Synoptic Flora of the *Ranunculaceae* in Thailand

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Abstract

Through the study of the *Ranunculaceae* for the Flora of Thailand, the author has enumerated 22 species and 1 variety, that is, 1 species in *Delphinium*, 10 in *Clematis*, 4 in *Naravelia*, 3 in *Ranunculus*, 4 and 1 variety in *Thalictrum*. Among them, 2 of them are new species, and some are further needed for nomenclatorial clarification.

Ranunculaceae A. L. Juss., Gen. Pl. 231. 1789; Tamura in Nat. Pfl.-fam. ed. 2, 17 a IV: 223. 1995.

Flowers actinomorphic, rarely zygomorphic, principally pentamerous, sometimes trimerous or tetramerous. Sepals free. Petals present or absent, free, shorter than or longer than sepals. Stamens numerous, free, anthers longitudinally dehiscent. Carpels many to single, free, rarely connate to various degree, styles usually more or less elongate. Ovules many to single in a carpel. Fruits follicular, achenial, baccate, or capsulate.

59 genera and ca 2500 species are distributed nearly all over the world, but rather poor in the tropics. In Thailand, 5 genera, 22 species and 1 variety have been recorded.

KEY TO THE GENERA

1. Fruits follicular. Flowers zygomorphic — **1. Delphinium**
1. Fruits achenial. Flowers actinomorphic
  2. Stems twisted. Leaves opposite
    3. Petals absent. All leaflets foliar — **2. Clematis**
    3. Petals present. Upper 3 leaflets transformed into tendrils — **3. Naravelia**
  2. Stems erect, sometimes decumbent. Leaves alternate
    4. Petals present. Achenes smooth on both faces — **4. Ranunculus**
    4. Petals absent. Achenes longitudinally ribbed — **5. Thalictrum**

I. **Delphinium** L., Sp. Pl. 530, excl. p. 1753; Munz in J. Arnold Arb. 48: 250. 1967, 49: 73. 1968; Tamura in Nat. Pfl.-fam. ed. 2, 17 a IV: 291. 1995.

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320 species mostly in the north hemisphere, and south to the montane zones of Africa. One species in Thailand.

1. Delphinium siamense (Craib) Munz in J. Arnold Arb. 49: 116. 1968.— *D. stapeliosmus* var. *siamensis* Craib in Fl. Siam. Enum. 1: 19. 1925; Smitinand in Nat. Hist. Bull. Siam. Soc. 21: 101. 1966.— *D. altissimum* var. *siamense* (Craib) T. Shimizu in South-east Asian Stud. 8: 180. 1970; Tamura in J. Phytogeogr. Tax. 28: 15. 1980.

S p e c i m e n s.— NORTHERN: Chiang Mai, Doi Chiangdao, 2100 m, on rocky ground, Kerr 6612, Nov. 6, 1922, fl (ABD, BK, BM, K) - type of *D. stapeliosmus* var. *siamensis*, Put 337, Oct. 15, 1926, fl (ABD, BK, BM, E, K), Put 4454, Dec. 21, 1931, fl, fr (ABD, BK, BM, K), 2000 m, herb common in limestone rock on open ridge, Smitinand, Poose & Robbins 7778, Nov. 10, 1962, fl (BKF, E); Mae Rim, 1300 m, not common in savanah on summit, up to 80 cm tall, Phengklai & Tamura 10186, Nov. 26, 1996, fr (SLR); Mae Sa, herbs to 1 m tall, common in lower montane in shady spots, Smitinand 12208, fl (BKF); Doi Pa Mawn, south face 1510 m, growing in rock crevices, Garrett 452, Sep. 16, 1927, fl (ABD, E, K).

D i s t r i b u t i o n.— Endemic.

N o t e s.— Thai plants were often identified with *Delphinium altissimum* var. *siamensis* but the species was synonymous with *D. scabriflorum* D. Don according to Hara (in J. Jap. Bot. 50: 264). They are slightly different in indumentum from *D. altissimum,* and until more specimens are collected, I treat Thai plants as an independent species according to Munz (1968).

II. **Clematis** L., Sp. Pl. 543. 1753; Hand.-Mazz. in Acta Horti Gothob. 13: 183. 1939; Tamura in Acta Phytotax. Geobot. 38: 33. 1987, in Nat. Pfl.-fam. ed. 2, 17 a IV: 368, 1995.

240 species distributed nearly all over the world, and 10 species are found in Thailand.

KEY TO THE SPECIES

1. Sepals erect or ascending. Stamens hairy
   2. Leaves 3-foliolate, glabrous or nearly glabrous beneath. Sepals glabrous outside except margin **2. C. sikkimensis**
   2. Leaves usually pinnately 5-foliolate, tomentose or densely villose. Sepals tomentose outside **1. C. buchananiana**
1. Sepals spreading or reflexed. Stamens glabrous
   3. Leaves simple, entire. Sepals 6 in number
      4. Leaves reticulate beneath. Achenes covered with yellowish-brownish hairs **10. C. fluvicoma**
      4. Leaves not reticulate beneath. Achenes covered with grayish-whitish hairs **9. C. smilacifolia**
   3. Leaves compound. Sepals 4 in number
      5. Leaves 3-foliolate
         6. Leaves glabrous
            7. Leaves coriaceous, inconspicuously reticulate beneath, 3–5-veined **6. C. meyeniana**
            7. Leaves chartaceous, prominently reticulate beneath, 5–7-veined **7. C. burmanica**

6. Leaves densely hairy especially beneath **3. C. thaiana**
5. Leaves bipinnately compound
8. Flowers 1.1–1.5 cm in diam. Leaflets subcoriaceous **4. C. subumbellata**
8. Flowers more than 2 cm in diam. Leaflets herbaceous
9. Plants blackish when dry. Anthers short, ca 1 mm long, connectives not projected **5. C. wissmanniana**
9. Plants not blackish when dry. Anthers long, more than 1.5 mm long, connectives projected **8. C. eichleri**

1. Clematis buchananiana DC., Syst. Nat. 1: 140. 1817, '*C. buchaniana*'; Hook.f. & Thomson Fl. Ind. 10. 1855; Hand.-Mazz. in Acta Horti Gothob. 13: 192. 1939; Hara in Enum. Fl. Pl. Nepal 2: 14. 1979; Tamura in J. Phytogeogr. Tax. 28: 14. 1980.— *C. wattii* Drumm. & Craib in Kew Bull. 1915: 421. 1915 in Fl. Siam. Enum. 1: 16. 1925; T. Shimizu in South-east Asian Stud. 8: 179. 1970. Figure 1.

S p e c i m e n s.— NORTHERN: Chiang Mai, Doi Chiangdao, 5900 ft, in loose herbage, open jungle, Kerr 2875, Jan. 28. 1913, fr (BM, K) - type of *C. wattii,* Put 4459, Dec. 21, 1931, fl (AAU, ABD, BK, BM, E, K), 2000 m, low brushwood with stunted trees on exposed ridge, shrub 1.5 m tall, fls. yellowish, Hennipman 3292, Dec. 7, 1965, fl (L.); 2000 m, among limestone in open place, Fukuoka 4372, Jan. 5, 1966, fl (BKF, KYO); Doi Pa Khao, south side, 1400 m, open grassy slope rising to peak, climbing among tall grass, very expassed situation, Garrett 115, Jun. 2, 1914, fl (BK, BKF, E, K, L) - type of *C. wattii*; Doi Nang, climbers with yellow fls., scattered on ridge, Bunchuai 75, Dec. 14, 1961, fl (BKF); Fang, climber along hill side, evergreen forest, fls. cream, Sadakorn 378, Dec. 3, 1974, fl (BK); Khun Khawang-Pangboh, 1150 m, scattered in hill evergreen forest, Smitinand 8736, Mar. 12, 1965, fl, fr (BKF); Doi Inthanon, 1400–1500 m, secondary grass vegetation on granite, straggling on tall grasses, Geesink, Hiepko & Phengklai 8034, Jan. 3, 1975 (C), Kerr 115, Jan. 2, 1914, fl (BM) - type of *C. wattii*; Doi Ang Khang, 1470 m, limestone area, Bänziger 606, Jan. 25, 1990 (C); Chiang Rai, Doi Thung, 1600 m, evergreen forest on summit zone, in secondary vegetation, Geesink, Hiepko & Phengklai 8244, Jan. 12, 1975, (C); Pra That Doi Thung, Charoenphol 428, Dec. 25, 1973, fl (BKF).

D i s t r i b u t i o n.— Himalaya: from Kashmir to Bhutan (type from Nepal), Assam, northern Burma, northern Thailand, Vietnam and China (Yunnan).

N o t e s.— *C. wattii* was described from Thailand and characterized by the leaves and young branches densely covered with white hairs. But the characters of indumentum are the quite similar with *C. buchananiana*.

2. Clematis sikkimensis (Hook. f. & Thomson) Drumm. ex Burkill in Rec. Bot. Surv. India 10: 229. 1925; Hara in Fl. E. Himal. 89. 1966, in Enum. Fl. Pl. Nepal. 2: 15. 1979.— *C. acuminata* var. *sikkimensis* Hook. f. & Thomson, Fl. Br. Ind. 1: 6. 1872; Tamura in J. Phytogeogr. Tax. 28: 14. 1980.— *C. acuminata* ssp. *sikkimensis* var. *hookeri* Brühl in Ann. Roy. Bot. Gard. Calc. 5: 75. 1896.— *C. siamensis* Drumm. & Craib in Kew Bull. 1915: 420. 1915; in Fl. Siam. Enum. 1: 15. 1925; T. Shimizu in South-east Asian Stud. 8: 178. 1970.

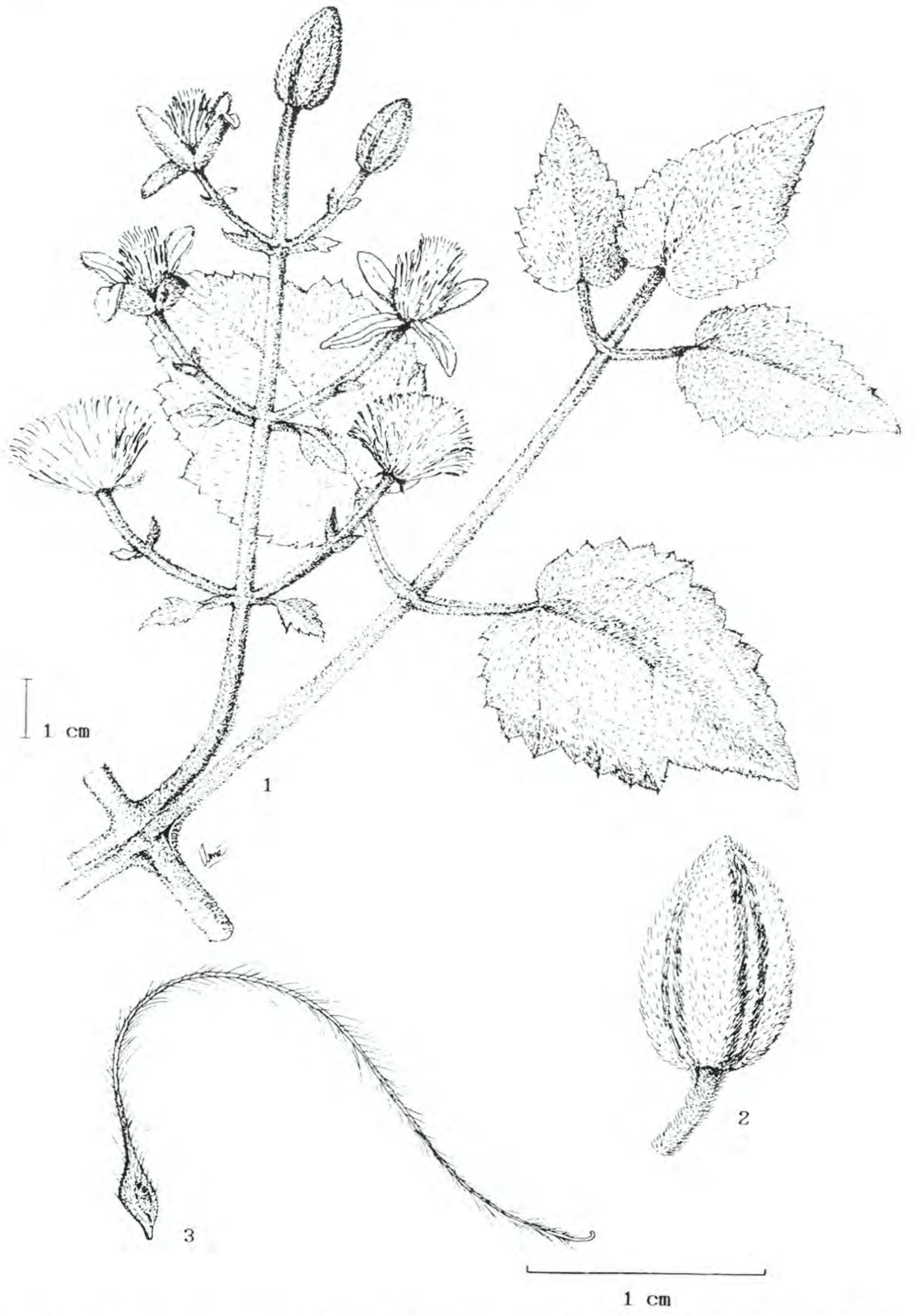


Figure 1. *Clematis buchananiana* DC: 1. Twig and inflorescence; 2. Young flower (C. Ch. Charoenphol 428); 3. Achene (H. Koyama et al. T-33530).

S p e c i m e n s.— NORTHERN: Chiang Mai, Doi Suthep, 1300 m, on bushes in evergreen jungle by stream, Kerr 3146, Nov. 22, 1941, fl (BM, E, K) - type of *C. siamensis*; Doi Inthanon, 1800 m, Niyomdham 14, Jan. 3, 1978 (BKF), 2500 m, Fukuoka & Ito 35377, Dec. 19, 1983, fl (BKF, KYO), 1000 m, Saithong waterfall, climbing in savannah, Smitinand & Phengklai 6078, Nov. 1986, fl. (BKF); Doi Angka, 2200 m, main east slope, fls. pale yellow green, Garrett 648, Feb. 21, 1931 (ABD, BKF, K, L); Doi Sam Muen to Doi Chang, 1500 m, Smitinand, Jan. 25, 1977 (BKF); Doi Pui, 1600–1685 m, Bjørnland & Schumacher 672, Feb. 8, 1979 (C).

D i s t r i b u t i o n.— Himalaya: from Nepal eastwards (type from Sikkim), Assam, Naga Hills, Mishmi, nothern Burma and northern Thailand.

N o t e.— In *C. sikkimensis*, leaves, inflorescence and sepals except margin are glabrous or only sparsely hairly, inflorescences many flowered, buds narrow and acute, and sepals rather small. *C. siamensis* is recognized in the variation range of the species.

3. Clematis wissmanniana Hand.- Mazz. in Acta Horti Gothob. 13: 212. 1939; Tamura in J. Phytogeogr. Tax. 28: 15. 1980.

S p e c i m e n s.— NORTHERN: Chiang Mai, Doi Chiangdao, 1400–1600 m, Kerr 6534, Nov. 3, 1942 (BK, BM, K).

D i s t r i b u t i o n.— Northern Thailand and southern Yunnan (type from Yuan-chiang).

N o t e s.— Thai plants are less hairy than Chinese ones.

4. Clematis subumbellata Kurz in J. Asiat Soc. Bengal 39(2): 61. 1870; H. Eichler, in Bibl. Bot. 124: 27. 1958; Tamura in J. Phytogeogr. Tax. 28: 14. 1980.— *C. floribunda* Kurz in J. Bot. 5: 240. 1867, non Planch. & Triana 1862.— *C. umbellifera* Gagnep. in Bull. Soc. Bot. France 82: 477. 1935; in Suppl. Fl. Gen. Indo-Chine: 4, fig. 1. 1938.— *C. kerriana* Drumm. & Craib in Kew Bull. 1914: 122. 1914; in Fl. Siam. Enum. 1: 15. 1925; Hand.- Mazz. in Act. Hort. Gothob. 13: 213. 1939.— *C. laxipaniculata* Péi in Sinensia 7: 437, f. l. 1936. Figure 2.

S p e c i m e n s.— NORTHERN: Pang Mapha, 560 m, not common in old clearing, Hansen & Smitinand 12714, Feb. 24, 1968, with stipular appendages, fl. (AAU, BKF, C, E, K, L); Huay Na, 900 m, common in mixed forest, fls. yellowish, scented, Hansen, Seidenfaden & Smitinand 10952, Jan. 26, 1964, with stipular appendages, fl (BKF, E, K, L); Huai Krasa, 1100 m, scandent undershrub scattered in old clearning, fls. whitish, Hansen & Smitinand 12963, Mar. 19, 1968,with or without stipular appendages, fl (AAU, BKF, C, E, K, L); Fang, 800 m, scattered in evergreen forest by stream, fl greenish, Smitinand 3740, Feb. 14, 1957, without stipular appendages, fl (BKF, C, L); Fang to Chiang Mai, 300 m, along road, Nooteboom, Tantisewe & Phengklai 872, Jan. 28, 1969, without stipular appendages, fl (BKF, C, K); Pangboh, 900 m, common in secondary growth, fl. greenish, Smitinand 8793, Mar. 16, 1965, without stipular appendages, fr (BKF, K, L); Samoeng, Bo Kaeo, 800 m, straggling shrub, scattered in scrub forest, Smitinand 10173, Jan. 25, 1967, without stipular appendages, fl (BKF, K, L); Doi Inthanon,



Figure 2. *Clematis subumbellata* Kurz: 1. Twig and fruit inflorescences (T3. 8793); 2. Flowers (S. Hansen et al. 10952).

Wachirathan waterfall, 800 m, mixed forest in ravine, Koyama, Tamura, 15583, without stipular appendages, fr (BKF, NY); Mae Taeng, Sam Muen, 1200 m, scattered in open lower forest, Smitinand 90–118, Mar. 17, 1990, without stipular appendages, fr (BKF). NORTH-EASTERN: Loei, Phu Peak Mt., 300 m, sand stone table, mixed deciduous forest, in open area, fls. yellowish, scented, Beusekom & Phengklai 2974, Jan. 11, 1970, without stipular appendages, fl (AAU, E, KYO). EASTERN: Chaiyaphum, Phu Khieo Wildlife Sanct. 550 m, Santisuk 920, Feb. 2, 1977, with stipular appendages (BKF). SOUTH-WESTERN: Kanchanaburi, Takanun, 400 m, climbing on branches in scrub by stream, fls. white, Kerr 10265, Jan. 19, 1924, with stipular appendages, fl (ABD, BK, BM, C, E, K); Mae Krai, 1000 ft, Kerr 2374, Feb. 14, 1912, without stipular appendages (BM, E, K) - type of *C. kerriana.*

D i s t r i b u t i o n.— Burma (type), Thailand. Indo-China and western and China (southern Yunnan).

N o t e s.— At the base of leaves or axillary inflorescences, the stipular appendages are sometimes present. They are broadly ovate, up to 25 mm long, usually dentate and with short petioles. This character is very remarkable, but not constant, and it is not easy to distinguish both groups as different varieties. In types of *C. kerriana* and *C. umbellata*, plants have no stipular appendages.

5. Clematis thaiana Tamura in J. Phytogeogr. Tax. 28: 14. 1980.

S p e c i m e n s.—NORTHERN: Chiang Mai, Doi Chiangdao, Shimizu, Toyokuni, Koyama, Yahara, Santisuk & Niyomdham 21172, Oct. 27, 1979 (KYO) - type; 2100 m, climbing herb among thicket on rocky ridge, Smitinand, Poore, & Robbins 7792, Nov. 10, 1962 (BKF, E, KYO), 1900–2175 m, Shimizu, Koyama & Nalampoon 10030, Sep. 14, 1967, fl (KYO), 2000 m, among rocks in open limestone ridge, fr. greenish, Smitinand & Abbe, 6259, Dec. 7, 1957, fr (BKF, K), 2000 m, on limestone rock, Smitinand & Anderson 7337, Dec. 3, 1961, fl (BKF, E, K, KYO).

D i s t r i b u t i o n.— Endemic.

6. Clematis meyeniana Walp. in Nov. Act. Acad. Caes. Leop.- Carol. Nat. Cur. 19, Suppl. 1: 297. 1843; Tamura in J. Phytogeogr. Tax. 28: 14. 1980.— *C. meyeniana* var. *insularis* Sprague in Kew Bull. 1916: 46. 1916; H. Eichler in Bibl. Bot. 124: 30.

S p e c i m e n s.— NORTHERN: Chiang Mai, Doi Angka, 1660 m, among low vegetation, fls. white, nasty smell, Garrett 395, Jan. 30, 1927, fl (A, K); Doi Pu Tong, 1100 m, climbing on bushes, edge of evergreen forest, Kerr 8863, Mar. 25, 1924, fr (BK, BM, K). NORTH-EASTERN: Loei, Phu Kradueng 1045 m, Din 5, Oct. 3, 1958, fl (BKF); 1045 m, Nakkan 5, May 6, 1948, fl (C).

D i s t r i b u t i o n.— Burma, Thailand, Indo-China, southern and southeastern China (type from Hong Kong), Taiwan, Luzon to southern Japan.

7. Clematis burmanica Lace in Kew Bull. 1915: 394. 1915; Tamura in J. Phytogeogr. Tax. 28: 14. 1980.

S p e c i m e n s.— NORTHERN: Chiang Mai, Doi Chiangdao, Put 363, Oct. 17, 1926, fr (BK, BM, K), 1800 m, on limestone rocks, fls. yellowish green, Smitinand & Anderson 7237, Dec. 2, 1961, fr (K); Chiang Rai, Doi Tung, 1600 m, evergreen forest, on summit zone, limestone, Geesink, Hiepko & Phengklai 8243, Jan. 12, 1975, fr (BKF).

D i s t r i b u t i o n.— Burma (type), Thailand and Indo-China.

8. Clematis eichleri Tamura, comb. nov. Figure 3.

Naravelia eichleri Tamura in Acta Phytotax. Geobot. 37: 109. 1986.

Climbers, deciduous in dry season. *Stems* striate with more than 20 striae. *Leaves* remotely 5–7-pinnate, lower leaflets ternate, leaflets ovate-elliptic, entire, acute or acuminate at apex, cuneate to truncate at the base, 5–7-veined diverging from the base, upper leaflets smaller. *Inflorescences* terminal and axillary, compound racemiform or subpaniculiform. *Flowers* white, open flat. *Sepals* elliptic-oblong, 8–11 mm long, margin white tomentose, sometimes caducous. *Stamens* more or less dimorphic, anthers lateral or introrse, connective projected; filaments of outer stamens thinner than anther; those of inner stamens as broad as anther. *Achenes* oblique fusiform, sometimes tortuose, 8–10 mm long, slightly compressed, tapering to both ends, with basal projection up to 2 mm, marginata, with a thick longitudinal ridge on each side, glabrous, tails 5–7.5 cm long, plumose. *Flowering* in November and fruiting in January and February. After fruiting the plants withered.

S p e c i m e n s.— NORTHERN: Chiang Mai, Ban Pong Yaeng, between Mae Puin and Samoeng, 2400 ft, Kerr 2903, Feb. 2, 1913 (BM, E, K) - type; Mae Rim, Botanical Garden 600 m, climber, scattered in evergreen forest, fls. white, fragrant, Phengklai & Tamura 10193, Nov. 26, 1996, fl (SLR), Pooma 1926, Feb. 19, 1946, fr (BKF).

D i s t r i b u t i o n.— Endemic.

N o t e s.— This species was described under *Naravelia,* because of similarity in achenes. But recently I collected fertile specimens which cleary belong to *Clematis.* It differs from *Naravelia* in that upper leaflets are not transformed into tendrils, 5 main veins branched at the base of the leaves, and petals absent.

9. Clematis smilacifolia Wall. in Asiat. Res. 13: 414. 1820; Kurz in J. Asiat. Soc. Bengal 43: 44. 1874; Williams, in Bull. Herb. Boiss. ser. 2, 5: 22. 1905; Finet & Gagnep. in Lecomte, Fl. Gen. Indo-Chine 1: 3. 1907; Hosseus, in Beih. Bot. Centralbl. II Abt. 28: 389. 1911; Craib in Republ. Univ. Aberdeen Stud. 57: 4. 1912; Gagnep. Suppl. Fl. Gen. Indo-chine 1: 3. 1938; H. Eichler in Bibl. Bot. 124: 44; Hara in Enum. Fl. Pl. Nepal 2: 16. 1979.— *C. smilacifolia* var. *grandiflora* Craib in Fl. Siam. Enum. 1: 15. 1925.— *C. smilacifolia* var. *angustifolia* Tamura in J. Phytogeogr. Tax. 28: 14. 1980.— *C. smilacina* Blume in Bijdr. 1. 1825; Craib, Fl. Siam. Enum. 1: 15. 1925.— *C. subpeltata* Wall. Pl. As. Rar. 1: 19, t. 20. 1830; Craib, Fl. Siam. Enum. 1: 15. 1925.— *C. loureiriana* Merril in Trans. Amer. Phil. Soc. n. ser. 24: 154. non DC. 1935; Hand.-Mazz. in Acta Horti Gothob. 13: 219. 1939; M.-Y. Fang in Fl. Reipub. Popul. Sin. 28: 228. 1980.— *C. loureiriana* var. *subpeltata* (Wall.) Hand-Mazz. in Acta Horti Gothob. 13: 219. 1939.— *C. loureiriana* var *peltata* W.T. Wang in Acta Phytotax. Sin. 6: 220. 1957. Figure 4.

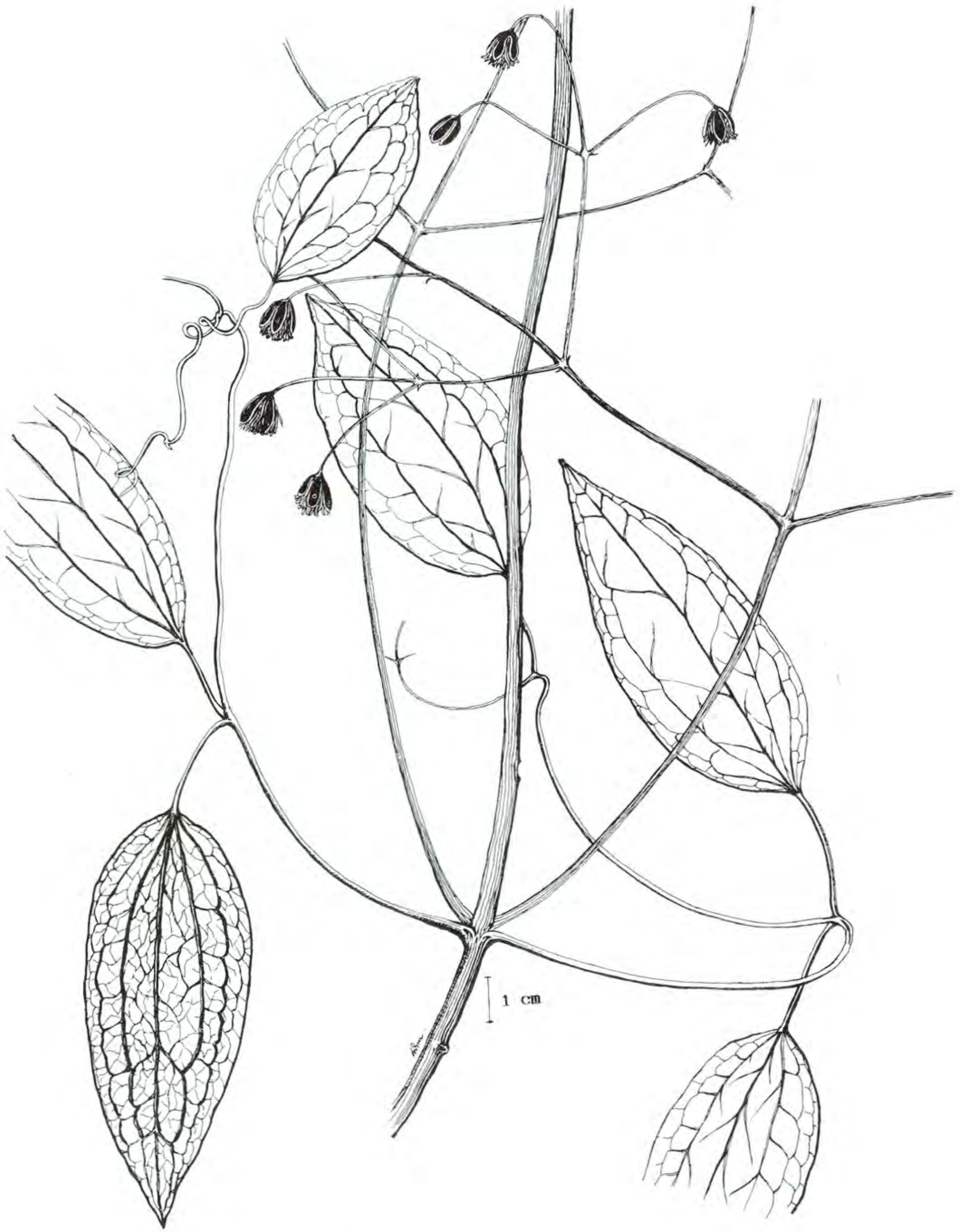


Figure 3. *Clematis eichleri* Tamura: Twig and young inflorescences (Phengklai & Tamura)

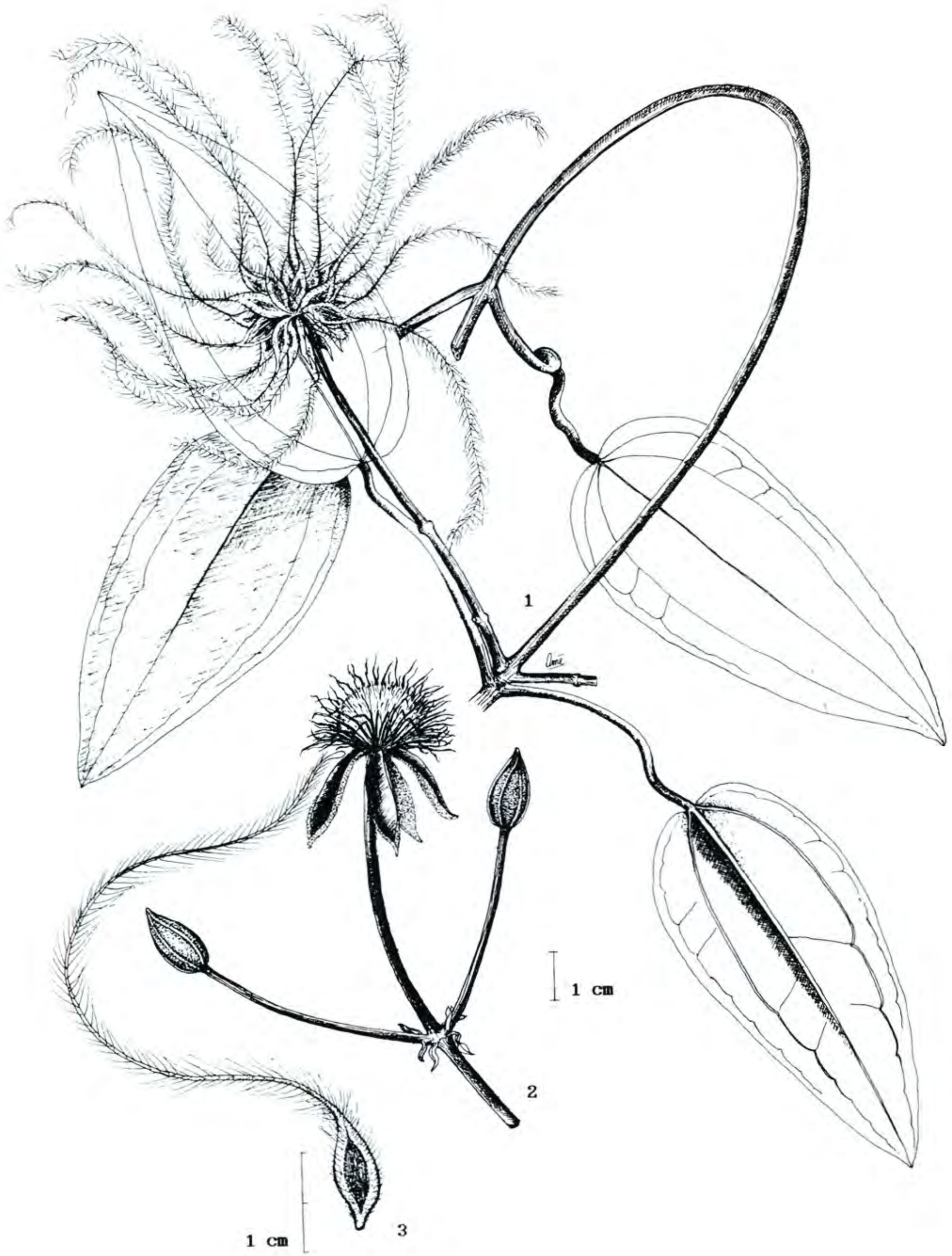


Figure 4. *Clematis smilacifolia* Wall. var. *angustifolia* M. Tamura: 1. Twig and inflorescence; 2. Flowers; 3. Achene (C. Niyomdham 368).

S p e c i m e n s.— NORTHERN: Chiang Mai, Doi Chiangdao, 1800 m, on limestone rocks, Smitinand & Anderson 7237, Dec. 2, 1961, fr (BKF), 400 m, scandent shrub in deciduous forest on ridge, fls. whitish, Smitinand 3725, Feb. 10, 1957, fl, fr (BKF); Doi Suthep, Collins 1212, Feb. 10,1926, fr (ABD, BK, K), 500–700 m, Hosseus 297, Jan. 1, 1905, fr (BM, E, K, L, P), 1100 ft, mixed jungle by stream, Kerr 1552, Nov. 14, 1910, fl (BM), 330 m, near stream, perennial climber, fls. dark purple, Kerr 1552b, Nov. 18, 1911, fl (BM, E, K), 400 m, climbing on small trees in deciduous forest by stream, Kerr 6705, Dec. 10, 1922, fl (ABD, BM, E, K, P), 1400 m, open grassy *Quercus* forest, Sørensen, Larsen & Hansen 6580, Dec. 31,1958, fr (C); Sop Mae Prik, Mae La, Mae Kok 470 m, climbing in scrub, Garrett 150, Feb. 18, 1924, fr (ABD, BKF, BM, K, L); Mae Kong, 370 m, river bank, Garrett 304, Nov. 9, 1926, fl (ABD, C, E, K, L,), Mae Rim, Mae Sa Bot. Garden, 700 m, Pooma 22, Feb. 10, 1987, fl (BKF); Doi Inthanon, 470 m, Nooteboom, Tantisewe & Phengklai 755, Jan. 19, 1969, fr (BKF, C, K); Huai Mae Sa, Mae Rim, 600 m, climbing along stream in open *Dipterocarpus turbinatus* forest, Pooma 12, Dec. 17, 1986, fl (BKF); Omkoi, Bo Luang Tableland, Shimizu, Toyokuni, Yahara & Santisuk 19159, Oct. 18, 1979, fl (BKF); Omkoi to Omhaet, 900 m, climber in gallery forest, Hansen, Seidenfaden & Smitinand 10854, Jan. 21, 1964, fl (C); Phrae, Huai Le Lami, 500 m, climbing in evergreen by stream, Kerr 4864, Feb. 18, 1921, fr (ABD, BM, E) - type of *C. smilacifolia* var. *grandiflora*. NORTH-EASTERN: Phetchabun, Nam Nao Nat. Park, 800 m, climber scattered in Pine-Dipterocarpus forest, Smitinand, Dec. 12, 1973, fl, fr (BKF). EASTERN: Nakhon Ratchasima, Bukanum, 400 m, climbing in evergreen forest, Kerr 9862, Jan. 6, 1925, fl (A, BK, BM, E, K); Pak Chong, 300 m, river bank, Marcan 1579, Jan. 1, 1924, fl (A, BM, K). SOUTH-WESTERN: Kanchanaburi, Ta Kanun, 200 m, climbing in bamboo forest by stream, Kerr 10529, Feb. 18, 1926, fr (A, AAU, BK, BM, C, E, K) - type; Song Thu, Larsen 9482, Feb. 1, 1962 fl (C, K, L); Paon Ngam, Lakol Nakom, in evergreen forest, Adisai 247, Dec. 4, 1962, fl (A, BK, K); Sai Yok, Ban Keng Liang, at stream, Larsen 9303, Jan. 26, 1962, fl (C).

D i s t r i b u t i o n.— Himalaya, India (type from eastern Bengal), Burma, Thailand, Indo-China, southeastern Tibet, China (Yunnan, Kweichow, Kangton, Kangsi) and Malesia to northwestern New Guinea.

10. Clematis fulvicoma Rehder & Wilsson in Sargent Pl. Wils. 1: 327. 1913; Tamura in J. Phytogeogr. Tax. 28: 14. 1980.

S p e c i m e n s.— NORTHERN: Chiang Mai, Doi Angka, by stream, Coolidge & Carpenter 78, Mar. 15, 1937, fr (K); Huai Me Kami, 500 m, climbing in evergreen by stream. Kerr 4864, Feb. 18, 1921, fr (K).

D i s t r i b u t i o n.— Khasia, Burma, northern Thailand, Indo-China and Chinal (western and southern Yunnan (type)).

III. **Naravelia** DC., Syst. Nat. 1: 167. 1817; H. Eichler in Bibl. Bot. 124: 53. 1958; Tamura in Acta Phytotax. Geobot. 37: 106. 1986, in Nat. Pfl.-fam. ed. 2, 17 a IV: 387, 1995.— *Clematis* sect. *Naravelia* (DC.) Prantl in Bot. Jahrb. 9: 216, p.p. 1887.

6 species in the tropical and sometimes subtropical Asia.

KEY TO THE SPECIES

1. Achenes shortly caudate. Inflorescences axillary, 1–3-flowered **1. N. dasyoneura**
1. Achenes with a long tail. Inflorescences several- to many-flowered
  2. Leaves herbaceous-chartaceous, brown or yellowish brown when dry. Stems porcate with ca 12 ridges **2. N. siamensis**
  2. Leaves subcoriaceus, greyish when dry. Stems striate with many striae
    3. Leaves glabrous or pubescent, inflorescences pilose **3. N. laurifolia**
    3. Underside of leaves and inflorescences tomentose **4. N. zeylanica**

1. Naravelia dasyoneura Korth. in Nederl. Kruidk. Arch. 1: 208. 1847; Finet & Gagnep. in Bull. Soc. Bot. France 50: 602. 1903, Fl. Gen. Indo-Chine 1: 8, fig. 2. 1907; Gagnep. Suppl. Fl. Gen. Indo-Chine 1: 7. 1938; H. Eichler in Bibl. Bot. 124: 58. 1958; Tamura in J. Phytogeogr. Tax. 28: 15. 1980, in Acta Phytotax. Geobot. 37: 107. 1986. — *N. dasyoneura* var. *siamensis* Craib in Fl. Siam. Enum. 1: 17. 1925.— *N. axillaris* Ridl. in J. Asiat. Soc. Straits 59: 60. 1911.— *N. axillaris* var. *grandiflora* Craib in Fl. Siam. Enum 1: 16. 1925.— *N. axillaris* var. *paniculata* Craib in Fl. Siam. Enum. 1: 16. 1925.— *Clematis dasyoneura* (Korth.) Kuntze in Verh. Bot. Vereins Prov. Brandenburg 26: 123. 1885; Williams in Bull. Herb. Boiss. ser. 2, 5: 22. 1905.

S p e c i m e n s.— CENTRAL: Bangkok, climbing on bushes on waste ground, pets. green, Kerr 4070, Mar. 14, 1920, fl (BM, C, E, K) - syntype of *N. dasyoneura* var. *siamensis*; below 5 m, climbing on bushes on waste ground, Kerr 4070A, Apr. 29, 1920, fl, fr (BM, K) - syntype of *N. dasyoneura* var. *siamensis*, herbaceous climber, Marcan 2122, Jul. 4, 1920, fl (A, BM), Cruper, fls. white, Marcan 92, Mar. 14, 1920, fl (ABD, BM) - syntype of *N. dasyoneura* var. *siamensis*. NORTH-EASTERN: Nakhon Phanom, Ta Uten, 200 m, climbing in hedgerow, Kerr 8444, Feb. 13, 1924, fl (ABD, BK, BM, K) - syntype of *N. axillaris* var. *grandiflora*, Kerr 8444A, Feb. 14, 1924, fl (ABD, BK, BM, E, K) - syntype of *N. axillaris* var. *grandiflora*, 200 m, in scrub, pets. green, stams. white, fls. fragrant, Kerr 8943, Feb. 15, 1924, fl (ABD BM, K) - syntype of *N. axillaris* var. *grandiflora*. PENINSULAR: Yala-Pattani, 50 m, climbing on bushes on bank of river, Kerr 7731, Sep. 4, 1923, fr (A, BK, BM, K) - type of *N. axillaris* var. *paniculata*; Surat Thani, Ta Kanaun, under 50 m, climbing on scrub, Kerr 12341, Mar. 14, 1927, fl (BK, BM, K).

D i s t r i b u t i o n.— Thailand, Indo-China, Malay Peninsular, Philippines, Java and Borneo (type).

2. Naravelia siamense Craib in Kew Bull. 1915: 419. 1915, Fl. Siam. Enum. 1: 17. 1925; Tamura in J. Phytogeogr. Tax. 28: 15. 1980, in Acta Phytotax. Geobot. 37: 107. 1986.— *N. zeylanica* Finet & Gagnep. in Bull. Soc. Bot. France 50: 601, non L., p.p. 1903; Fl. Gén. Indo-Chine 1: 8, p.p. 1907; Gagnep., Suppl Fl. Gen. Indo-Chine 1: 7, p.p. 1938.

S p e c i m e n s.— NORTHERN: Chiang Mai, Doi Chiangdao, climber on hill in evergreen forest, Bunchuai 1182, Nov. 9, 1963, fl (BKF, C); Doi Suthep, 1100 ft, climber, fls. white, in scrub jungle, Kerr 1527b, Nov. 9, 1911, fl (BM, E) - syntype; climber, fls. yellow, Singhasathit 294, Oct. 30, 1948, fl (C); Mae Taeng, 700 m, climbing on low growth in mixed deciduous forest, Kerr 6489, Oct. 30, 1922, fl (ABD, BK, BM, E, K) -

syntype; Ban Huai Bong to the border, Rock 1902, Jan. 1922, fr (K); Mae Samoeng, 400 m, climber or rather twinning shrub, fls. yellowish green, Winit 638, Nov. 22, 1921, fl (ABD, BK, K) - syntype; near Nakhon Sawan, climber, scattered in secondary scrub, Smitinand 7197, Nov. 25, 1961, fr (K). NORTH-EASTERN: Sakon Nakhon, Phuphan, Phloenchit 2038, Dec. 10, 1962 (BKF); Phu Phan National Park, 380 m, Murata & Phengklai 50348, Nov. 15, 1984 (BKF). EASTERN: Nakhon Ratchasima, Pakchong, 200 m, climber, common in old clearings, Smitinand 4833, Sep. 1, 1958, fl (BKF, C, L); Buriram, Khao Phanom Rung, 370 m, Murata, Phengklai, Nagamasu & Nantasaen 37324, Oct. 3, 1984. (KYO). SOUTH-EASTERN: Chon Buri, near Sriracha, 5 m, seps. green, pets. yellow, Collins 1634, Oct. 24, 1927, fl (ABD), 40 ft, Collins 1724, Nov. 30, 1927, fr (A, BK, BM, K), 20 ft, Collins 1637, Oct. 24, 1927, fl (BK, K). CENTRAL: Saraburi, Muak Lek, 200 m, climbing on rocky limestone hill, Kerr 9142, Sep. 4, 1924 (A, BK, BM, K); Samlun, Maxwell 73–523, Oct. 16, 1973 (AAU, BK), Ban Nong Bua, Put 1084, Sep. 26, 1927, fl (ABD, BK, BM, C, E, K). SOUTH-WESTERN: Kanchanaburi, Sri Sawat, 150 m, disturbed forest near village on limestone, straggling shrublet, van Beusekom, Geesink, Phengklai & Wongwan 3399, Nov. 5, 1971, fl (C, K, KYO, L); Salak Pra Wildlife Sanctuary, Sadong, 100 m, savannah like dry deciduous forest on limestone, van Beusekom, Phengklai, Geesink & Wongwan 4039, Nov. 29, 1971, fr (BKF, C, K, KYO, L); Ratchaburi, Ban Pang, 10 m, a climber with yellow green fls. in scrub jungle, Winit 453, Oct. 23, 1916, fl (K) - syntype; 10 m, a climber on hedges fls. yellowish green, Winit 454, Oct. 25, 1916, fl (ABD, K), a deciduous climber in scrub jungle, Winit 455, Dec. 11, 1916, fr (K) - syntype.

D i s t r i b u t i o n.— Burma, Thailand (type) and Indo-China.

3. Naravelia laurifolia Wall. ex Hook. f. & Thomson, Fl. Ind. 1: 3. 1855; Craib in Fl. Siam. Enum. 1: 17. 1925; H. Eichler in Bibl. Bot. 124: 54. 1958; Tamura in J. Phytogeogr. Tax. 28: 15. 1980, in Acta Phytotax. Geobot. 37: 108. 1980.

S p e c i m e n s.— EASTERN: Nakhon Ratchasima, around Pak Thong Chai, Charoenphol, Larsen & Warncke 4510, Nov. 3–4, 1970 (AAU, E, KYO); Khao Laem, Put 3514, Dec. 26, 1930 (A, AAU, BK, BM, E, K); Prachinburi, Nong Khu Forest, Collins 471, 1917 (A, K); Buriram, 200 m, Phengklai et al. 3290, Nov. 19, 1976 (BKF). SOUTH-EASTERN: Chantaburi, Khao Soi Dao, 400 m, disturbed evergreen forest, climber in top of tree with grey frs., van Beusekom & Smitinand 2092, Nov. 10, 1969, fr (AAU, E, KYO); Tamun, Chantaburi, 200 m, climbing on trees by stream in evergreen forest, Kerr 9713, Dec. 19, 1924, fr (AAU, ABD, BK, BM, C, E, K); Chon Buri, Sriracha Forest, Nong Yui Bao, 80 ft, Collins 1724, Nov. 23, 1927, fr (ABD, BK, BM, K); Sattahip, Toong Brong, Maxwell 72–2, Jan. 1, 1972 (AAU, BK); Khao Khieo, Ban Bueng, 300 m, open area in dry evergreen forest, teps. green and thick, anths. yellow, very fragrant, leaflets dark green above, green bellow, Maxwell 76–691, Oct. 23, 1976 (AAU, BK); Trat, Ko Chang, 5m, climbing on bushes close to bush, Kerr 9247, Sep. 29, 1924, fl (ABD, BK, BM, E, K); Trat, 10 m, strong climber, 20 m long on tree by stream, fls. grey, Smitinand 2161, Feb. 16, 1955, fr (C, L); Chantaburi, Pong Nam Ron, 250 m, extensive climber up tall tree in evergreen forest, fls. green, stams. yellow, Smitinand 3472, Dec. 26, 1956, fl (BKF, L). PENINSULAR: Nakhon Si Thammarat, Khiri Wong, open secondary vegetation up to a few 100 m, climber in low treelet, van Beusekom & Phengklai 738, May 15, 1968, fl

(AAU, BKF, C, E, K, KYO, L); Pattani, 50 m, climbing on bushes in scrub, Kerr 7743, Sep. 8, 1923, fr (ABD, AAU, BK, BM, K); Chumphon, Pato Langsuan, 100 m, climbing on trees by stream, Kerr 12178, Mar. 2, 1927 (A, BK, BM, C, E, K, L); Ranong, Kam Puam, 10 m, climbing evergreen by stream, Kerr 17024, Feb. 5, 1929, fl (AAU, ABD, BK, BM, E, K); Trang, Kao Pap Pa, 150 m, evergreen forest, Larsen 33258, Mar. 13, 1974, fl (AAU, K, KYO); Surat Thani, Ko Samui, Put 694, May 25, 1927, fl (ABD, BK, BM, C, E, K).

Distribution.— Assam, Burma, Thailand, Indo-China, China (Hainan), and Malesia (type from Penang), to Tanimber, Molucca and Sula.

4. Naravelia zeylanica (L.) DC., Syst. Nat. 1: 167. 1817; Hook. f. & Thomson in Fl. Ind. 3. 1855; Tamura in J. Phytogeogr. & Tax. 28: 15. 1980, in Acta Phytotax. Bot. 37: 108. 1986.

Specimens.— SOUTH-WESTERN: Kanchanaburi: Mae Nam Noi, near waterfall, climber common by stream in evergreen forest, Phengklai 383, Jan. 2, 1962, fl (C, K).

Distribution.— Southern and western India, Ceylon (type), Burma, Thailand, and Malesia, to Sumbawa, Flores and Molucca.

IV. **Ranunculus** L., Sp. Pl. 548, excl. p. 1753; Hand.-Mazz. in Acta Horti Gothob. 13: 136. 1939; Tamura in Nat. Pfl.-fam. ed. 2, 17 a IV: 412. 1995.

ca 600 species in all continents, and 3 species in Thailand.

KEY TO THE SPECIES

1. Achenes compressed, marginate, with a distinct beak. Flowers 10–16 mm in diam
   2. Head of achenes globose. Leaves 3–5-fid to ternate — **1. R. siamensis**
   2. Head of achenes elliptic. Leaves biternate — **2. R. chinensis**
1. Achenes swollen, without distinct margin, beak short. Flowers 5–8 mm in diam
   3. Stem erect. Leaves divided. Flowers in corymbiform cyme — **3. R. sceleratus**
   3. Stem creeping. Leaves cordate, not divided. Flowers oppositifolious — **R. ficariiflolius**

1. Ranunculus siamensis Tamura in J. Phytogeogr. Tax. 28: 15. 1980.— *R. japonicus* Craib in Fl. Siam. Enum 18, non Thunb., non Langsd. ex DC. 1925; Finet et Gagnep., Fl. Gen. Indo-Chine 1: 10. 1907; Gagnep., Suppl. Fl. Gen. Indo-Chine 1: 12. 1938. Figure 5.

Specimens.— NORTHERN: Chiang Mai, Bo Luang 1100 m, disturbed rice field closed by dry Dipterocarpus forest, Geesink, Phanichapol & Santisuk 5904, Jun. 13, 1973 (BKF, C); Bo Luang to Omkoi, open forest of *Pinus khasya* and *Dipterocarpus tuberculatus*, in swampy place, van Beusekom & Phengklai 1143, Jun. 11, 1968, fl, fr (AAU, BKF, C, E, K, KYO, L); Omkoi, 800 m, Phengklai, Tamura, Niyomdham & Sangkachand 4180, Jun. 28, 1978 (BKF, KOBE, NY) - type; Mae Sanam, 900 m, Phengklai, Tamura, Niyomdham & Sangkachand 4157, Jun. 27, 1978 (BKF, KOBE, NY), 900 m, along stream in fen area, Hansen, Seidenfaden & Smitinand 10815, Jan. 20, 1964 (BKF, C); Mae Tung, 1100–1200 m, open grassy forest, Kerr s.n. Jul. 3, 1922, fl (BK, BM);

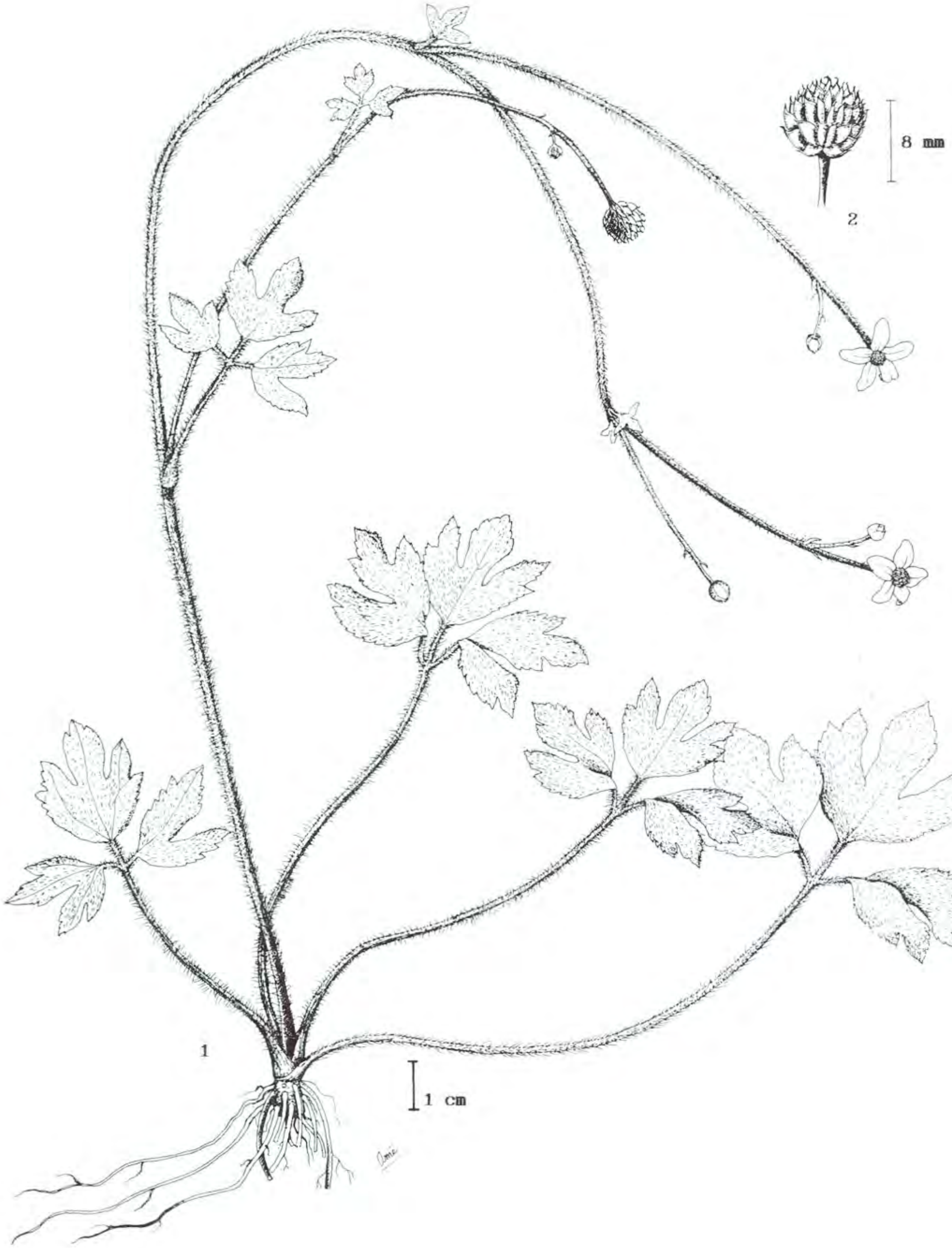


Figure 5. *Ranunculus siamensis* M. Tamura: 1. Habitat and inflorescences; 2. Head of achenes (R. Pooma 121).

Mae Wang, 1020 m, border of marsh in Pinus forest, Winit 1388, Apr. 8, 1925, fl, fr (BK, BKF, K); Doi Ngao, Mae Chaem 1300–1500 m, open grassy forest, Kerr 5426, May 12, 1921, fl, fr (ABD, BK, BM, K).

Distribution.— Himalaya: Nepal, eastern India (Munipur), Burma, Thailand (type) and Indo-China (Tonkin).

Notes.— This species resembles *R. napaulensis* and *R. diffusus*, but it differs from the former by the spreading sepals and from the latter by not foveolate achenes.

2. Ranunculus chinensis Bunge, Enum. Pl. Chin. Bor. 3. 1833.; Hook. f. & Thomson Fl. Ind. 38. p.p. 1855; Tamura in J. Phytogeogr. Tax. 28: 15. 1980.— *R. pensylvanicus* Hook. f. & Thomson in Fl. Brit. Ind. 1: 19. non L., p.p. 1972; Finet & Gagnep., Fl. Gen. Indo-Chine 1: 10. 1907; Gagnep., Suppl. Fl. Gen. Indo-Chine 1: 13. 1938; Craib in Fl. Siam. Enum. 18. 1925.

Specimens.— NORTH-EASTERN: Nakhon Phanom, Bank of Mae Khong, 200 m, Kerr 8431, Feb. 13, 1924 (ABD, BK, BM, P).

Distribution.— Himalaya: Nepal, Bhutan, India: Assam, Kamal, Munipur, Burma, Thailand, Indo-China, eastern Siberia, Mongolia, China (type), Korea and Japan.

3. Ranunculus sceleratus L., Sp. Pl. 551. 1753; Finet & Gagnep., Fl. Gen. Indo-Chine 1: 11. 1907; Gagnep., Suppl. Fl. Gen. Indo-Chine 13. 1938; Craib in Fl. Siam. Enum. 18. 1925; Tamura in J. Phytogeogr. Tax. 28: 15, 1980.

Specimens.— NORTH-EASTERN: Nakhon Phanom, Bank of Mae Khong, 200 m, Kerr 8432, Feb. 13, 1924 (BK, BM, K), Nong Khai, Chaiyaburi, 200 m, on sand bank, Kerr 21767 fl, fr (K).

Distribution.— Europe (type), Central Asia, Himalaya, northern India, Siberia, Mongolia, China, Korea, Japan and North America.

Ranunculus ficariifolius Lév. & Van. in Bull. Soc. Bot. France 51: 289. 1904; Hand-Mazz. Symb. Sin. 7: 298. 1931, in Acta Horti Gothob. 13: 163. 1939; Tamura in J. Phytogeogr. Tax. 28: 15.— *R. javanicus* H. Eichler in Bibl. Bot. 124: 98, p.p., non Blume, 1959.

Specimens.— Top of Pu Sai Lai Leng, near edge of spring, Smiles, Apr. 19, 1893, fl (K).

Distribution.— Himalaya: Nepal to Bhutan, Thailand and China (Yunnan (type), Sechuan, Kweichou and western Hupeh).

Notes.— The locality of this species is not in Thailand, though it is near there. The species is closely related to *R. javanicus* Blume, but in the latter, stems are not so leafy, cauline leaves narrower, usually cordate-lanceolate to lanceolate, petioles shorter, and flowers larger.

V. **Thalictrum** L., Sp. Pl. 545, 1753; Tamura in Nat. Pfl.-fam. ed. 2, 17 a IV: 474. 1995.

ca 200 species distributed in the north hemisphere, and Africa, South America and Malesia. In Thailand, 4 species and 1 variety occur.

KEY TO THE SPECIES

1. Filaments filiform, or slightly swollen only at the top
  2. Leaves 3–6 times ternate. Inflorescence many-flowered, paniculiform. Achenes 3–7 in a head **1. T. foliolosum**
  2. Leaves 2–3 times ternate. Inflorescence gabeled. Achenes 30–55 in a head **2. T. punduanum**
1. Filaments clavate, tapering downward
  3. Pedicels 2–13 mm in fruit. Achenes sessile **3. T. calcicolum**
  3. Pedicels 20–72 mm in fruit. Achenes with a stalk
    4. Leaves ternate **4a. T. siamense**
    4. Leaves 2–3 ternate **4b. T. siamense var. longicarpum**

1. Thalictrum foliolosum DC., Syst. Nat. 1: 175, 1817; Craib in Fl. Siam. Enum. 18. 1925; T. Shimizu in South-east Asian Studies 8: 185. 1970; Tamura in J. Phytogeogr. Tax. 28: 16. 1980.

S p e c i m e n s.— NORTHERN: Chiang Mai, Me tuen, 1000–2000 m, common in open grassy forest, growing to highest of 1.5 m, Kerr 6205, Jul. 3, 1922, fl (ABD, BK, BM, E, K, L); Doi Suthep, 1700 m, open grassy forest, Sørensen, Larsen & Hansen 4039, Jul. 13, 1958 (BKF, C, K); Doi Chiangdao, 800–1400 m, scrambling herb in more or less open places in forest edge, fls. white, Smitinand & Sleumer 1015, Aug. 15, 1963, fl (BKF, L); 1400 m, scrambling herb common on bare slope between limestone rock, Smitinand & Sleumer 1043, Aug. 16, 1963, fr (BKF, L); Ban Na-Rae, Doi Angkhong, Suthusom 3074, Aug. 5, 1974, fl (BK), Pong Pho, 1100 m, hill side evergreen, Larsen, Santisuk & Warncke 2831, Jul. 30, 1968 (AAU, BKF, C, E, K, L).

D i s t r i b u t i o n.— Himalaya: from Kashmir westward (type from Nepal), Tibet, northern Burma and Thailand.

2. Thalictrum punduanum Wall., Pl. As. Rar. 2: 26. p.p. 1831; Hook. f. & Thomson Fl. Ind. 18. p.p. 1855; Lecoy. Monogr. Thalictrum. 142. 1855; Tamura in J. Phytogeogr. Tax. 28: 16. 1980.— *T. punduanum* var. *glaucum* Hook. f. & Thomson, Fl. Br. Ind. 1: 13. 1872.

S p e c i m e n s.— NORTHERN: Doi Pa Maun, 1710 m, on rock face and rotting wood, very wet spots, fls. greenish white, Garrett 400, Jul. 7, 1927 (ABD, C, E, K).

D i s t r i b u t i o n.— Himalaya: Kumaon, Garhwal, Punda (type), Assam, Khasia Hills and northern Thailand.

N o t e s.— There are 3 plant segments on the type sheet of *T. punduanum*, Wallich 3712 in Kew. In the first, underside of leaves and achenes are covered with glandular hairs and regarded as the type of *T. punduanum* var. *glandulosum* Hook. f. & Thomson. In the second, leaves are glabrous, both anthers and filaments ca 2.5 mm,

and in the third, leaves glabrous, anthers ca 1 mm and filaments 2.5–3 mm. They belong to *T. punduanum* var. *glaucum* Hook.f. & Thomson. Thai specimens possess a form with short anther.

3. Thalictrum calcicolum T. Shimizu in Acta Phytotax. Geobot. 24: 41, p.p. 1969; Tamura in J. Phytogeogr. Tax. 28: 16. 1980.— *T. calcicolum* var. *calcicolum* in South-east Asian Stud. 8: 184. 1970.— *T. scabrifolium* var. *levis* Franch. Pl. Delav. 17. 1889.

S p e c i m e n s.— NORTHERN: Doi Pa Kao, 1650 m, in rock crevis, Garrett 690, Aug. 12, 1931, fl, fr (BKF, BM, K, L); Doi Chiangdao, 1900–2175 m, in grassy place among rocks at edges, Shimizu Koyama & Nalampoon 10034, Sep. 14, 1967 (BKF, E, KYO) - type, 2150 m, among grass between limestone boulders, fls. white, Smitinand & Sleumer 1061, Mar. 17, 1963 (BKF, K, L).

D i s t r i b u t i o n.— Nothern Thailand (type) and China (Yunnan).

N o t e s.— Thai plants named *T. calcicolum* is the same with Chinese *T. scabrifolium* var. *levis*. This differs from var. *scabrifolium* not only by the glabrous habit but also by the number and shape of achenes. In *T. scabrifolium* achenes are 5–30 in a head and tapering into a long hamate beak, while in *T. calcicolum*, achenes are 3–10 in a head, shorter and a beaks not always elongate.

4. Thalictrum siamense T. Shimizu in Acta Phytotax. Geobot. 24: 42. 1969, in South-east Asian Stud. 8: 185. 1970; Tamura in J. Phytogeogr. Tax. 28: 16. 1980.

S p e c i m e n s.— NORTHERN: Chiang Mai, Doi Chiangdao, 1900–2175 m, in grassy place among rocks at ridge, Shimizu, Koyama & Nalampoon 10035, Sep. 14, 1679, fl, fr (BKF, KYO) - type, 1900 m, herb common on rocky ridge, fls. lilac, Smitinand 4750, Jul. 16, 1958, fl, fr (BKF, C), 2100 m, herb in limestone rock crevices, fls. bluish, Smitinand, Poore & Robbins 7793, Nov, 10, 1962 (BKF).

D i s t r i b u t i o n.— Endemic.

var. longicarpum (T. Shimizu) Tamura in J. Phytogeogr. Tax. 28: 16. 1980.— *T. calcicolum* T. Shimizu, Acta Phytotax Geobot. 24: 41. p.p., non T. Shinmizu, 1969.— *T. calcicolum* var. *longicaropum* T. Shimizu in South-east Asian Stud. 8: 184. 1970.

S p e c i m e n s.— Chiang Mai, Doi Chiangdao, 1500 m, crevices in open limestone, Shimizu & Futoh 10242, Sep. 15, 1967 (BKF, KYO), 800–1950 m, rather common on limestone rocks, though scattered, fls. pale purple, Smitinand & Sleumer 1027, Aug. 17, 1963, fl, fr (BKF, K, L), 1850–2000 m, common on open limestone rocks along forest, Smitinand & Sleumer 1068, Aug. 17, 1963, fl, fr (BKF, K, L), 1900–2175 m, in grassy place among rocks at ridge, Shimizu, Koyama & Nalampoon 10034, Sep. 14, 1967, fl (KYO) - type of *T. calcicolum* var. *longicarpum*.

D i s t r i b u t i o n.— Endemic.

N o t e s.— This variety is distinguished from var. *siamense* only by the biternate leaves. It differs also from *T. calcicolum*, under which this variety was described, by achenes with elongate and hamate beaks and short stalks, and longer pedicels.