Contributions to the Flora of Southeast Asia
VII. Taxonomy and Phytogeography of Some Temperate Species in Thailand (3)#

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During the rainy season in 1982, SHIMIZU and KONTA made their third and first visit to Thailand for the purposes of floristic and biosystematic study of the Thai flora. Also, KOYAMA made his third visit in the dry season extending from 1982 to 1983. Through many botanical trips during their stay, new materials were added to their own hands. They are now in progress of identification and examination.

The present paper aims to present some new taxonomic or phytogeographical information on the temperate elements acquired to be continued from the second report.

We would like to mention, with many thanks, the 1982 expedition and this study were supported by the Grant of the Ministry of Education, Science and Culture, of Japan, No. 57041072 and No. 58043020, and the cordial helps of the Thai government.

**  Centinued from this Acta, 32: 37-46 (1981).
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Chiang Mai: Doi Chiang Dao, T9873 (KYO). Chiang Rai: Doi Tung, T11067 (KYO).—Open grassy field under limestone cliff, 1100–1800 m alt.

Distr. Endemic.

In this genus, about 60 species have been known from the temperate region of the northern hemisphere. Our species seems to belong to the temperate species group and to have affinity with a himalayan species, H. nepalense, and also with H. bivittatum distributed in Yunnan, Laos and Tonkin.

(F. KONTA)

Chiang Mai: Doi Chiang Dao, T21047, T21072 (KYO).—Open limestone ridge, 1800-2150 m alt.

Distr. Endemic (F. Konta)


Chiang Mai: Doi Pui, T9369, T9520, T15361, T18602, T29724 (KYO).—Creeping on ground at the roadside in light shade and in evergreen forest, 1350-1680 m alt.


Our specimens cited above have fruits with short spicate hairs. Since the hairs of fruit are absent in the figure given by Tardeu (1967), further study will be necessary as to the variation of hairiness.


Chiang Rai: Doi Pa Hom Pok, NW of Pham, T9687—type (KYO; isotype in BKF & SHIN). Chiang Mai: Pha Mawn (Ban Yang) to the camp, T15672 (KYO, SHIN), T15674, T15675 & T15754 (KYO); Chom Thong, K. Bunchai 1433 (BKF); Pha Mon, T. Smittinand & al. 7616 (BKF); Doi Anka, M. G. Lakshnakara 1482 (BKF); Doi Inthanon, T18782, T18789 & T29825 (BKF, KYO, SHIN). Loc: Phu Luang, G. Chernsivirithana 1087 (BKF).—Evergreen forest, 1600-2300 m alt.

Distr. North Thailand, North Burma and Sikkim.

In 1970, I. jurpioides was described, being characterized by larger outer lateral sepals to be 10-12 mm long than those of I. jurpia. The collection obtained from northern Thailand since then shows a wide variation in their shape and size. They are round to ovate and 5 to 12 mm long. The typical sepals of I. jurpia are shorter than 4 mm long and somewhat narrower. In addition, horn of the standard usually well develops in I. jurpia contrary to the present plant. The flower color is sometimes white as in T18789 and sometimes creamy as in T18782.


Chiang Mai: Doi Anka, Pa Ngem, north peak, H. B. G. Garrett 72 (K—type, isotype in BM & BK); Doi Angka, A. F. G. Kerr 6298 (K, BM, BK), M. G. Lakshnakara 1495 (BK); Doi Inthanon, T. Smittinand & al. 7642 (BKF), T15290 & T16083 (SHIN), T18047, T29785 & T29806 (BKF, KYO, SHIN), S. Takao s.n. (SHIN). Chiang Rai: Doi Pa Hom Pok, NW of Pham, T9613 (BKF, KYO, SHIN).—Open roadside or edge of evergreen forest, 1600-2500 m.

Distr. Endemic.

This is an inhabitant of the lower montane rain forest zone, growing in light shade such as at the edge of the forest. Its nearest species is I. stenantha Hook. f. from East
The chromosomal number of the present species was always found to be 2n=18 by T29806. (T. Shimizu)

**Impatiens racemosa** DC., Prodr. 1: 688, 1824; Shimizu in Southeast Asian Studies 8: 210, 1970. Type from Nepal.

Chiang Mai: Doi Angka, Pa Ngem, north peak, H. B. G. Garrett 83 (BK, BM, C, K) & South Peak, H. B. G. Garrett 334 (K), near summit, H. B. G. Garrett 429 (C, K, KYO, L, P), A. F. G. Kerr 6320 (BK, BM, K); Doi Inthanon, T15999, T16000, T16007, T18934, T29791, T29796 (BK, KYO, SHIN), S. Takao s.n. (SHIN), T. Smithinan & al. 7655 (BK); Doi Chiang Dao, A. F. G. Kerr 6561 (BK, BM, K), K. Bunchuan 1240 (BK); Doi Chang, Mae Taeng Distr., T20596, T23708 (BK, KYO, SHIN); Doi Pha Hom Pok, Fang Distr., T33440 (BK, KYO).—Marshy ground under or at the edge of evergreen forest, 1600–2500 m.

Distr. South Tibet, Himalayas (Kashmir to Sikkim), Khasia, Burma and North Thailand.

This is also an inhabitant of the lower montane rain forest, growing in the top area of the high mountains in North Thailand. So far it had been recorded from Doi Inthanon and Doi Chiang Dao. Our collection added two new localities as mentioned above.

Although this species is characterized by a long slender spur of the lip, occasionally it does not develop when plants are very small or flowers are on their lower part. Sometimes both the flowers with and without spur are seen on the same plant. The name, var. ecalcarata Hook. f., is not necessary. According to the original description, color of the flower is yellow. Actually, all the specimens from Nepal, Sikkim and Bhutan which I examined in TI show the yellow flowers. However, our collection from Thailand indicated by T-number are all bearing slightly pinkish flowers, being never yellow.

The chromosomal number was hitherto reported to be n=9 by Chaterjee, A. and A. K. Sharma (1970, Nucleus 13: 179–200) and n=10 by Malla et al. (1977, Taxon 26: 557–565) as to the Nepalian materials. The Thai plant, T29791, was proved to be 2n=18. (T. Shimizu)


Chiang Mai: Doi Chang, T20747 (BK, KYO); Doi Chiang Dao, T21088, T21168 (BK, KYO); Pine Improvement Center, Mae Sa Nam, T32370 (BK, KYO).—Edge of open forest or open limestone ridge, 1100–2150 m alt.
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Distr. Himalayas, Cambodia, Vietnam, China, Taiwan and South Japan.
As pointed out by Murata (1973), leaves are very variable in shape and hairiness.

(F. Konta)


Subsp. deltoidea
Chiang Mai: Doi Pha Hom Pok, T33441 (KYO-rosette leaves).—On grassy slopes in old clearings of evergreen forest, 2000–2250 m.

Distr. Nepal, Bhutan and China (Yunnan, Hupeh, Kweichow and Taiwan).
Chromosome number is 2n = 34. Only seed collection was made from Doi Pha Hom Pok, alt. 2210 m, on February 12, 1983.


Chiang Mai: Doi Inthanon, T32051, T32068*, T32087 (KYO), T32069 (KYO-rosette leaves).—On grassy slopes in scattered evergreen forest, 1700–200 m.

Distr. Nepal, Assam and China (Kweichow).
Chromosome number is 2n = 34. An asterisk in the above list indicates the voucher specimen of the mother plant from which the seeds were collected for cytological examination.

(H. Koyama & M. Shimizu)


Chiang Mai: Doi Chang, T72734 (KYO); Doi Inthanon, T31996 (KYO); Doi Maeya T32819 (KYO); Doi Suthep—Doi Pui, T33625* (KYO). Mae Hong Son: Kiewlom, border between Pai and Muang, T32631 (KYO), T32631-bis (KYO-rosette leaves).—On grassy slopes at edge of evergreen forest, 1500–1800 m.

Distr. Burma and China (Yunnan and Kweichow).
Chromosome number is 2n = 34. An asterisk means the mother plant. (ibid.)


Chiang Mai: Doi Chiang Dao, T33207* (KYO).—On grassy slopes on limestone ridges, 2000 m.

Distr. Endemic.
Chromosome number is 2n = 34. An asterisk means the mother plant. As already mentioned in our previous paper (1981), these four taxa of Saussurea are considered as the temperate species in Thailand. An additional collection is cited here on three species and one subspecies for the materials of the flora of Thailand.
A

B

C

5 μ

Fig. 1. Chromosomes of Saussurea deltoidea (A), S. penguensis (B) and S. venosa (C).

Chromosome number of these taxa concerned was determined to be 34 in root tip cells of young plants germinated in the botanic garden of Kyoto University, as shown in Fig. 1. This number has been considered by Moore & Frankton (1962, Can. Journ. Bot. 40: 281–293) to be an ancestral number in the tribe Cynareae. The same number was reported in two species, Saussurea chenopodifolia and S. heteromalla. These two species and three species listed here are classified by Lipschitz (1979) into sect. Elatae, in which most of the species are confined to the Himalayan mountains from westernmost part to easternmost one (Fig. 2).

In the course of our field survey in Thailand in dry season, I (Koyama) encountered some populations of the species concerned. Saussurea deltoidea and S. penguensis grow well in scattered hill evergreen forests where plants with only large rosette leaves and tall erect ones with mature seeds occur side by side, while S. venosa grows in grassy slope of Doi Chiang Dao where only erect herbs with mature seeds are found.

According to our preliminary observation of growing habit of these species cultivated in the botanic garden of Kyoto University, Saussurea venosa grows up from germinated plants to erect ones, 1.3 m high, from April to December in 1983, while S. deltoidea and
S. *peguensis* grow up to plants with only large rosette leaves during the same period. Considering their simple root system and growing habit both in field and in our garden, *S. deltoidea* and *S. peguensis* seem to be biennial and *S. venosa* to be annual, though they have been considered to be perennial. (H. Koyama & M. Shimizu)


Phetchabun: Nam Nao National Park, T31672, T31656 (KYO). Khon Kaen: near the entrance of Nam Nao National Park, T22506, T22523 (KYO). Loei: Um Khao, Phu Kradung National Park, T23003 (KYO).—Open sandy grassland, 850–1280 m.

**Distr.** Endemic.

This species is characterized by having linearly lobed leaves and has been noted by Craib (1931) to have affinity with *S. yunnanense*. (F. Konta)


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The following species (and genera) are new to the flora of New Caledonia. All the specimens cited here are kept in NICH.

Andrewsianthus puniceus (Nees) Schust. ex Gro.
Mont Panié, 800–1200 m alt., on tree trunk, NK 22019 (+Jamesoniella flexicadis). Mé Ori, N of Moindou, 750–950 m alt., on tree trunk, NK 22683. Mont Do, N of Boulparis, 900–1010 m alt., on rock, ZI 16813. Mont Mou, N of Païta, 350 m alt., on tree trunk NK 21488 (+Schusterella microscopica). Montagnes des Sources, NE of Nouméa, 800 m alt., on tree trunk, ZI 15555 (+Acrosphys iwatsukii).

Calypogeia arguta Mont et Nees
Mont Mandjélia, W of Pouébo, 550–650 m alt., on soil, NK 22389. Cavaatch, 12 km west of Hienghène, 100 m alt., on bank, NK 21771. Plateau de Dogny, NE of Sarraméa, 350–750 m alt., on moist soil, NK 23063. Mé Ori, 550 m alt., on bank, NK 22646, 22647.

Calypogeia fusca (Lehm.) Steph.
Mont Mou, 350 m alt., on soil, NK 21462.

Conoscyphus trapezioides (Sde. Lac.) Schiffn.
Plateau de Dogny, 800–950 m alt., on tree trunk, NK 23176 (+Adelanthus bintulius). Mont Mou, 1100–1200 m alt., on tree trunk, NK 21428. Mont Dzumac, N of Nouméa, 900 m alt., on tree trunk, NK 22581 (+Denotarisia linguifolia, Bazzania deplanchei).

Jackiella javanica Schiffn.
Mont Mandjélia, 700 m alt., on soil and rock, ZI 16106, NK 22134, 22265. Plateaux de Dogny, 800–950 m alt., on moist soil, NK 23157. Mé Ori, 550 m alt., on bank, NK 22641, 22643. Mont Kogis, 600 m alt., on soil, NK 21311, 21315, 21316, 21317. Montagnes des Sources, 400 m alt., on bank, NK 21587, 21594. Rivière des Pirogues, NE of Nouméa, 400 m alt., on bank, NK 22469.

Jubula javanica Steph.
Plateau de Dogny, 800–950 m alt., on moist rock, NK 23119, on tree trunk, NK 23120.

Saccogynidium muricellum (DeNot.) Gro.
Mont Mandjélia, 550–650 m alt., on rock along stream, NK 22376. Valley near Tao, 10 m alt., on soil, NK 21847.