# Studies in Flora of Thailand

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During October–December 1973, the author have a chance to study Thai plants at Kyoto University, Japan under the sponsorship of the Japan Society for the Promotion of Science. During that period four small families of Thai plants have been intensively studied, as follows:

1. Hippocastanaceae, with the indigeneous *Aesculus assamica* Griff.;
2. Cannabidaceae, with the introduced *Cannabis sativa* Linn.;
3. Irvingiaceae, with the indigeneous *Irvingia malayana* Oliver; and
4. Casuarinaceae, with one native species, *Casuarina equisetifolia* J.R. & G. Forst.; and two introduced ones, *C. junghuhniana* Miq. and *C. sumatrana* Jungh. ex de Vriese.

## 1. HIPPOCASTANACEAE

A family with 2 genera widely distributed in the temperate regions and northern hemisphere but not very frequent in the tropics. It is characterized by digitately compound leaves and large seed with a more or less woody hilum.

The family is represented in Thailand by a single species.

### AESCULUS

Linn., Sp. Pl. 1 : 344. 1753 : Gen. Pl. ed. 5 : 161. 1754.

Tree or shrub with scaly buds. *Leaves* opposite, digitate, deciduous, exstipulate; leaflets oblanceolate, serrate or serrulate. *Flowers* bisexual (rarely unisexual), zygomorphic in terminal panicles. *Calyx* tubular or campanulate with 5 unequal, imbricate lobes. *Petals* 5–4, unequal, clawed. Stamens 8–5, free, inserted within a lobed disk. *Ovary* superior, 3-locular, with 2 ovules in each locule; style and stigma simple. *Fruits* often with sharp spiny tubercles, dehiscent, usually 1–few-seeded; seeds large, with large, more or less woody hilum, endosperm absent.

**Aesculus assamica** Griff., Notul. Pl. Asia 4 : 540. 1854; Kurz, For. Fl. Br. Burm. 1 : 286. 1877 ; Craib, Fl. Siam. En. 1 : 338. 1931; Hardin, Brittonia 12 : 36, f. 3. 1960; Hara, Fl. E. Himal. : 193. 1966.—*A. punduara* Wall. [Cat. No. 1189 (1829) nom. nud.] ex Hiern in Hook.f., Fl. Br. Ind. 1 : 675. 1875; Brandis, Ind. Trees : 185. 1921.—Fig. 1.

Thailand.—NORTHERN: Chiang Mai, Tak, Kamphaeng Phet; SOUTH-WESTERN: Kanchanaburi.

* Forest Herbarium, Royal Forest Department, Bangkok 9, Thailand.

Fig. 1 *Aesculus assamica* Griff. A. twig and fruit inflorescence; B. fruits; C. flowers; D. inflorescence.

Distribution.—Tropical Himalaya, Sikkim, Assam (Type), Burma, Thailand, Laos and S.-W. Yunnan.

Ecology.—By streams in evergreen forest, alt. 150–1300 m. Flowering during February–April and fruiting during April–June; fruits mature around August.

Use.—Young fruits edible.

Vernacular. — Mak khalam pong หมากขลำป่อง, Khalam pong ขล่ำป่อง, Chawopue จะหว่อบื่อ, Puaknam ปวกน้ำ, Manieng nam มะเนียงน้ำ, Makia nam มะเกียน้ำ (Northern); Potana โปตานา (South-western).

## 2. CANNABIDACEAE

A family with only two genera, widely cultivated in tropical Asia through Europe to North America. It is characterized by the 5 tepals and strongly serrate margins of the palmate leaves.

The family is represented under cultivation in Thailand by a single species of the genus *Cannabis*.

### CANNABIS

Linn., Sp. Pl. : 1027. 1753; Gen. Pl. ed. 5 : 453. 1754.

Dioecious or occasionally monoecious, robust, tall, erect herb. Stipules 2, free. *Leaves* opposite near the base, spirally arranged in the upper part of stem, palmate (3–) 5–7 (–11)-partite; segments narrowly lanceolate; petioles 4–6 cm long. *Flowers* unisexual, subsessile. *Male flowers*, axillary and terminal. *Tepals* 5, free, oblong, membranous, imbricate. *Stamens* 5, epitepalous; anthers basifixed, 2-celled; rudimentary ovary 0. *Female flowers* solitary, axillary. *Ovary* 1-locular; style short devided into 2 long stigmatic arms; ovule solitary. *Fruits* achene ovoid or ellipsoid, smooth, closely enveloped by 2 bracts.

**Cannabis sativa** Linn., Sp. Pl. : 1027. 1753; Roxb., Fl. Ind. 3 : 772. 1832; Hook., f., Fl. Br. Ind. 5 : 487. 1888; Gagnep. in Fl. Gén. I.-C. 5 : 693. 1928; Backer in Fl. Mal. I. 4 : 223, f. 1. 1951 ; Ohashi in Fl. E. Himal. : 53. 1966.—*C. indica* Lamk. Enc. 1 : 695. 1783. — Fig. 2.

Thailand.—NORTHERN, NORTH-EASTERN and CENTRAL cultivated only.

Distribution. — Cultivated nearly throughout the world, type from central Asia.

Use. — Fibre from the stems (male plant) for rope making and textile (especially hill-tribes in northern Thailand); leaves from female plant as euphoric drug for smoking.

Vernacular. — Kancha กัญชา (General); Kancha chin กัญชาจีน (Central).

Fig. 2 *Cannabis sativa* Linn. A. twig and fruits inflorescence; B. twigs and male inflorescence; C.D.E female flowers and inflorescence; F. male flowers.

## 3. IRVINGIACEAE

A family of 3 genera and about 45 species, occurring in the tropics from Africa to Asia, is characterized by the sword-like intra-petiolar, folded stipules embracing the terminal bud, and early caducous leaving scars on the branchlets.

The family is represented in Thailand by a single species of the genus *Irvingia*.

NOTE: — The genus is treated as a member of Simaroubaceae in Engler, Syllabus der Pflanzenfamilien, II Band, 12th ed., 1964 and a member of Ixonanthaceae by H.K. Airy Shaw in his revision for the seventh edition of Willis' Dictionary of Flowering Plants and Ferns, 1966.

### IRVINGIA

Hook. f., Trans. Linn. Soc. 23 : 167. 1860; Benth. & Hook. f., Gen. Pl. 1 : 314. 1862.

An evergreen tree with conspicuous annular leaf scars on young branches. *Stipules* sword-like shape, enclosing the terminal buds, caducous. *Leaves* simple, coriaceous or sub-coriaceous, ± glabrous, entire; petioles grooved above. *Panicles* terminal or axillary; bracts small, early caducous. *Flowers* 5-merous, bisexual. *Sepals* connate at base, imbricate in bud. *Petals* exceeding sepals, imbricate in bud. *Stamens* 10, inserted beneath the disk. *Ovary* superior 2-locular, conical or somewhat flattened, sessile on the torus-like disk; stigma inconspicuous; ovules solitary. *Drupe* large, 1-seeded.

**Irvingia malayana** Oliv. ex Benn. in Hook. f., Fl. Br. Ind. 1 : 522. 1875; Oliv. in Hook., Ic. Pl. : t. 1247. 1877; King, J. As. Soc. Beng. 62 (2) : 230. 1893; Craib, Fl. Siam. En. 1 : 243. 1926; Ridl., Fl. Mal. Pen. 1 : 364. 1922; Gagnep. in Fl. Gén. I.-C. Suppl. 1 : 669. 1946; Noot. in Fl. Mal. I.6 : 225, f. 23 et 24. 1962.—*I. oliveri* Pierre, Fl. For. Cochinch. 4 : t. 263B. 1892; Lec., Fl. Gén. I.-C. 1 : 701. 1911; Craib, Fl. Siam. En. 1 : 243. 1926; Gagnep. in Fl. Gén. I.-C. Suppl. 1 : 670. 1946. — Fig. 3.

Thailand. — Throughout the country.

Distribution. — India, Burma, Laos, Cambodia, Vietnam, Malaya (Type), Sumatra, and Borneo.

Ecology. — Frequent in Dry Deciduous Dipterocarp forests, Dry Evergreen forest and also in Tropical Rain forest at the altitude below 300 m.a.s.l. Flowering between January – March and fruiting between February – April.

Fig. 3 *Irvingia malayana* Oliv. ex Benn. A. twig and inflorescence; B.C.D. flowers; E. fruit; F. seed.

U s e. — Owing to a large silica content in the wood and the low durability, the wood is generally used for chacoal; seeds are edible either cooked or raw, and used as an integral part in the manufacturing of wax, cocoa and soap.

V e r n a c u l a r. — Kabok กะบก, Chabok จะบก, Tabok ตะบก, Maluen มะลื่น (General); Mak luen หมักลื่น, Muen มื่น (Northern); Lakkai หลักกาย, Bok บก, Mak bok หมากบก (North-eastern); Cha-ang ชะอัง (South-eastern).

## 4. CASUARINACEAE

A family with two genera and 65 species, distributed mainly in Australia and New Caledonia, few in South-East Asia, is characterized by the very slender, switch-like, green twigs with a whorl of very small, tooth-like leaves at each node of twigs.

### CASUARINA

Adans., Fam. 2 : 481. 1763; J.R. & G. Forst., Char. Gen. Pl. : 103, f. 52. 1776.

Evergreen, monoecious or dioecious shrubs or tree. Twigs very narrowly slender, green, each internode cylindrical and deeply grooved. *Leaves* whorled, tooth-like or scale-like; stipules absent. ♂ *inflorescences*, terminal, pendulous spike; bracteoles 1–4; stamen 1 protruding beyond the bract. ♀ *inflorescences* capitate or spicate, on stout terminal or lateral branches. *Ovary*, superior, originally 2-locular, later 1-locular by abortion; ovules 2 (–4), only one developing; style deeply bifid, protruding beyond the bract. *Infructescence* cone-like with persistent bracts; bracts opening like a capsule and exposing the samaroid indehiscent nut; seeds solitary, without endosperm, winged.

Besides the species mentioned below *C. sumatrana* Jungh. ex de Vriese was introduced into Thailand in 1971. It seems to thrive in the peninsular region, where it was planted at the Khao Chong Botanic Garden in Trang. This species can be easily recognised by the 4 scale-like leaves in a whorl at each node.

#### Key to the species

1. Monoecious. Internodes 2.5–9 mm long. Leaves 7–(6–9). Bracteoles of ♂ flowers with mucronate apex. Fruiting bracteoles glabrous inside
   **1. C. equisetifolia**

1. Dioecious. Internodes 10–15 mm long. Leaves 9–11 (rarely 12 or 13). Bracteoles of ♂ flowers with cuspidate apex. Fruiting bracteoles densely pubescent inside
   **2. C. junghuhniana**

Fig. 4 *Casuarina equisetifolia* J.R. & G. Forst.
A. & B. Twig with ♂ & ♀ inflorescences, C. leaves, D. female inflorescence, E. male inflorescence.

**1. Casuarina equisetifolia** J.R. & G. Forst., Char. Gen. : 104. t. 52. 1776; Miq., Rev. Crit. Casuarina : 309, f. 5. 1848; in DC. Prodr. 15. 2 : 338, 1864; Bark., Fl. Maur. Seychell. : 294. 1877; Kurz, Fl. Br. Burm. 2 : 494. 1877; Gamble, Man. Ind. Timb. : 346. 1881; Hook. f., Fl. Br. Ind. 5 : 598. 1888; Ridl., Fl. Mal. Pen. 3 : 372. 1924; Dode in Fl. Gén. I.-C. 5 : 936. 1930; Back. & Bakh. f., Fl. Java 2 : 10. 1965. — *C. muricata* Roxb., Fl. Ind. ed. 2. 3 : 549. 1832.—Fig. 4.

Thailand. — SOUTH-WESTERN : Prachuap Khiri Khan and Phetchaburi; PENINSULAR : Phangnga, Phuket, Songkhla and Narathiwat.

Distribution. — India, Burma, Vietnam, Malaya (type), Java, Australia and Polynesia.

Ecology. — Along seashores on sandy beaches, from the sea level up to 30 m alt. In Thailand cultivated up to 1100–1300 m alt. Fruiting and flowering during January–March.

Use. — The timber is generally used for posts and poles, as well as for fuel wood.

Vernacular. — Son tha-le สนทะเล (General); Ku กู (Peninsular – Narathiwat).

**2. Casuarina junghuhniana** Miq., Pl. Jungh. 1 : 7. 1853; Back. & Bakh. f., Fl. Java 2 : 10. 1965.

Thailand. — Known only under cultivation, it was introduced either from Penang or Singapore by Phraya Pradiphat Phuban sometime in the 1900.

Distribution. — Java (Wonosari, type), Lesser Sunda Is.

Ecology. — Often as a pioneer species in dry and periodically burnt areas, sometimes forming forest. Only male trees were introduced into Thailand. It thrives on any type of soil and is planted as road-side tree throughout the country. Being a fast-growing species, it is also planted in forest plantation.

Use. — Wood is hard and strong, generally used for posts or poles.

Vernacular. — Son pradiphat สนประดิพัทธ์.

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## INDEX TO COLLECTOR'S NUMBERS

### *Hippocastanaceae*

BUNKRONG 61
CHAIKLOM Sn
F.T.P. 9601
GARRETT 162
KERR Sn
KOSTERMANS 66, 803
MAXWELL 73–231
NIMANONG 21
SANGKHACHAND 734, 1418
THAI-DUTCH 88
T.D.B.S. 12920

### *Cannabidaceae*

BUNCHUAI 30
GARRETT 851
KERR Sn
MAXWELL 71–301
NAKKAN 213
NUPARKDEE 14
PHENGNAREN 483
PHUSOMSAENG et al. 15
SUTHISORN 359
SUVARNAKOSES 213, 1437

### *Casuarinaceae*

KERR 9248 : 1, 11186 : 1
KOMKRIT Sn : 1
LAKSHNAKARA 406 : 1
SANGKHACHAND 124 : 1, 406 : 1, 407 : 1
SRIWANNA Sn : 1
SUTHISORN 2595 : 1
TAENGSUWAN 47 : 1
T.D.B.S. 12437 : 1
YONGBOONKIRD 393 : 1, 394 : 2
WOOTIJURINONG 28 : 1

### *Irvingiaceae*

AMORNTHAD 47
BOONKIRD 6, 9
CHERMSIRIVATHANA 512
KERR 5822, 17164, 17937, 18607, 21286, Sn
LAKSHNAKARA 1320
MAXWELL 72–136, 72–301
NITIKUL 3
NOI Sn
PHAEN 2, 5, 85
PUT 2791
SANGKHACHAND 186
SMITINAND 2677
SUTHISORN 1136
SUVARNAKOSES 1554
T.D.B.S. 5605, 5819
THAVORN 1045
WILLIAMS 17179