods*: falcate, echinate with curved-tipped spines, indehiscent. *Seeds*: elliptic, *ca.* 3 by 1 mm, glabrous.

**Thailand.**— SOUTH-EASTERN: Chanthaburi and Trat; PENINSULAR: Ranong.

**Distribution.**— Sri Lanka, India, Taiwan, Cambodia and Vietnam.

**Ecology.**— Scattered on the beach. Flowering: October–November.

**Vernacular.**— Khram nam (ครามหนาม).

**Specimens examined.**— *Adisai* 857 (BK-2 sheets); *C. Chermisirivatana* 381 (BK) & 381A (BK); *J.F. Maxwell* 72-497 (AAU,

BK); *Y. Paisooksantivatana* y45980 (BK, KKU); *C. Phengkklai et al.* 42-497 (BKF).

**Notes.**— The distinctive taxonomic features of this species are; a simple leaf, 1 (–2)-ovuled ovary and falcate pods with curved-tipped spines.

**21. *Indigofera reticulata*** Franch., Pl. Delav.: 153. 1889; Craib, Fl. Siam. Enum. 1: 380. 1928. Type: China, Yunnan, 18 August 1885, *Delavay* 1964 (K!, P).

Shrub *ca.* 30 cm high; twigs with slightly symmetric T-shaped hairs. *Leaves*: imparipinnate, spiral; petioles 5–10 mm long; stipules linear, 3–4 by *ca.* 0.5 mm, apex acuminate, hairy outside, glabrous inside. *Leaflets*: 7–15, opposite; petiolules *ca.* 1 mm long; stipels linear, 2–3 mm long; lamina elliptic to slightly oblong or ovate, 15–20 by 7–15 mm, apex acute, rarely retuse or cordate, with mucro *ca.* 1 mm long, base obtuse or emarginate, both surfaces hairy; venation distinctly reticulate; lateral veins 5–8-paired. *Racemes*: 3–5 cm long, hairy; bracts triangular, 1.5–2 by *ca.* 0.5 mm. *Pedicels*: 2–2.5 mm long, hairy. *Calyx tube*: 2–2.5 mm long; lobes triangular, 1.5–2 by *ca.* 0.5 mm, apex obtuse, margin ciliate, hairy outside, glabrous inside. *Corolla*: purplish to pinkish; standard 8–10 by 5 mm, apex obtuse, margin ciliate, hairy on the back, glabrous inside; wings oblong, *ca.* 10 by 1.5 mm, apex obtuse, margin ciliate, hairy outside, glabrous inside; keel 8–10 by *ca.* 2 mm, margin ciliate, hairy outside, glabrous inside; lateral pocket *ca.* 1 mm long. *Staminal tube*: 4–5 mm long; anthers with an apiculate connective. *Ovary*: hairy, with 8–12 ovules. *Pods*: cylindrical, straight, 2–3 cm long, sparsely hairy, dehiscent. *Seeds*: cylindrical, straight, 2–2.5 mm long, glabrous.

**Thailand.**— NORTHERN: Chiang Mai and Tak; NORTH-EASTERN: Loei; EASTERN: Chaiyaphum.

**Distribution.**— China.

**Ecology.**— Hills evergreen forest, alt. 700–1,475 m. Flowering: May–July.

**Vernacular.**— Khram (คราม).

**Specimens examined.**— *N. Fukuoka*, *G. Murata* & *C. Phengklai* 2035 (AAU, C, K); *A.F.G. Kerr* 6218 (BK, BM-2 sheets, C, K, TCD); *K. Larsen*, *T. Santisuk* & *E. Warncke* 31420 (BKF); *J.F. Maxwell* 95-681 (BKF, BH-CMU); *G. Murata*, *N. Fukuoka* & *C. Phengklai* T-16806 (AAU, BKF); *C. Phengklai et al.* 6261 (BKF-2 sheets); *C. Phengklai*, *M. Tamura*, *C. Niyomdham* & *B. Sangkhachand* 4168 (BKF); *T. Santisuk* 590 (BKF-2 sheets) & 5834 (BKF); *Sawai* 429 (KKU), 490 (KKU) & 984 (KKU); *Sirivatana* 245 (K); *T. Smitinand* 11470 (BKF).

**Notes.**— *I. reticulata* shows very close affinity with *I. emmae*, from which it differs mainly in its undershrub, more reticulate veins, purplish to pinkish flowers and cylindrical seeds.

**22. *Indigofera scabrida*** Dunn, *J. Linn. Soc., Bot.* 35(245): 487. 1903; Craib, *Notes Roy. Bot. Gard. Edinburgh* 8: 64. 1913; Sanjappa, *Reinwardtia* 10(2): 233. 1985. Type: China, Yunnan, in exposed grassy parts of Mengtze mountains, alt. 1,380–1,800 m, *A. Henry* 9686a, 9686b (K!; MO).

Shrub 1–2 m high with both asymmetric T-shaped hairs and gland-tipped hairs throughout. *Leaves:* imparipinnate, alternate; petioles 1.5–2 cm long, hairy; stipules lanceolate, 2–3 by *ca.* 0.5 mm, apex acute, margin hairy, hairy outside, glabrous inside; rachis 7–9 cm long, hairy. *Leaflets:* 11–13, opposite; petiolules 0.5–1 mm long,

hairy; stipels linear, *ca.* 1.5 by 0.1–0.2 mm; rachis 7–9 cm long, hairy; lamina elliptic, (1.5–) 2.5–3 by 1–1.7 cm, apex acute, with mucro *ca.* 2 mm long, base obtuse or cuneate, margin with gland-tipped hairs, both surfaces with asymmetric T-shaped hairs; lateral veins 4–6 pairs, with gland-tipped hairs along midrib. *Racemes:* 7–10 cm long, with gland-tipped hairs; bracts lanceolate, 2–3 mm long, apex acuminate, margin with glandular hairs. *Pedicels:* 1–2 mm long. *Calyx tube:* *ca.* 0.5 by 1 mm; lobes triangular, 1.5–2 by *ca.* 1 mm, apex acute, margin with gland-tipped hairs, hairy outside, glabrous inside. *Corolla:* standard orbicular, 6–7 by 4.5–5 mm, apex emarginate, with minutely mucro or rounded, base obtuse, margin hairy, hairy on the back, glabrous inside; wings 6–7 by *ca.* 1.5 mm, glabrous both outside and inside; keel *ca.* 7 by 2 mm, margin ciliate, hairy outside, glabrous inside; lateral pocket 0.5–1 mm long. *Staminal tube:* 5–6 mm long; filament 0.5–1 mm long; anthers *ca.* 0.5 mm long, with an apiculate connective, tufted hairs at base. *Ovary:* glabrescent, with *ca.* 10 ovules; style 2–2.5 mm long, glabrous. *Pods:* cylindrical, straight, 3–4 cm long, dehiscent. *Seeds:* unknown.

**Thailand.**— NORTHERN: Chiang Mai.

**Distribution.**— Myanmar and China.

**Ecology.**— Open areas.

**Vernacular.**— Khram sak (ครามซาก).

**Specimens examined.**— *R. Pooma* 524 (BKF); *W. Sankamethawee* 237 (BH-CMU).

**Notes.**— There are two collections from Chiang Mai, *Sankamethawee* 237 (BH-CMU) was determined as *I. colutea*, and *Pooma* 524 (BKF) as unknown. We examined and found that both collections are unequivocally *I. scabrida*. Therefore, this species is the first record for Thailand.

The species is apparently similar to *I. colutea* in having gland-tipped hairs throughout but differs by having broader leaflets, longer inflorescence and orbicular standard.

**23. *Indigofera sootepensis*** Craib, Bull. Misc. Inform., Kew. 1911: 35. 1911 & Fl. Siam. Enum. 1: 381. 1928; Gagnep., Fl. Indo-Chine 2: 433. 1916; de Kort & G. Thijssse, Blumea 30(1): 131. 1984; Thuân, Dy Phon & Niyomdham, Fl. Cambodge, Laos & Vietnam 23: 85. 1987. Type: Thailand, Chiang Mai, Doi Suthep, *A.F.G. Kerr* 684 (holotype K!, isotypes BM!, E!, TCD!).

#### KEY TO THE SUBSPECIES

1. Leaflets 35–43, 1.5–2.5 by 1–1.5 cm  
 .....subsp. **sootepensis**  
 1. Leaflets 15–19, 3–5 by 1.5–1.7 cm  
 .....subsp. **acutifolia**  
 subsp. **sootepensis**

Shrub 1–2 m high; twigs with slightly symmetric T-shaped hairs. *Leaves*: imparipinnate, alternate; petioles 2–10 mm long, densely hairy; stipules 5–8 mm long; rachis 27–33 mm long. *Leaflets*: 35–43, opposite to subopposite; petiolules 1–3 mm long; stipels lanceolate; lamina oblong, ovate or oblanceolate, 1.5–2.5 by 1–1.5 cm, apex rounded, with mucro *ca.* 1 mm long, base acute or rounded, margin entire; both surfaces with slightly symmetric T-shaped hairs; lateral veins 10–13 pairs. *Racemes*: 7–20 cm long; bracts triangular or lanceolate, 2–3 by 0.5 mm, apex acute, margin hairy, densely hairy outside, glabrous inside. *Pedicels*: 1.5–2 mm long. *Calyx tube*: 1.5–1 by 2.5 mm, dark brown outside; lobes triangular or subtruncate, hairy outside,

glabrous inside. *Corolla*: pink to reddish; standard ovate, 11–14 by 5–6 mm, margin ciliate, densely hairy on the back, glabrous inside; wings 13–15 by 2.5–3 mm, margin ciliate, hairy outside, glabrous inside; keel 13–15 by 2–3 mm, margin ciliate; lateral pocket *ca.* 1 mm long, densely hairy outside, glabrous inside. *Staminal tube*: 10–12 mm long; filament 1–1.5 mm long; anthers with an apiculate connective. *Ovary*: densely hairy, with 8–10 ovules; style glabrous. *Pods*: cylindric, straight, 40–50 mm long, hairy, dehiscent. *Seeds*: oblong, 2.5–3 by 2–2.5 mm, glabrous.

**Thailand.**— NORTHERN: Mae Hong Son, Chiang Mai, Chiang Rai, Lumphun, Lumpang, Sukhothai and Phitsanulok; EASTERN: Chaiyaphum, Si Sa Ket and Ubon Ratchathani; SOUTH-WESTERN: Kanchanaburi, Ratchaburi and Phetchaburi; CENTRAL: Saraburi; SOUTH-EASTERN: Prachin Buri.

**Distribution.**— Laos, Cambodia and Vietnam.

**Ecology.**— Dry dipterocarp forest, *ca.* 1,000 m. Flowering: July–September.

**Vernacular.**— Khram pa (ครามป่า) (Central, Northern), Pai sema (ไผ่เสมา) (Northern), Pai sa mao (ไผ่สะเมา) (Lampang).

**Specimens examined.**— *BS.* & *KB.* 1166 (BKF-2 sheets); *P. Chantaranothai et al.* 338 (KKU) & 1351 (KKU); *C. Hambanand* 257 (BKF); *A.F.G. Kerr* 684 (BM, E, K, TCD) & 9024 (BK, BM, E, TCD); *F.H.W. Kerr* 152 (TCD); *KK* 914 (BCU); *K. Larsen, S.S. Larsen, I. Nielsen & T. Santisuk* 31581 (AAU, BKF), 31617 (AAU, BKF) & 31842 (AAU); *K. Larsen, T. Santisuk & E. Warncke* 826 (AAU, C, K-2 sheets) & 2685 (AAU, C, E, K); *J. Leeratiwong* 98-21 (KKU), 99-65 (KKU) & 99-160 (KKU); *A. Marcan* 929 (BM, C) & 2757 (BM); *J.F.*

*Maxwell* 76-588 (AAU, BK), 87-683 (BKF, CMU) 94-947 (BKF, BH-CMU) & 96-1364 (BKF); *C. Niyomdham* 5579 (BKF-2 sheets) & 6511 (BKF-2 sheets); *Noi Mao* (BK 210545); *C. Phengkklai et al.* 3891 (BKF); *S. Phusomsaeng* 276 (BKF-2 sheets); *N. Piakkaew* 13 (KKU-2 sheets), 21 (KKU), 22 (KKU) & 25 (KKU); *R. Pooma, W.J.J.O. de Wilde, B.E.E. Duyfies, V. Chamchumroom, K. Phattarahirankanok* 2431 (BKF-2 sheets); *Sawai* 231 (KKU), 244 (KKU), 899 (KKU) & s.n. (KKU); *Soradej* 14A (BKF); *Th. Sorensen, K. Larsen & B. Hansen* 4359 (C), 4399 (C) & 4444 (C); *K. Sridith* 43 (BCU); *BGO. Staff* 115 (BCU, QBG) & 3953 (QBG); *S. Suddee* 67 (BCU); *S. Sutheesorn* 4122 (BK); *O. Thaihong et al.* 271 (BCU); *P. Trisarasri* s.n. (BCU); *M. van de Bult* 444 (BKF, BH-CMU); *Winit* 359 (BK) & 562 (BKF); *S.N.* (BKF-97946).

**Notes.**— *I. sootepensis* subsp. *sootepensis* is distinguished by the numerous leaflets, the lamina varies in shape from oblong, ovate to oblanceolate and the apex of leaflets is rounded.

subsp. **acutifolia** de Kort & G. Thijssse, *Blumea* 30 (1): 131. 1984. Type: Thailand, Mae Hong Son, Khun Yuam, *K. Larsen* 34072 (holotype K!; isotypes AAU!, P). Fig. 2H.

Shrub *ca.* 2 m high; twigs with slightly symmetric T-shaped hairs. *Leaves:* imparipinnate, alternate; petioles 5–10 mm long; stipels linear, *ca.* 5–0.5 mm long, apex acuminate. *Leaflets:* 15–19, opposite or subopposite; stipels linear *ca.* 1 mm long, hairy; lamina ovate to lanceolate, 3–5 by 1.5–1.7 cm, apex acute, with mucro *ca.* 0.5 mm long, base obtuse, margin hairy, both surfaces hairy, glaucous; lateral veins 8–12 pairs. *Racemes:* (9–) 19–24 cm long; bracts caducous. *Pedicels:* 3–5 mm long. *Calyx*

*tube:* 1–1.5 mm long; lobes deltoid or truncate, *ca.* 0.5 by 1.5–2 mm, hairy outside, glabrous inside. *Corolla:* pink to reddish; standard 10–11.5 by 5–6 mm, hairy on the back, glabrous inside; wings 7–9 by 1.5–2 mm; keel 10–12 by 2–3.5, margin ciliate, hairy outside at the upper part, glabrous inside; lateral pocket *ca.* 0.5 mm long. *Staminal tube:* 10–12 mm long; filament *ca.* 2 mm long; anthers with an apiculate connective, tufted hairs at apex and base. *Ovary:* densely hairy. *Pods:* cylindric, straight, 25–30 mm long, densely hairy, dehiscent. *Seeds:* glabrous.

**Thailand.**— NORTHERN: Mae Hong Son.

**Distribution.**— Endemic to Thailand.

**Ecology.**— Dry dipterocarp and pine forests, alt. 600–700 m. Flowering: July–September.

**Vernacular.**— Khram bai laem (ครามใบแหลม).

**Specimens examined.**— *R. Geesink, D. Phanichapol & T. Santisuk* 5951 (BKF, E); *K. Larsen* 34072 (AAU, K, P); *K. Larsen & S.S. Larsen* 34295 (C); *T. Santisuk* 6675 (BKF); *T. Smitinand* 4569 (K); *BGO. Staff* 4706 (QBG).

**Notes.**— Subsp. *acutifolia* is obviously different from the typical subspecies by having a lower number of the leaflets, acute apex of the leaflets, and its lamina broader than that taxon. The distribution of subsp. *acutifolia* is restricted to Khun Yuam district, Mae Hong Son while the typical subspecies is widely spread throughout the country.

**24. *Indigofera squalida*** Prain, *J. Asiat. Soc. Bengal* 66(2): 355. 1897; Gagnep., *Fl. Indo-Chine* 2: 439. 1916; Craib, *Fl. Siam. Enum.* 1(3): 381. 1928; de Kort & G. Thijssse, *Blumea* 30(1): 134. 1984; Sanjappa, *Reinwardtia* 10(2): 235. 1985; Thuân, Dy Phon & Niyomdham, *Fl. Cambodge, Laos*

& Vietnam 23: 68. 1987. Type: Myanmar, Shan hills, *King's collection* 442 (CAL, K!).

*I. polygaloides* Gagnep., Not. Syst. 3: 198. 1914 & Fl. Indo-Chine 2: 426. 1916. Types: Vietnam, Bien Hoa, *Pierre* s.n. (P); Laos, *M. Massie* s.n. (P) & *C. Thorel* s.n. (P).

*I. changensis* Craib, Bull. Misc. Inform., Kew 1922: 171. 1922 & Fl. Siam. Enum. 1(3): 377. 1928. Type: Thailand, Mae Chang, *A.F.G. Kerr* 3607 (BM!, K!).

Shrub 30–60 cm high, with storage roots. *Leaves*: simple, spiral, scabrous; petioles 2–7 mm long; stipules lanceolate, caducous; lamina obovate, elliptic or lanceolate, (3–) 5–9 by 0.9–1.5 cm, apex apiculate, base attenuate, margin entire; upper surface with slightly symmetric T-shaped hairs; lower surface with both slightly symmetric T-shaped and whitish disc-shaped glandular hairs; midrib raised above; lateral veins 6–10 pairs, indistinct. *Racemes*: 0.5–2 cm long; bracts triangular or lanceolate, 1–1.5 by 1 mm, apex acute, margin ciliate, densely hairy outside, glabrous inside. *Pedicels*: 9–10 mm long. *Calyx*: cup-shaped, 9–10 mm long; lobes 1–2 by 0.5 mm, densely hairy outside, glabrous inside. *Corolla*: reddish to pinkish; standard elliptic, 2.5–4 by 1–2 mm, apex acute, margin entire, hairy on the back, glabrous inside; wings oblong, 2.5–3.5 by 0.8–1 mm, apex rounded, base oblique, or truncate, margin rounded, hairy outside, glabrous inside; keel 3–5 by 1–1.5 mm, apex rounded, base oblique, margin ciliate; lateral pocket *ca.* 1 mm long. *Staminal tube*: 5–6 mm long; filament 0.5–4 mm long; anthers *ca.* 0.5 by 0.2 mm, with an apiculate connective. *Ovary*: densely hairy, with 4–6 ovules; style 2.5–3 mm long. *Pods*: cylindric, straight, 10–15 mm long, densely hairy, dehiscent. *Seeds*: oblong, 1.5–2 mm long, glabrous.

**Thailand.**— NORTHERN: Mae Hong Son, Chiang Mai, Lumphun, Lumpang, Tak, Phitsanulok and Kamphaeng Phet; EASTERN: Chaiphaphum; SOUTH-WESTERN: Uthai Thani and Kanchanaburi. **Distribution.**— Myanmar, China, Cambodia and Vietnam.

**Ecology.**— Dry dipterocarp forest, *ca.* 1,300 m. Flowering: May–October.

**Vernacular.**— Ba hing men (ป่าหิ้งแมน) (Northern).

**Specimens examined.**— *Amnat* 53 (BKF); *E.F. Anderson* 6003 (CMU); *A. Bunyarataphand* s.n. (BKF); *P. Chantaranothai et al.* 1390 (KKU); *N. Fukuoka, G. Murata & C. Phengklai* T-16801 (K, L) & T-16808 (L); *R. Geesink, T. Hattink & C. Phengklai* 7071 (AAU, BKF, C); *R. Geesink, D. Phanichapol & T. Santisuk* 2005 (AAU, L) & 5825 (L); *H. Jawsii* 987 (BH-CMU); *Kasem* 211 (BK), 352 (BK) & 587 (BK); *A.F.G. Kerr* 658 (BM, K, TCD), 3607 (K) & 6106 (BK, BM, E, K, TCD); *K. Larsen, S.S. Larsen, I. Nielsen & T. Santisuk* 31403 (AAU, L), 31404 (AAU) & 31405 (AAU, L); *K. Larsen, T. Santisuk & E. Warncke* 2005 (BKF, E), 2279 (AAU, BKF, C, E, L); *K. Larsen, T. Smitinand & E. Warncke* 652 (AAU, BKF, C); *J. Leeratiwong* 99-67 (KKU); *J.F. Maxwell* 87-871 (CMU); 89-1045 (E, L, CMU), 90-627 (E, CMU), 91-596 (E, L, CMU) & 93-548 (BH-CMU); *C. Phengklai et al.* 6570 (BKF), 12325 (BKF); *N. Piakkaew* 12 (KKU-2 sheets) & 14 (KKU-2 sheets); *R. Pooma* 327 (BKF-2 sheets, BH-CMU); *Pradit* 385 (BK) & 638 (BK); *Prayad* 326 (BK); *Put* 148 (AAU, BK, BM, K) & 3980 (BK, BM, C, E, K, TCD); *W. Sankamethawee* 188 (BH-CMU) & 296 (BH-CMU); *Sawai* 218 (KKU), 292 (KKU) & 706 (KKU); *T. Smitinand* 4567 (K, L) & 8570 (BKF); *Th. Sørensen, K.*

Larsen & B. Hansen 3374 (C) & 3813 (BKF, C); C.F. van Beusekom, R. Geesink, C. Phengkklai & E. Warncke 3329 (L); C.F. van Beusekom, R. Geesink, C. Phengkklai & B. Wongwan 3824 (BKF, C, K); C.F. van Beusekom & C. Phengkklai 1070 (C, E, K, L), 1071 (AAU-2 sheets) & 1124 (C, E, K, L); Wichian 339 (BK, K); Winit 358 (BK, K).

**Notes.**— *I. squalida* is characterized by a simple leaf which is scabrous and its lower surface with whitish disc-shape glandular hairs throughout.

**25. *Indigofera suffruticosa*** Mill., Gard. Dict. ed. 8, no. 2. 1768; Craib, Fl. Siam. Enum. 1(3): 381. 1928; Backer & Bakh.f., Fl. Java 1: 592. 1963; de Kort & G. Thijssse, Blumea 30(1): 134. 1984; Sanjappa, Reinwardtia 10(2): 237. 1985; Thuân, Dy Phon & Niyomdham, Fl. Cambodge, Laos & Vietnam 23: 81. 1987; Huang & Ohashi, Fl. Taiwan 3: 305. 1993. Type: India, Miller s.n., Herb. Sloane, Jan. 1742 (BM!).

*I. anil* L., Mant 2: 272. 1771; Gagnep., Fl. Indo-Chine 2: 427. 1916. Type: *Linnaeus* 923-20 (LINN).

Shrub 1–2 m high; twigs with slightly symmetric T-shaped hairs. *Leaves*: imparipinnate, alternate; petioles 1.3–2.2 cm long, densely hairy; stipules narrowly triangular, 3–6 by 0.5–1 mm, apex acuminate, margin entire, hairy outside, glabrous inside; rachis 4.5–7 cm long. *Leaflets*: 7–15, opposite; petiolules 1.5–2.5 mm long; stipels lanceolate, hairy or glabrous; lamina obovate or elliptic, 20–30 by 7–10 mm, apex rounded or acute, with mucro *ca.* 0.5 mm long, base attenuate, margin entire; both surfaces with slightly symmetric T-shaped hairs; midrib grooved above; lateral veins indistinct. *Racemes*: 5–9 cm long, hairy; bracts lanceolate, *ca.* 2 by 2

mm, apex acuminate, margin ciliate, hairy outside, glabrous inside. *Pedicels*: *ca.* 1 mm long, densely hairy. *Calyx*: cup-shaped, *ca.* 1 mm long; lobes triangular to lanceolate, 1–1.5 by 0.5–1 mm, apex acute, margin entire. *Corolla*: pink; standard obovate, 4–5 by 3–4 mm, apex rounded, margin ciliate, base cuneate, densely hairy on the back, glabrous inside; wings oblong, 4–4.5 by 1–1.5 mm, sparsely hairy outside, glabrous inside; claw *ca.* 0.5 mm long; keel *ca.* 5 by 2 mm, apex rounded, base attenuate, margin ciliate, hairy outside, glabrous inside; lateral pocket *ca.* 0.5 mm long. *Staminal tube*: 2.5–3 mm long; filament 0.5–1 mm long; anthers *ca.* 0.5 by 0.5 mm, with an apiculate connective. *Ovary*: densely hairy, with 5–6 ovules; style glabrous. *Pods*: falcate or sickle-shaped, 10–15 mm long, dehiscent. *Seeds*: cubic, 1.5–2 by 1.5–2 mm, glabrous, lustrous.

**Thailand.**— NORTHERN: Mae Hong Son, Chiang Mai and Nan; EASTERN: Ubon Ratchathani; CENTRAL: Krung Thep Maha Nakhon; PENINSULAR: Surat Thani and Songkhla.

**Distribution.**— India, China, Taiwan, Cambodia and Vietnam.

**Ecology.**— Roadsides, waste grounds, grasslands, alt. 0–1,800 m. Flowering: October–December.

**Vernacular.**— Khram phi (ครามตี), Khram thuean (ครามเถื่อน) (Chiang Mai); Khram yai (ครามใหญ่) (Ubon Ratchathani).

**Specimens examined.**— *A.F.G. Kerr* 1004 (BM), 3325 (BM, K) 6495 (BK, BM, C, E, K, TCD), 8358 (BM, K) & 16095 (BK, BM, K); *J.F. Maxwell* 84-294 (BKF); *K. Larsen & S.S. Larsen* 34306 (AAU, BKF, L); *M. Nantasorn* 16 (BCU); *Prayad* 418 (BK); *Sawai* 765 (KKU), 956 (KKU) & 1045 (KKU); *S. Suthesorn* 1107 (BK); *P.*



*Trisarasri* 354 (BCU) & 493 (BCU); *Vacharapong* 50 (BK); *S.N.* (BK 210566).

**Notes.**— *I. suffruticosa* resembles *I. tinctoria* but it differs by having falcate or sickle-shaped and dehiscent pods.

**26. *Indigofera tinctoria* L., Sp. Pl.: 751. 1753; Roxb., Fl. Ind. 3: 379. 1832; Baker in Hook.f., Fl. Brit. Ind. 2: 99. 1876; Gagnep., Fl. Indo-Chine 2: 428. 1916; Craib, Fl. Siam. Enum. 1(3): 382. 1928; Backer & Bakh.f., Fl. Java 1: 592. 1963; de Kort & G. Thijssse, Blumea 30(1): 136. 1984; Sanjappa, Reinwardtia 10(2): 238. 1985; Thuân, Dy Phon & Niyomdham, Fl. Cambodge, Laos & Vietnam 23: 89. 1987; Huang & Ohashi, Fl. Taiwan 3: 310. 1993. Type: Sri Lanka, Herb. Hermann vol. 3: 20, no. 273 (lectotype BM!, selected by Fawcett & Rendle, 1920).**

*I. indica* Lam., Encyc. 3: 245. 1789. Type: Herb. Lamarck (P).

*I. cinerascens* DC., Prodr. 2: 226. 1825. Type: Herb. de Candolle II-226-47 (G-DC, L).

Shrub 1–1.5 m high; twigs with slightly symmetric T-shaped hairs. *Leaves:* imparipinnate, alternate; petioles 2–3 cm long hairy; stipules lanceolate, 1–1.5 mm long, densely hairy outside, glabrous inside; rachis (1.5–) 4–7 cm long. *Leaflets:* 7–11, opposite; petiolules 1.5–2 mm long; densely hairy; stipels *ca.* 0.5 mm long, lanceolate; lamina elliptic to narrowly obovate, 2.5–3 by 1.4–1.8 cm, apex rounded, with mucro *ca.* 0.5 mm long, base cuneate, margin entire; upper surface glabrous; lower surface with slightly symmetric T-shaped hairs; venation indistinctly reticulate; lateral veins 6–8 pairs; midrib grooved above. *Racemes:* 1.5–8 cm long, hairy, with lax flowers; bracts triangular, *ca.* 1 by 0.5 mm, apex acute, margin ciliate, densely hairy outside,

glabrous inside. *Pedicels:* 1.5–2 mm long, densely hairy. *Calyx:* cup-shaped, *ca.* 1 mm long; lobes triangular, *ca.* 1 by 0.5 mm, apex acute, margin ciliate, densely hairy outside, glabrous inside. *Corolla:* pink; standard elliptic or narrowly obovate, 5–6 by 4 mm, apex acute, base cuneate, margin ciliate, densely hairy on the back, glabrous inside; wings obovate, irregular, 4.5–5 by 2 mm, apex rounded, margin entire or sparsely ciliate, base oblique, sparsely hairy outside at base, glabrous inside; claw *ca.* 0.5 mm long; keel 5–5.5 by 2 mm, apex rounded, base attenuate, margin ciliate, densely hairy outside, glabrous inside. *Staminal tube:* 4–4.5 mm long; filament 0.5–1 mm long; anthers *ca.* 0.5 by 0.5 mm, with an apiculate connective, glabrous. *Ovary:* densely hairy, with 9–10 ovules; style glabrous. *Pods:* cylindrical, 20–28 mm long, sparsely hairy, indehiscent. *Seeds:* oblong, *ca.* 0.5 mm long, *ca.* 0.5 diam., glabrous, lustrous.

**Thailand.**— NORTH-EASTERN: Khon Kaen; EASTERN: Chaiyaphum, Amnat Charoen and Ubon Ratchathani; SOUTH-WESTERN: Kanchanaburi and Prachuap Khiri Khan.

**Distribution.**— Sri Lanka, India, Pakistan, China, Taiwan, Japan, Vietnam, Indonesia and Philippines.

**Ecology.**— Cultivated. Flowering: all year round.

**Vernacular.**— Khram (คราม), Kham (กาม).

**Specimens examined.**— *A.F.G. Kerr* 8363 (BM, K), 10445 (BK, BM, E, K, TCD), 16149 (BK, BM, K, TCD); *K. Larsen & S.S. Larsen* 33657 (AAU, BKF, K, L); *J.F. Maxwell* 93-1026 (L); *Sawai* 1020 (KKU); *Tippan* 241 (BK).

**Notes.**— *I. tinctoria* is rather similar to *I. arrecta* but it can be separated by having lax

racemes and the ovary has much denser hairs. The pod of *I. tinctoria* is also longer and thicker than *I. arrecta*.

**27. *Indigofera trifoliata*** L., Cent. Pl. 2: 29. 1756; DC., Prodr. 2: 223. 1825; Baker in Hook.f., Fl. Brit. Ind. 2: 96. 1876; Gagnep., Fl. Indo-Chine 2: 437. 1916; Craib, Fl. Siam. Enum. 1(3): 382. 1928; Backer & Bakh.f., Fl. Java 1: 590. 1963; Collett & Army, Fl. Siml. 1: 121. 1980; de Kort & G. Thijssse, Blumea 30(1): 137. 1984; Sanjappa, Reinwardtia 10(2): 239. 1985; Thuân, Dy Phon & Niyomdham, Fl. Cambodge, Laos & Vietnam 23: 72. 1987; Huang & Ohashi, Fl. Taiwan 3: 310. 1993. Type: India, *Linnaeus* 923-3 (LINN microfiche!).

*I. trifoliata* var. *brachycarpa* Gagnep., Fl. Indo-Chine 2: 438. 1916. Type: Vietnam, *C. Thorel* s.n. (P).

*I. canescens* Grah. in Wall., Cat. no. 5448A, B (K-W!), *nom. nud.*

*I. congesta* Grah. in Wall., Cat. no. 5471A, B (K-W!), *nom. nud.*

*I. adenophylla* Grah. in Wall., Cat. no. 5462A, B (K-W!), *nom. nud.*

Shrub 15–30 cm high; twigs with symmetric T-shaped hairs. *Leaves*: trifoliolate, spiral; petioles 10–15 mm long; stipules *ca.* 2 by 0.5 mm, hairy outside, glabrous inside; rachis *ca.* 1 mm long. *Leaflets*: 3; petiolules 1–1.5 mm long, hairy; stipels linear, *ca.* 1 mm long; lamina obovate or lanceolate, 20–28 by 5–8 mm, apex rounded with mucro *ca.* 0.5 mm long, base cuneate, margin entire; upper surface with slightly symmetric T-shaped hairs; lower surface with reddish or dark orange disc-shaped glandular hairs; lateral veins 3–5 pairs. *Racemes*: 4–5 mm long, hairy; bracts triangular, *ca.* 1.5 by 0.5 mm, apex acute, margin entire, hairy outside, glabrous inside. *Pedicels*: *ca.* 0.5 mm long. *Calyx*

*tube*: *ca.* 1 mm long; lobes triangular *ca.* 2 by 0.5 mm, apex acuminate, margin entire, hairy outside, glabrous inside. *Corolla*: pink; standard orbicular, *ca.* 5 by 2.5 mm, apex rounded, margin entire, disc-shaped glandular hairs on the back, glabrous inside; wings *ca.* 5 by 2.5 mm; keel 4–5 by 2 mm, margin ciliate, hairy outside, glabrous inside. *Staminal tube*: *ca.* 4 mm long, glabrous; filament *ca.* 0.5 mm long; anthers with an apiculate connective. *Ovary*: densely hairy; style 1.5–2 mm long. *Pods*: *ca.* 2 cm long, with thickened margins, hairy, dehiscent. *Seeds*: unknown.

**Thailand.**— EASTERN: Nakhon Ratchasima; CENTRAL: Lop Buri, Saraburi and Krung Thep Maha Nakhon; SOUTH-EASTERN: Sa Kaeo; PENINSULAR: Phuket.

**Distribution.**— India, Myanmar, China, Taiwan, Vietnam, Indonesia and Philippines.

**Ecology.**— Open areas, alt. 300–500 m. Flowering: September–October.

**Vernacular.**— Luk phuan (ลูกพรวน), Sanokhao (โสนเขา) (Central); Luk ueng lek (ลูกอึ่งเหล็ก) (Sa Kaeo).

**Specimens examined.**— *Ch. Charoenphol*, *K. Larsen* & *E. Warncke* 4532 (AAU, BKF); *Kasin* 454 (BM); *A.F.G. Kerr* 3108 (BM), 7931 (BK-2 sheets, K, TCD) & 9083 (BK, BM-2 sheets, C, TCD); *J.F. Maxwell* 03-314 (BH-CMU); *Put* 1120 (BK, BM, E, K, TCD) & 3108 AAU, BK, BM, C, E); *T. Shimizu*, *H. Toyokuni*, *H. Koyama*, *T. Yahara* & *C. Niyomdham* T-27283 (BKF); *T. Smitinand* 12101 (BKF).

**Notes.**— *I. trifoliata* is easily recognized by having a trifoliolate leaf, densely reddish disc-shaped glandular hairs on the lower surface of leaflets, and its thickened margins of the pod.

**28. *Indigofera trita*** L.f. subsp. **subulata** (Vahl ex Poiret) Sli var. **scabra** (Roth) Ali, Bot. Notis. 111(3): 558. 1958, Thuân, Dy Phon & Niyomdham, Fl. Cambodge, Laos & Vietnam 23: 91. 1987.

*I. scabra* Roth, Nov. Pl. Sp.: 359. 1821. Type: India, Heyne s.n. (holotype L!, isotype K).

*I. trita* subsp. *scabra* (Roth) de Kort & G. Thijssse, Blumea 30(1): 140. 1984.

*I. subulata* Vahl ex Poiret var. *scabra* (Roth) Meikle, Kew Bull. 5: 352. 1951.

*I. laotica* Gagnep., Not. Syst. 3: 123. 1914 & Fl. Indo-Chine 2: 438, f. 40. 1916. Type: Laos, C. Thorel 2315 (P).

Shrub or prostrate shrub; young twigs angular, with both asymmetric and slightly symmetric T-shaped hairs. *Leaves*: imparipinnate, alternate; petioles 2.5–3.5 cm long, densely hairy; stipules narrowly lanceolate to linear, 5–7 mm long, densely hairy; rachis (1.2–) 4–5 cm long. *Leaflets*: (3–) 5–7, opposite or subopposite; petiolules 1–2 mm long, densely hairy; stipels 1.5–2 mm long, densely hairy; lamina elliptic to ovate, (2.5–) 3–5 by 1–2.8 cm, apex acute, with mucro *ca.* 0.5 mm long, base obtuse, margin entire, upper surface with asymmetric T-shaped hairs; lower surface with slightly symmetric T-shaped hairs; midrib grooved above; lateral veins 5–7 pairs. *Racemes*: (3–) 7–12 cm long, hairy; bracts 0.5–2 mm long. *Pedicels*: *ca.* 1 mm long, hairy. *Calyx*: cup-shaped, 0.5–1 mm long; lobes lanceolate, 2–3 by 0.5 mm, apex acuminate; margin ciliate, hairy outside, glabrous inside. *Corolla*: pink; standard obovate, 5 by 3–4 mm, apex obtuse, with mucro *ca.* 0.1 mm long, margin ciliate, base cuneate, hairy on the back at the upper part, glabrous inside; wings oblanceolate, 4 by 1–1.5 mm, apex obtuse, base oblique, margin entire, glabrous both outside and inside;

claw *ca.* 0.5 mm long; keel *ca.* 5 by 2 mm, base attenuate, margin ciliate, glabrous both outside and inside; lateral pocket *ca.* 0.5 mm long. *Staminal tube*: 3–4 mm long; filament 0.5–1 mm long; anthers *ca.* 0.5 by 0.5 mm, glabrous, with an apiculate connective. *Ovary*: densely hairy, with 8–9 ovules; style glabrous. *Pods*: crested or 4-ridged, 25–30 mm long, densely hairy, dehiscent. *Seeds*: cubic, *ca.* 2 by 1 mm, glabrous, lustrous.

**Thailand.**— NORTH-EASTERN: Khon Kaen; SOUTH-WESTERN: Kanchanaburi and Phetchaburi; CENTRAL: Saraburi.

**Distribution.**— Sri Lanka and India.

**Ecology.**— Bamboo forest, on limestone mountains, alt. 10–700 m. Flowering: September–October.

**Vernacular.**— Khram bai sak (ครามใบซาก).

**Specimens examined.**— *C. Chermirsiriwattana* 779 (BK); *A.F.G. Kerr* 11086 (BK, BM) & 11086A (BK); *G. Murata, S. Mitsuta, T. Yahara, H. Nagamasu & N. Nantasan* T-51117 (BKF); *Sawai* 463 (KKU), 975 (KKU), 1011 (KKU), 1029 (KKU) & 1051 (KKU); *T. Smitinand & H. Sleumer* 1116 (BKF, L); *C.F. van Beusekom, C. Phengklai, R. Geesink & B. Wongwan* 3931 (BKF, L, K).

**Notes.**— This taxon has distinctly angled twigs, especially when young. The size and shape of leaflets are very variable in the Thai specimens, according to their habitats. It has slightly 4-ridged pods along the sutures, which is similar to *I. trifoliata* but the pods are longer.

**29. *Indigofera wightii*** Grah. ex Wight & Arn., Prodr.: 202. 1834; Gagnep., Fl. 2: 434. 1916; de Kort & G. Thijssse, Blumea 30(1): 137. 1984; Sanjappa, Reinwardtia 10(2): 241. 1985; Thuân, Dy Phon & Niyomdham, Fl. Cambodge, Laos &

Vietnam 23: 88. 1987. Type: India, *Wallich* 5458 (K-W!, P).

*I. inamoena* Thw., Enum. Pl. Zeyl.: 83. 1859. Type: Sri Lanka, *Thwaites* 3513 (K!, P).

*I. pallida* Craib, Bull. Misc. Inform., Kew 1927: 56. 1927 & Fl. Siam. Enum. 1: 380. 1928. Type: Thailand, Lampang, *A.F.G. Kerr* 3083 (BM!, K!, SING!).

*I. cinerascens* Franch., Pl. Delav.: 153. 1859. Type: China, Yunnan, *Tapintze*, *Delavay* 519 (P).

*I. foliolosa* Grah. in Wall., Cat. no. 5485 (K-W!), *nom. nud.*

Shrub 1–1.5 m high; twigs with slightly symmetric T-shaped hairs. *Leaves*: imparipinnate, alternate; petioles 4–10 mm long; stipules triangular or lanceolate, hairy outside, glabrous inside; rachis 3–6 cm long. *Leaflets*: 13–37, opposite or subopposite, scabrous; petiolules *ca.* 1 mm long; lamina obovate or elliptic, 8–10 by 3–5 mm, apex emarginate or shallowly cordate, rarely rounded, base cuneate; lateral veins indistinct; both surfaces with slightly symmetric T-shaped hairs. *Racemes*: 2–5 cm long; bracts ovate, *ca.* 1 mm long. *Pedicels*: 1.5–2 mm long, hairy. *Calyx*: cup-shaped, *ca.* 1 mm long; lobes triangular, 0.5–1 by 0.5 mm, apex acute, margin hairy. *Corolla*: pinkish; standard broadly ovate, 5–6 by 3.5–4 mm, apex acute, base rounded, margin entire, densely hairy on the back, glabrous inside; wings 4–5 by 1.5–2 mm, apex acute, margin entire, glabrous both outside and inside; claw *ca.* 0.5 mm long; keel 6–7 by 2 mm, hairy outside, glabrous inside; lateral pocket *ca.* 1.5 mm long, apex rounded, base attenuate, margin ciliate, hairy outside, glabrous inside. *Staminal tube*: 4–5 mm long, glabrous; filament 0.5–1 mm long; anthers with an apiculate connective. *Ovary*: densely hairy, with 10–

12 ovules; style *ca.* 2 mm long. *Pods*: cylindrical, straight, 2–3 cm long, densely hairy, dehiscent. *Seeds*: 10–12, cubic, *ca.* 1.5 mm long, *ca.* 1 mm diam., glabrous.

**Thailand.**– NORTHERN: Chiang Mai, Lumpang, Tak, Sukhothai and Nakhon Sawan; NORTH-EASTERN: Loei, Sakon Nakhon and Khon Kean; EASTERN: Chaiyaphum and Buri Ram; SOUTH-WESTERN: Phetchaburi.

**Distribution.**– Sri Lanka, India, Myanmar, China, Cambodia and Vietnam.

**Ecology.**– Deciduous and dry dipterocarp forests, *ca.* 2,000 m. Flowering: June–September.

**Vernacular.**– Khram bai lek (ครามใบเล็ก).

**Specimens examined.**– *P. Chantaranonthai*, *J. Parnell* & *D. Simpson* 90/422 (KKU, TCD); *P. Chantaranonthai et al.* 21 (KKU) & 1841 (KKU); *Ch. Charoenphol*, *K. Larsen* & *E. Warncke* 4916 (AAU, BKF); *C. Chermisrivathana* 72 (BK); *Kasem* 232 (BK); *A.F.G. Kerr* 3083 (K) & 19771 (BK, BM); *K. Larsen*, *S.S. Larsen*, *I. Nielsen* & *T. Santisuk* 31873 (AAU, BKF, L) & 31878 (AAU, BKF, E); *J. Leeratiwong* 99-45 (KKU), 99-73 (KKU) & 99-131 (KKU); *A. Marcan* 2767 (BM); *J.F. Maxwell* 87-1250 (L, CMU) & 97-1085 (L); *G. Murata*, *N. Fukuoka* & *C. Phengklai* T-16970 (AAU, BKF, L) & T-16973 (AAU, BKF); *G. Murata*, *C. Phengklai*, *S. Mitsuta*, *T. Yahara*, *H. Nagamasu* & *N. Nantasan* T-49816 (AAU, BKF); *C. Niyomdham* 5772 (BKF-2 sheets); *Y. Paisooksantivatana* y183086 (BK); *C. Phengklai et al.* 3437 (BKF-2 sheets) & 3737 (BKF); *N. Piakkaew* 2 (KKU), 20 (KKU) & 23 (KKU-2 sheets); *R. Pooma*, *K. Phattarahirankanok*, *S. Sirimongkol* & *M. Poopath* 4574 (AAU, BKF, L) *P. Rogers* 4 (BK); *Sawai* 1052 (KKU); *T. Smitinand* 11672 (BKF); *T.*

*Smitinand* & *C. Phengkklai* 8870 (BKF); *S. Sutheesorn* 667 (BK).

**Notes:** *I. wightii* is distinguished by having numerous and scabrous leaflets. The apex of leaflets is emarginate to shallowly cordate.

**30. *Indigofera zollingeriana*** Miq., Fl. Ind. Bat. 1(2): 310. 1855; Craib, Fl. Siam. Enum. 1(3): 383. 1928; Backer & Bakh.f., Fl. Java 1: 592. 1963; de Kort & G. Thijssse, Blumea 30(1): 142. 1984; Thuân, Dy Phon & Niyomdham, Fl. Cambodge, Laos & Vietnam 23: 82. 1987; Huang & Ohashi, Fl. Taiwan 3: 314. 1993. Type: Java, *Zollinger* 2390 (holotype P; isotypes BM, BO, U). Fig. 2I.

*I. teysmannii* Miq., Fl. Ind. Bat. 1(6): 1083. 1855; Gagnep., Fl. Indo-Chine 2: 429. 1916. Type: Indonesia, Sumatra, *Teijsmann* HB 867 (U).

*I. benthamiana* Hance, Ann. Nat. Bot. 18 (4): 219. 1862. Type: China, Whampoam, *Hance* 6063 (K!).

Treelet 5–10 m high; twigs with slightly symmetric T-shaped hairs. *Leaves:* imparipinnate, alternate; petioles 2–3 mm long; stipules lanceolate, 5–7 mm; rachis 9.5–16 (–20). *Leaflets:* 23–47, opposite or subopposite; petiolules 1–2 mm long; stipels *ca.* 1.5 mm long; lamina elliptic or ovate, 5–7 by 1.9–2.2 cm, apex acute, base cuneate, margin entire; both surfaces with slightly symmetric T-shaped hairs; lateral veins 14–20 pairs. *Racemes:* 11–17.5 cm long, hairy; bracts 2.5–3 mm long. *Pedicels:* 1.8–2.2 mm long, densely hairy. *Calyx:* cup-shaped, 1.9–2 by 2.5–3 mm; lobes triangular, greenish to blackish, 0.5–1 by 1 mm, apex acute, margin serrate, hairy outside, glabrous inside. *Corolla:* pinkish; standard ovate, 9.5–10.5 by 7–8 mm, apex rounded, base obtuse, margin entire, hairy on the back, glabrous inside; wings oblong, 6–7 by

2.5 mm, apex rounded, base oblique or truncate, margin entire, glabrous both outside and inside; claw *ca.* 0.5 mm long; keel falcate, 8.5–11 by 2.5–3 mm, apex acute, base cuneate, margin ciliate, hairy outside at the upper part, glabrous inside; lateral pocket, 2–2.5 mm long. *Staminal tube:* 5–7.5 mm long, glabrous; filament 1.5–2 mm long; anthers *ca.* 1 by 0.5 mm, with an apiculate connective. *Ovary:* glabrous, with 13–15 ovules; style 4.5–5 mm long, glabrous. *Pods:* cylindrical, straight, 3.5–4 mm long, indehiscent. *Seeds:* globose, 2.5–3 mm diam., glabrous.

**Thailand.**— NORTHERN: Lampang; NORTH-EASTERN: Nong Khai and Mukdahan; EASTERN: Chaiyaphum.

**Distribution.**— Myanmar, China, Taiwan, Vietnam and Indonesia.

**Ecology.**— Swamp forest, alt. 0–1,200 m. Flowering: July–September.

**Vernacular.**— Khram Chang (ครามช้าง), Khram luang (ครามหลวง) (Lampang); Cha Khram (ชะคราม) (Nong Khai).

**Specimens examined.**— *R. Geesink*, *T. Hattink* & *C. Phengkklai* 6918 (K, L); *A.F.G. Kerr* 8415 (BK, BM, E, K); *S.S. Larsen*, *C. Tange* & *D. Sookchaloem* 46194 (BKF, K); *J.F. Maxwell* 74–831 (L); *C. Niyomdham* 4460 (BKF-2 sheets) & 4934 (BKF-2 sheets); *T. Santisuk* 6678 (BKF); *Sawai* 474 (KKU), 938 (KKU) & 1046 (KKU); *Winit* 1221 (BK, BKF, K).

**Notes.**— *I. zollingeriana* is characterized by a treelet, the calyx tube which is longer than the calyx lobes and the pods are thick and indehiscent.

#### ACKNOWLEDGEMENTS

This research was supported financially by the Institute for the Promotion of

Teaching Science and Technology (IPST) through the Development and Promotion of Science and Technology Talents Project (DPST).

#### LITERATURE CITED

- Craib, W. 1912. XV. Contributions to the Flora of Siam. Bulletin Miscellaneous Information, Kew. no. 3: 144-160.
- Craib, W. 1928. Florae Siamensis Enumeratio I. Siam Society, Bangkok.
- De Kort, I.D. and Theijsse, G. A revision of the genus *Indigofera* (Leguminosae-Papilionoideae) in Southeast Asia. Blumea. 30: 89-151.
- Du Puy, D.J., Labat, J.N. & Schrire, B.D. 1993. The separation of two previously confused species in the *Indigofera spicata* complex (Leguminosae: Papilionoideae). Kew Bulletin. 48: 727-733.
- Fawcett, W. & Rendle, A.B. 1920. Flora of Jamaica vol. IV. Dicotyledons; Families Leguminosae to Callitrichaceae. The British Museum, London.
- Holmgren, P.K. & Holmgren, N.H. 2001. Index Herbarium. Part 1: the Herbarium of the World. 8<sup>th</sup> Edition. NYBG Press, New York.
- Larsen, K & Larsen, S.S. 1995. Additions to the Leguminosae of Thailand. Thai Forest Bulletin (Botany). 23: 43-44.
- Lecomte, M.H. 1916. Flore Générale de L'Indo-Chine. F. 4. Masson det Cie Editeurs, Paris.
- Linnaeus, C. 1753. Species Plantarum, Stockholm.
- Newman, M., Ketphanh, S., Svengsuksa, B., Thomas P., Sengdala, K., Lamxay, V. and Armstrong, K. 2007. A checklist of the vascular plants of Lao PDR. Royal Botanic Garden Edinburgh, Scotland.
- Polhill, R.M. and Raven, P.H. 1981. Advances in Legume Systematics. Part 1. Kew.
- Pyramam, K. 1986. *Indigofera kasinii* sp. nov. (Papilionaceae) in Thailand. Thai Forest Bulletin (Botany). 16: 207-210.
- Sanjappa, M. 1985. The genus *Indigofera* L. (Fabaceae-Papilionoideae) in Burma. Reinwardtia. 10: 211-244.
- Thiers, B. [continuously updated]. Index Herbariorum: A global directory of public herbaria and associated staff. New York Botanical Garden's Virtual Herbarium. <http://sweetgum.nybg.org/ih/> May 27, 2011.
- Thuân, N.V., Dy Phon, P. and Niyomdham, C. 1987. Leguminosae-Papilionoideae. Flore du Cambodge, du Laos et du Vietnam. 23: 63-254.
-