

## A REVISION OF THE GENUS CENTRANTHERA (SCROPHULARIACEAE) IN CHINA

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*Centranthera*, with about eight species, is a Scrophulariaceous genus of southeastern Asia. One of the species has a range that extends to northern Australia. China, where six of the species occur, is the center of development of the genus. This paper, in which one new species is proposed, is a taxonomic revision of the Chinese species.

Merrill, in Bull. Torrey Bot. Club 64: 589-598, 1937, adopted *Razumovia* Sprengel in place of *Centranthera* R. Brown as the oldest valid name for this group of species. Later, however, he noted that Sprengel actually published *Razumovia* for an entirely different group of plants, in the Compositae, in 1805, not in 1826 as listed in current literature, and accordingly he reinstated *Centranthera* in a paper in the 150th An. Vol. Roy. Bot. Gard. Calcutta 53-58, 1942.

Herbarium specimens from the following herbaria are cited:

- A Arnold Arboretum
- GH Gray Herbarium
- MO Missouri Botanical Garden
- NY New York Botanical Garden
- PH Philadelphia Academy of Sciences
- TAI National Taiwan University
- UC University of California
- US United States National Herbarium

Thanks are due to the curators of these herbaria for the privilege of consulting their collections.

### *Centranthera* R. Brown

*Centranthera* R. Brown, Prodr. Fl. Nov. Holl. 438. 1810.

Type species: *C. hispida* R. Br. of northern Australia, the only original species.

*Razumovia* Spreng., Fl. Hal. Tent. Nov. Mant. 45. 1807; non *Razumovia* Spreng., Allgem. Lit.-Zeit. Intelligenzbl. 136. 1805 (Compositae).

Type species: *R. tranquebarica* Spreng. of northern India, the only original species.

*Centranthera* is a genus of about 8 species in southeastern Asia, one of

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which extends to northern Australia.

### Key to the Chinese Species

- A. Leaves narrow, to 4-8 mm. wide, not longitudinally 3-nerved, entire; flowers 1.4 cm. long; bracts narrow.
- B. Coarse erect plants, simple or branched, hispid or hirsute, usually lepidote; flowers 1.5-4 cm. long; leaves opposite throughout, rarely alternate.
- C. Calyx rather densely appressed-hirsute; vegetative parts of the plant hispid.
- D. Corolla smaller, about 1.5-2 cm. long.
  - E. Corolla yellow, 1.5-2 cm. long; bracts usually shorter than the calyx; plants usually taller, 40-100 cm. tall.....1. *C. cochinchinensis*
  - EE. Corolla purple, 1.5 cm. long; bracts usually longer than the calyx; plants usually lower, 5-50 cm. tall.....2. *C. nepalensis*
  - DD. Corolla larger, 3-4 cm. long.....3. *C. longiflora*
  - CC. Calyx with stiff, spreading, hispid hairs; indumentum on the vegetative parts of the plant similar in type.....4. *C. rubra*
  - BB. Small prostrate plants, glabrous or lepidote; flowers less than 1 cm. long; leaves narrow, linear, the upper ones alternate...5. *C. tranquebarica*
- AA. Leaves broad, to 2 cm. or more wide, longitudinally 3-nerved, sparingly toothed along the margins; flowers large, about 5 cm. long; bracts broad..
  - .....6. *C. grandiflora*

#### 1. *Centranthera cochinchinensis* (Loureiro) Merrill

*Centranthera cochinchinensis* Merrill in Trans. Am. Philos. Soc. II. 24: 353. 1953; Li in Quart. Journ. Taiwan Mus. 3:75. 1950. Based on the following.

*Digitalis cochinchinensis* Lour. Fl. Cochinch. 378. 1790. ed. 2. 459. 1793.

*Razumovia cochinchinensis* Merrill in Bull. Torrey Bot. Club. 64:594. 1937.

Also based on the above.

"*Centranthera hispida*" sensu Benth. in Hook. Journ. Bot. 5: 131. 1853, Fl. Hongk. 254. 1851; Miq., Fl. Ind. Bot. 2: 707. 1857; Forbes & Hemsl. in Journ. Linn. Soc. Bot. 26: 202. 1890; Merrill in Lingnan Sci. Jour. 6: 383. 1928; Pai in Contr. Inst. Bot. Nat. Acad. Peiping 2: 204. 1934; Hand.-Mazz. Symb. Sin. 7: 843. 1936; non R. Brown.

"*Centranthera brunnoniana*" sensu Hance in Journ. Bot. 23: 326. 1885; Forbes & Hemsl. in Journ. Linn. Soc. Bot. 26: 201. 1890; Diels in Bot. Jahrb. 29: 569. 1900; Matsum. & Hay. in Journ. Coll. Sci. Imp. Univ. Tokyo 22: 283. 1906 (Enum. Pl. Formos.); Hay., Gen. Ind. Formos. 52. 1916; Nemoto, Fl. Jap. Suppl. 656. 1936;

Mori in Masamune, Short Fl. Formos. 190. 1936; non Wall. For the application of the above two names, see Merrill, l.c. 1937.

Open grasslands, at altitudes of about 110-240 meters, from Siam to south-eastern China, Japan, Formosa, the Philippine Islands, Sumatra, and Java. Flowers yellow. Flowering from May to September.

Hupei: No precise locality, *A. Henry* 140 pp. (US); Wuchang, *S. C. Sun* 750 (NY).

Kweichow: Lohu, *Y. Tsiang* 7297 (NY).

Kiangsi: Kao-an, *Y. Tsiang* 10396 (NY); Ling-chuan, *Y. Tsiang* 9898 (NY); Kien-nan District, *S. K. Lau* 4368 (GH, US).

Anhui: Siu-nin, *R. C. Ching* 9029 (UC, US).

Kwangtung: Wan-tong-shan, *H. Y. Liang* 61233 (NY), *W. T. Tsang* 14436 (UC).

Hainan: Yaichow, *H. Y. Liang* 62078 (NY); Taam-chua District, *W. T. Tsang* 17228 (GH, MO, NY, US) Nga-ping Mountain, *W. T. Tsang* 15474 (UC); Ngai District, *Masamune & Fukuyama* 764 (TAI); San Uk Chung Village, *W. T. Tsang* 17228 (UC).

Taiwan: No precise locality, *U. Faurie* 8365; Sintiku-syu, *Suzuki-Tokio* 5846, (TAI); *Fukuyama s.n.* (TAI); Simotuke, *Suzuki-Tokio s.n.* (TAI); Sintiku, Koko, *Horikawa s.n.* (TAI).

Formerly this species has often been confused with *C. hispida* R. Br. and *C. nepalensis* D. Don. The latter two differ from this species in that they bear larger corollas which are purple rather than yellow. The corolla of *C. hispida* is about 2.5 cm. long, while the corolla of *C. cochinchinensis* varies from 1.5 to 2 cm. long, but rarely longer. The geographical ranges of these species are also different. The species *C. hispida* and *C. nepalensis* have been treated as varieties by Merrill (in Bull. Torrey Bot. Club. 64: 595-596. 1937, and in 150th An. Vol. Roy. Bot. Gard. Calcutta 56-57. 1942). See next species for further discussion.

## 2. *Centranthera nepalensis* D. Don

*Centranthera nepalensis* D. Don, Prodr. Fl. Nepal. 88. 1825; Pennell in Mongr. Acad. Nat. Sci. Phila. 5: 93. 1943. The type was from Nepal: "Hab. in Nepalia, Hamilton." collected in 1802-03.

*Razumovia cochinchinensis* Merrill var. *nepalensis* Merrill in Bull. Torrey Bot. Club. 64: 595. 1937. This was based on the above. See Merrill, l. c., for synonymy of this variety.

*Centranthera cochinchinensis* Merrill var. *nepalensis* Merrill in 150th An. Vol. Roy. Bot. Gard. Calcutta 56. 1942.

Grassy slope at altitudes of 1600-2150 meters, from western Himalaya through eastern Himalaya to Yunnan and Hupei. Flowers purple. Flowering in August

and September.

Hupei: No precise locality, *A. Henry 140 pp.* (US).

Yunnan: Szemao, *A. Henry 12430* (NY), *12430A* (US); Ma-chang-rai Valley, *G. Forrest 11804* (UC); Teng-yueh, *G. Forrest 25109* (NY, US); Chengkang, *T. T. Yu 17522* (A).

This species has formerly been included, together with *C. cochinchinensis*, in *C. hispida* R. Br., the latter being an Australian species. It appears that the three should be maintained as distinct species. *C. hispida* is limited in its range to northern Australia and New Guinea. *C. nepalensis* is confined to the Himalayas and western China to as far east as western Hupei. *C. cochinchinensis* has a more eastern range, extending from Hupei in central China to southern China, Japan and southward to Formosa and Hainan, the Philippine Islands, Java, and Sumatra.

The taxonomic characteristics of *C. nepalensis* differ from the other two species in that *C. nepalensis* bears purple flowers that possess smaller corollas. The corolla usually attains a length of 1.5 cm. but rarely longer. In only one case, *Henry 12430* from Yunnan, does the corolla exceed this length. In the specimens examined for this collection, the corolla was found to vary in length from 1.5 to 2.3 cm. *C. nepalensis* also differs from *C. cochinchinensis* in that the seeds are spirally ridged rather than reticulate, the stems are usually longer, and the bracts are relatively longer and usually exceed the calyces in length.

### 3. *Centranthera longiflora* Merrill

*Centranthera longiflora* (Merrill) Merrill in 150th An. Vol. Roy. Bot. Gard. Calcutta 56. 1942.

*Razumovia longiflora* Merrill in Bull. Torrey Bot. Club. 64: 593. 1937.

The type was from Indo-China: "China, Kwangtung Province, Taai Yeung Shan *F. A. McClure 7241*, July 18, 1921, on dry grassy slopes, altitude 600 m., flowers white with red and yellow markings. Indo-China, Annam, Quang Binh Province, My Duc, *A. Petelot 4189*, July, 1930, Herb. N. Y. Bot. Gard. (type)".

Grassy slopes at altitudes of 600-800 meters in Yunnan, Kwangtung, and Annam. Flowers reddish brown. Flowering from July through October.

Kwangtung: Taai Yeung Shan, *F. A. McClure 7241* (NY).

This species is a close relative of *C. cochinchinensis* (Lour.) Merrill and resembles it in most respects, but differs in that it has larger flowers.

### 4. *Centranthera rubra* sp. nov.

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Herba erecta, hispida, simplex vel ramosa, 10-20 cm. vel ultra alta; foliis oppositis vel raris suboppositis vel alternis, sessilibus, lineari-lanceolatis vel

oblongo-lanceolatis, intergerrimis, margine revolutis, subtus lepidotis vel consperse hispidulis, nervis lateralibus obsoletis, 1.5-4 cm. longis, 4-6 mm. latis, superioribus multo brevioribus, apice obtusis vel rotundatis; floribus axillaribus; bracteis quam calycibus aequantiubus, rigidis, hispidis, anguste oblongis vel lanceolatis, 4-8 mm. longis; calycibus spatheceis ovoideis, acuminatis, circiter 6 mm. longis, extus dense hispidis, intus glabris vel consperse breviter hirsutis, obscure longitudinaliter nervosis; corolla rubra, subglabra vel extus consperse pubescens, circiter 1.7 cm. longa, tubo ampliato; capsula glabra, circiter 8-9 mm. longa.

Type, in fields, at an altitude of about 1000 meters, in Sheau-meng-yeang, Che-li District, Yunnan Province, collected Oct. 1936, by C. W. Wang, No. 79531; holotype in the herbarium of the Arnold Arboretum.

In southern Yunnan. Flowers purple to reddish. Flowering in August, September, and October.

Yunnan: Sheau-meng-yeang, Che-li District, C. W. Wang 79531 (A); Yunnan sen, Kieou ya ping, F. Ducloux 985 (UC).

This species differs from all other species known in China and resembles instead *C. brunnoniana* Wall., because it has stiff, spreading hairs on the calyx. However, it can be readily distinguished from *C. brunnoniana* by its flowers which are reddish purple rather than yellow and which attain a length of only 1.8 cm. The corolla of *C. brunnoniana*, which is found in lower Burma, is 3-3.5 cm. long. Chinese plants identified as *C. brunnoniana* by Hance and Hemsley are, as pointed out by Merrill (in Bull. Torrey Bot. Club 64: 592. 1937), probably *C. cochinchinensis* (Lour.) Merrill.

##### 5. *Centranthera tranquebarica* (Sprengel) Merrill

*Centranthera tranquebarica* (Sprengel) Merrill in 150th An. Vol. Roy. Bot. Gard. Calcutta 57. 1942; Yamazaki in Journ. Jap. Bot. 25: 209. 1950.

*Razumovia tranquebarica* Spreng., Fl. Hal. Tent. Nov. Mant. 45. 1807; Britten in Journ. Bot. 39: 69. 1901; Merrill in Bull. Torrey Bot. Club 64: 597. 1937.

*Centranthera humifusa* Wall. List No. 3883. 1830, nomen nudum; Benth., Scroph. Ind. 50. 1835, in DC. Prodr. 10: 535. 1846; Hook. f., Fl. Brit. Ind. 4: 301. 1884; Forbes & Hemsl. in Journ. Linn. Soc. Bot. 26: 202. 1890; Bonati in Lecomte, Fl. Gen. Indo-chine 4: 447. 1927. The type was from India: "Hab. in Peninsula, Wight. ad Nathpur, Hamilton."

Open, sandy places widely distributed in India, Ceylon, southern China, and Malaysia. Flowers yellow. Flowering in July and August.

Kwangtung: Ying Tak C. L. Tso 22189 (NY); Fung Wan, North River Region, To Keng Pen 12870 (PH, US).

Hainan: Yaichow, H. Y. Liang 62833 (NY, US).

Fukien: No precise locality, H. H. Chung 6128 (NY), 6138 (NY); Dionglho,

*Chen Ping En 2377* (UC).

This species is readily distinguished from other species of the genus because it is a small prostrate plant, with small linear leaves which are more or less glabrous to lepidote. It has small flowers which are less than 1 cm. long. The upper leaves are usually alternate. Merrill's proposed binomial for this species antedates that of Yamazaki by eight years.

#### 6. *Centranthera grandiflora* Bentham

*Centranthera grandiflora* Benth. in Wall. List. No. 3880. 1830, nomen undum, Scroph. Ind. 50. 1835, in DC. Prodr. 10: 525. 1845; Hook. f., Fl. Brit. Ind. 4: 301. 1884; Bonati in Lecomte, Fl. Gen. Indo-chine 4: 449. 1927.

*Centranthera maxima* Bonati in Bull. Soc. Bot. Geneve II. 5: 140. 1913.

*Razumovia grandiflora* Merrill in Bull. Torrey Bot. Club. 64, 590. 1937.

Grassy at altitudes of 150-1700 meters, from Assam, Khasia, and the Sikkim Himalayan region to Burma, Indo-China, and southern China. Flowers yellow. Flowering in September.

Yunnan: Mengtze, A. Henry 9019 (NY).

Kweichow: Lohu, Y. Tsiang 7248 (NY).

Kwangsi: Kako Shan, west of Poseh, R. C. Ching 7363 (NY).

This characteristic species is readily distinguished by the exceedingly large flowers and the large, broad, more or less toothed leaves and bracts. The leaves become 2 cm. or more wide and are distinctly 3-nerved longitudinally. The nearest ally of this species is *C. hookeri* (Merrill) Merrill of Sikkim, India, which has narrow, entire leaves.

## 中國 *Centranthera* 屬 (玄參科) 之重訂

李 惠 林

玄參科 *Centranthera* 屬主產於中國。全屬約有 8 種，內 6 種分佈中國境內，本文爲其分類之訂正。6 種之中，其一 *C. rubra* 爲新發表種，見於雲南南部。此種具有剛毛，因之與國產各種不同，但與印度之 *C. brunnoniana* Wall. 類似。但前者之花較小且爲紅色，故極易區別。其他各種亦均分佈於中國南部各省。(摘要)