

Taxonomic Notes on Sections *Corymbosae* and *Subracemosae* of Genus *Ligularia* (*Asteraceae*)

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Ligularia sect. *Corymbosae* was previously divided into 3 series: *Calthifoliae*, *Retusae* and *Lapathifoliae*. The author places these 3 groups at the rank of subsection based on additional morphological and anatomical studies. *Ligularia hodgsonii* is placed in sect. *Subracemosae* I. D. Illar. because of inflorescence structure. The general inflorescence of *L. hodgsonii* is a corymb or broad raceme and the heads of the corymb or raceme begin to blossom acropetally, while heads of species of sect. *Corymbosae* begin to blossom basipetally. *Ligularia hodgsonii* occurs only in Japan and the Kuril Islands and is absent in China. *Ligularia dentata* is divided into 2 subspecies: *L. dentata* subsp. *dentata* and *L. dentata* subsp. *sutchuenensis* (Franch.) I. D. Illar. Plants from south-western and central China, Myanmar and Vietnam are considered as *L. dentata* subsp. *sutchuenensis*. This subspecies differs from *L. dentata* subsp. *dentata* in its smaller heads (5–8 cm in diam., involucre 0.6–1.5 cm in diam.) and distribution area.

Key words: *Asteraceae*, China, flora, Japan, *Ligularia dentata*, *Ligularia hodgsonii*, *Senecioneae*, taxonomy.

The genus *Ligularia* Cass. belongs to the tribe *Senecioneae* Cass. and includes about 150 species distributed in Eurasia, with the center of species diversity in south-western China. The genus *Ligularia* in China was divided into six sections (Liu 1989).

Section *Corymbosae* (Franch.) Hand.-Mazz., of 41 species, is the oldest and one of the largest sections in the genus *Ligularia* (Liu et al. 1994). This section is characterized by a corymbose inflorescence. Section *Corymbosae* was divided into three series (Liu 1985, 1989): *Calthifoliae* S. W. Liu, *Retusae* S. W. Liu and *Lapathifoliae* S. W. Liu.

Members of series *Calthifoliae* and *Retusae* have palmately veined leaves; basal leaves

reniform or ovate-reniform, base cordate. Species of series *Calthifoliae* have capitula (including ligules) 5–12 cm in diam., involucre campanulate or hemispherical, involucre bracts closely imbricate, convex. In series *Retusae*, capitula (including ligules) are not more than 4 cm in diam., involucre cylindric, campanulate or hemispherical, involucre bracts laxly imbricate, not convex (Liu 1985, 1989). Species of ser. *Lapathifoliae* are characterized by oblong, ovate or ovate-lanceolate leaves, pinnately veined; capitula is variable in size.

Series *Lapathifoliae* is distinctive from the representatives of ser. *Calthifoliae* and *Retusae* by leaf morphology, however, species of the last two series are not always clearly distinguishable

by the protologue characters. The results of an anatomical study of achenes provided new taxonomical characters in addition to partially overlapping characters of the external structure used by Liu (1985). Achene anatomy is already accepted as one of the most important features in the taxonomy of *Asteraceae* due to comparative stability of fruit characters in a single plant as well as within the species.

A member of ser. *Calthifoliae* is distinguished by 10 vascular bundles and secretory ducts in the pericarp of achenes (Illarionova 2008). In my opinion, the complex of morphological and anatomical characters provides a reasonable basis for recognizing three subsections in the section *Corymbosae*: *Calthifoliae* (S. W. Liu) I. D. Illar., *Retusae* (S. W. Liu) I. D. Illar. and *Lapathifoliae* (S. W. Liu) I. D. Illar.

Ligularia dentata (A. Gray) H. Hara and *L. hodgsonii* Hook. f. are very close and were placed in sect. *Corymbosae* (Franch.) Hand.-Mazz. ser. *Calthifoliae* (Pojarkova 1961, Liu 1989). *Ligularia dentata* occurs in central, eastern, south-western and southern provinces of China, Japan, Myanmar and Vietnam. *Ligularia hodgsonii* has been reported from Japan and south-western and central China in the earlier (Henry 1902, Handel-Mazzetti 1936, 1938) and in the later publications (Liu 1989, Koyama 1995, Min 2004, Torihata et al. 2009, Liu and Illarionova 2011, Wang et al. 2013). A. I. Pojarkova in the "Flora of URSS" (1961) restricted distribution area of *L. hodgsonii* to southern Kurils and Japan, but in a morphological description of sect. *Corymbosae* she noticed that ser. *Calthifoliae* should also include a number of geographical races from western and central China, described by A. Franchet and other authors as varieties of *L. hodgsonii*. In the recent edition of "Flora of China" (Liu and Illarionova 2011), authors were not able to reach consensus on the *L. hodgsonii* species concept.

There are no problems with identification of *Ligularia dentata* and *L. hodgsonii* specimens,

collected in Japan, but in China distinguishing these species is very problematic. Sometimes specimens collected from the same population were identified as different species.

Koyama (1968) noted that plants from Sichuan Province, China, kept in TNS which were identified as *L. hodgsonii* var. *crenifera* Franch., were different from *L. hodgsonii* by the absence of foliose bracts and that the distribution of *L. hodgsonii* in China requires further studies.

To address the issue, extensive herbarium material in LE, MW, MHA, VLA, E, K, BM, P, PE, KUN, CDBI, SZ, SCBG and some others herbaria has been investigated. According to my observations, the inflorescence of *L. hodgsonii* is a corymb or broad raceme, and the heads of corymb and raceme begin to blossom acropetally, while heads of species of sect. *Corymbosae* begin to blossom basipetally. Therefore, *L. hodgsonii* is sometimes included in sect. *Ligularia*, species of which have acropetally maturing racemes (Koyama 1966, 1968, Barkalov 1992). Racemes of species in sect. *Ligularia* are usually narrow, but the inflorescences are sometimes paniculate-racemose due to the branching in the basal part of the inflorescence, but it is never corymbose.

In my opinion, *L. hodgsonii* (Fig. 1) differs from *L. dentata* (Fig. 2) by large cymbiform foliose bracts at the base of the peduncle throughout the whole inflorescence, which has a racemose or corymbose form and always blooms acropetally. The plants from China always have a basipetal corymbose inflorescence; only the lower foliose bracts are wide, while the upper are narrowly lanceolate or non-existent. Thus, as a result of herbarium study and living plant observation, I concluded that, according to the characters mentioned above, the specimens from China belong to *L. dentata* (A. Gray) H. Hara; another species, *L. hodgsonii* occurs only in Japan and the Kuril Islands.

In a recent publication on phylogeny and distribution of *L. hodgsonii* (Wang et al. 2013) specimens from south-western and central

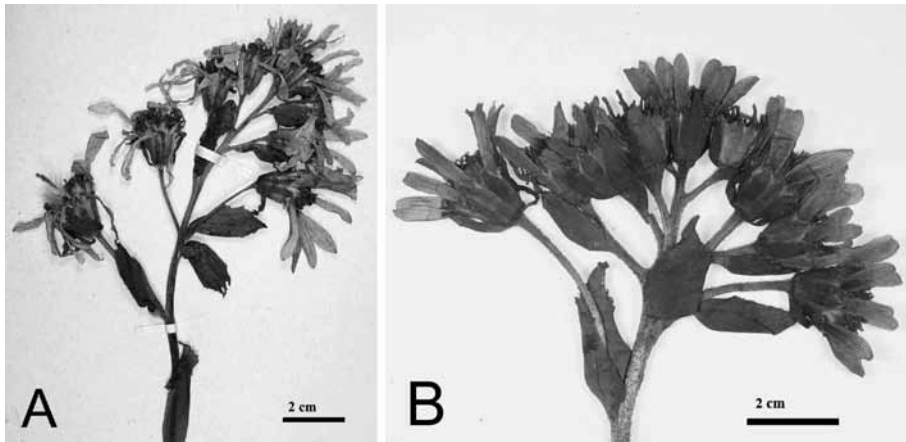


Fig. 1. Inflorescence of *Ligularia hodgsonii*. A. Russia, Iturup Isl., near Kurilsk, 2 Aug. 1959, E. Pobedimova & G. Konovalova s.n. (LE). B. Japan, Hakodate, 20 July 1861, Maximowicz s.n. (LE).

China were also considered as populations of *L. hodgsonii*, but the authors revealed that populations from China and from Japan have totally different haplotypes and are strongly isolated. Authors of another paper about *L. hodgsonii* (Torihata et al. 2009) reported that the sequence of the internal transcribed spacers (ITS) of the ribosomal RNA gene was different in the Japanese and the Chinese samples. The chemical composition of the root extract of these samples was also different. Additionally, morphological

differences between specimens from Japan and China were observed, for example, in the flower color. These facts may testify in favor of the viewpoint that these populations are different species.

Plants of *L. dentata* which have been considered as *L. hodgsonii* due to smaller size of its heads (with ray flowers 5–8 cm in diam., involucre 0.6–1.5 cm in diam.) occur in southwestern and central China (Guizhou, Guangxi, Sichuan, Chongqing, Yunnan, Hunan and Hubei

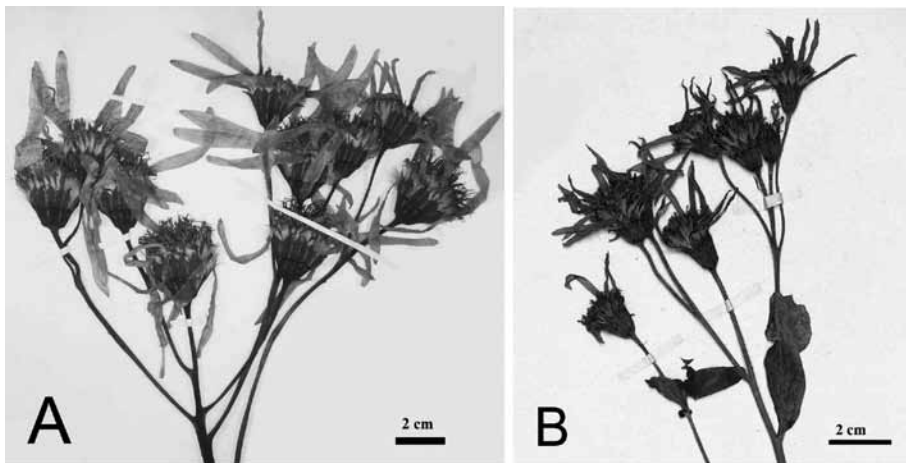


Fig. 2. Inflorescence of *Ligularia dentata*. A. Japan, Prov. Senano [Nagano Pref.], 1864, Tschonoski s.n. (LE). B. China, Sichuan, Tchen-keou-tin, R. P. Farges s.n. (P02803224).

provinces) and areas adjacent to it (south of Shaanxi and Gansu provinces), also in Myanmar and Vietnam. Foliose bracts of these plants are cymbiform and usually present at the basal and higher branches of inflorescence. Often, there are lanceolate or linear foliose bracts in the middle part of peduncle in addition to foliose bracts at the base of peduncle. Plants of *L. dentata* from Japan and mountain regions of eastern China (Anhui, Zhejiang, Jiangxi, Henan provinces) and south of Shanxi province have large heads (with ray flowers 7–12 cm in diam.; involucre 1.5–2.5 cm in diam.). Foliose bracts are usually broad, cymbiform, surrounding peduncle and present at basal branches of inflorescence only, sometimes foliose bracts are nonexistent.

As early as 1892, Franchet noticed differences between Chinese plants and his species *Senecio yesoensis* Franch. from Japan (this name later considered a synonym of *L. hodgsonii*) and he described two varieties from Sichuan province: *Senecio yesoensis* var. *sutchuenensis* and *S. yesoensis* var. *crenifera*, later referred them to *Ligularia hodgsonii*: var. *sutchuenensis* and var. *crenifera*. Variety β . *sutchuenensis* Franch., according to the author, is characterized by the following features: «inflorescence often with many heads, which are loosely arachnoid pubescent, pappus rufous; leaves dentate or crenate.» Variety γ . *crenifera* Franch. is «twisty undersized plants, leaves coarsely crenate-toothed, thick; ligules of ray florets are short; heads of short woolly, campanulate.» A. I. Pojarkova gave a new name for plants identified as these varieties – *L. araneosula*, but this name was written on herbarium labels only and has never been validly published.

According to my observations, the size of plants, pubescence of heads and form of leaf edge of *L. dentata* vary widely. Within the distribution area there are plants with glabrous and puberulous heads; the edge of the leaf blade can be from dentate to crenate. These characters, in this case, should not be considered

as diagnostic.

Because plants from south-western and central China differ from the specimens of *L. dentata* s. str. and have separate distribution area, I recognize them as subspecies. I make a new combination on the basis of one of Franchet's varieties, which description is more appropriate: *L. dentata* (A. Gray) H. Hara subsp. *sutchuenensis* (Franch.) I. D. Illar.

The inflorescence structure of *L. hodgsonii* is noticeably different from the inflorescence of representatives of *Corymbosae* and *Ligularia* sections and it is an intermediate type between corymbose and racemose. Thus, *L. hodgsonii* should be placed in the separate section *Subracemosae* I. D. Illar. (Illarionova 2013). This section also includes *L. trichocephala* Pojark., a species from Sakhalin Island and north of Hokkaido. *Ligularia trichocephala* is very close to *L. hodgsonii* and differs from the latter by hairs on involucral bracts.

According to the carpological characters sect. *Subracemosae* is close to sect. *Corymbosae* (subsect. *Calthifoliae* (S. W. Liu) I. D. Illar.), *Ligularia* (subsect. *Speciosae* (Pojark.) I. D. Illar.) and *Monocephalae* Nakai. All above mentioned taxa have separately sclerenchymatous strands, 10 vascular bundles and 10 secretory ducts in the pericarp of achenes (Illarionova 2008).

Taxonomic citation, synonyms, types and distribution of taxa discussed in this paper are provided below.

***Ligularia* Sect. *Corymbosae* (Franch.)** Hand.-Mazz. in Bot. Jahrb. Syst. **69**: 107 (1938), p.p.; Pojark., in Fl. URSS **26**: 798 (1961), p.p.; S. W. Liu, Bull. Bot. Res., Harbin **5**(4): 64 (1985), p.p.; S. W. Liu, Fl. Reipub. Popul. Sin. **77**(2): 13 (1989), p.p. – *Senecio* groupe *Ligularia* B. *Euligularia* 3. *Corymbosi* Franch. in Bull. Soc. Bot. Fr. **39**: 290 (1892), p.p. – *Ligularia* sect. *Euligularia* ser. *Corymbosae* (Franch.) Kitam. in Mem. Coll. Sci. Kyoto Univ., ser. Biol. **16**(3): 197 (1942), p.p. – *Ligularia* sect. *Ligularia* ser.

Corymbosae (Franch.) H. Koyama in Mem. Fac. Sci. Kyoto Univ., ser. Biol. **2**(1): 41 (1968), p.p.

Type: *Ligularia calthifolia* Maxim.

Erythrochaete Siebold & Zucc. in Abh. Math.-Phys. Cl. Königl. Bayer. Acad. Wiss. **4**: 188 (1846) – *Ligularia* sect. *Erythrochaete* (Siebold & Zucc.) Nakai in Bot. Mag. (Tokyo) **31**: 123 (1917).

Senecio groupe *Ligularia* B. *Euligularia* 1. *Racemosi* Franch. in Bull. Soc. Bot. Fr. **39**: 289 (1892), p.p.

Ligularia sect. *Ligularia*: Barkalov, Pl. Vasc. Orient. Extr. Soviet. **6**: 199 (1992), p.p.; H. Koyama in K. Iwats. & al., Fl. Jap. **IIIb**: 39 (1995), p.p.

The section *Corymbosae* includes three subsections: *Calthifoliae* (S. W. Liu) I. D. Illar., *Retusae* (S. W. Liu) I. D. Illar. and *Lapathifoliae* (S. W. Liu) I. D. Illar.

Subsect. 1. *Calthifoliae* (S. W. Liu) I. D. Illar., **stat. nov.** – *Ligularia* sect. *Corymbosae* ser. *Calthifoliae* S. W. Liu in Bull. Bot. Res., Harbin **5**(4): 64 (1985), p.p.; S. W. Liu, Fl. Reipub. Popul. Sin. **77**(2): 13 (1989), p.p.

Type: *Ligularia calthifolia* Maxim.

This subsection includes four species occurring in the Russian Far East, China, Japan, Myanmar, Vietnam, India and Korea (*L. dentata*, *L. japonica* Less., *L. calthifolia* Maxim., *L. vorobievii* Worosch.). Only one species of this subsection, *L. dentata* (with two subspecies), is given below.

1. *Ligularia dentata* (A. Gray) H. Hara in J. Jap. Bot. **15**(5): 318 (1939); Kitam. in Mem. Coll. Sci. Kyoto Univ., ser. Biol. **16**(3): 200 (1942); Ohwi, Fl. Jap.: 879 (1965); H. Koyama in Mem. Fac. Sci. Kyoto Univ., ser. Biol. **2**(1): 42 (1968); in K. Iwats. & al., Fl. Jap. **IIIb**: 39 (1995); S. W. Liu, Fl. Reipub. Popul. Sin. **77**(2): 13 (1989); T. Min, Fl. Yunnan. **13**: 470 (2004) – *Erythrochaete dentata* A. Gray in Mem. Amer. Acad. Arts, n.s., **6**: 395 (1859). – *Senecillia dentata* (A. Gray) Kitam. in Acta Phytotax.

Geobot. **8**: 83 (1939). Type: JAPAN. 1853–1856, C. Wright s.n. (GH00009795–holotype; NY00391973–isotype; Fig. 3).

Ligularia clivorum Maxim. in Bull. Acad. Sci. Pétersb. **15**: 374 (1870); Hand.-Mazz., Symb. Sin. **7**(4): 1132 (1936); in Bot. Jahrb. **69**: 116 (1938) – *Senecio clivorum* (Maxim.) Maxim. in Bull. Acad. Sci. Pétersb. **16**: 221 (1871); Franch. & Sav., Enum. Pl. Jap. **1**: 247 (1875); F. B. Forbes & Hemsl. in J. Linn. Soc. London (Bot.) **23**: 451 (1888); Franch. in Bull. Soc. Bot. Fr. **39**: 306 (1892); Hook. f., Curtis Bot. Mag., ser. **3**(59), tab. 7902 (1903) – *Ligularia japonica* var. *clivorum* (Maxim.) Makino in Bot. Mag. (Tokyo) **19**: 153 (1905); Koidz. in Bot. Mag. (Tokyo) **24**: 263 (1910); Matsum., Index Pl. Jap. **2**(2): 657 (1912). Lectotype (Grubov in Novosti Sist. Vyssh. Rast. **33**: 266, 2001): JAPAN. Yokohama, in pratis montanis jugi Hakone, 15/27 Oct. 1862. C. J. Maximowicz s.n. (LE!).

a) *Ligularia dentata* subsp. *dentata*.

Distribution: China (Shanxi, Anhui, Zhejiang, Hubei, Hunan, Henan and Jiangxi) and Japan.

Note: Also known as very attractive ornamental plant in the gardens.

b) *Ligularia dentata* subsp. *sutchuenensis* (Franch.) I. D. Illar., **comb. et stat. nov.** – *Senecio yesoensis* Franch. var. *sutchuenensis* Franch. in Bull. Soc. Bot. Fr. **39**: 307 (1892) – *Ligularia yesoensis* (Franch.) Diels var. *sutchuenensis* (Franch.) Diels in Bot. Jahrb. **29**: 621 (1900); Pamp. in Nuov. Giorn. Bot. Ital., n. s. **18**: 142 (1911) – *L. hodgsonii* Hook. f. var. *sutchuenensis* (Franch.) A. Henry in Gard. Chron., ser. **3**(32): 218 (1902); Hand.-Mazz., Symb. Sin. **7**(4): 1132 (1936); in Bot. Jahrb. Syst. **69**: 115 (1938). Type: CHINA. Sutchuen oriental, district de Tchen-keou-tin, R. P. Farges 133 (P00723342–holotype!, Fig. 4; P, K–isotype!).

Senecio labordei Vaniot in Bull. Acad. Geogr. Bot., sér. **3**(11): 345 (1902). Type: CHINA, Kouy-tcheou, environs de Tsin-gay,

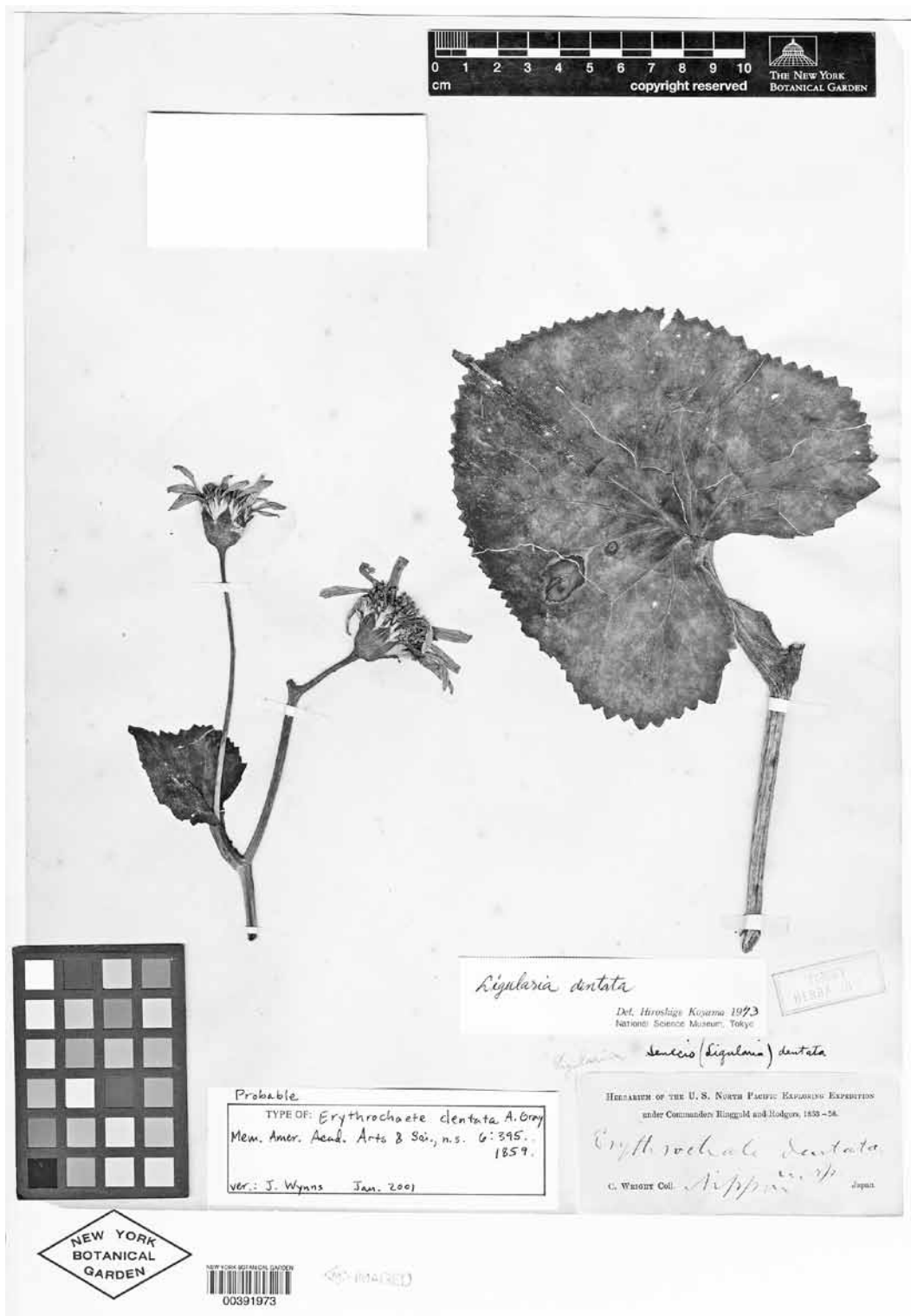


Fig. 3. Isotype of *Ligularia dentata* subsp. *dentata* (C. Wright s.n., NY00391973).

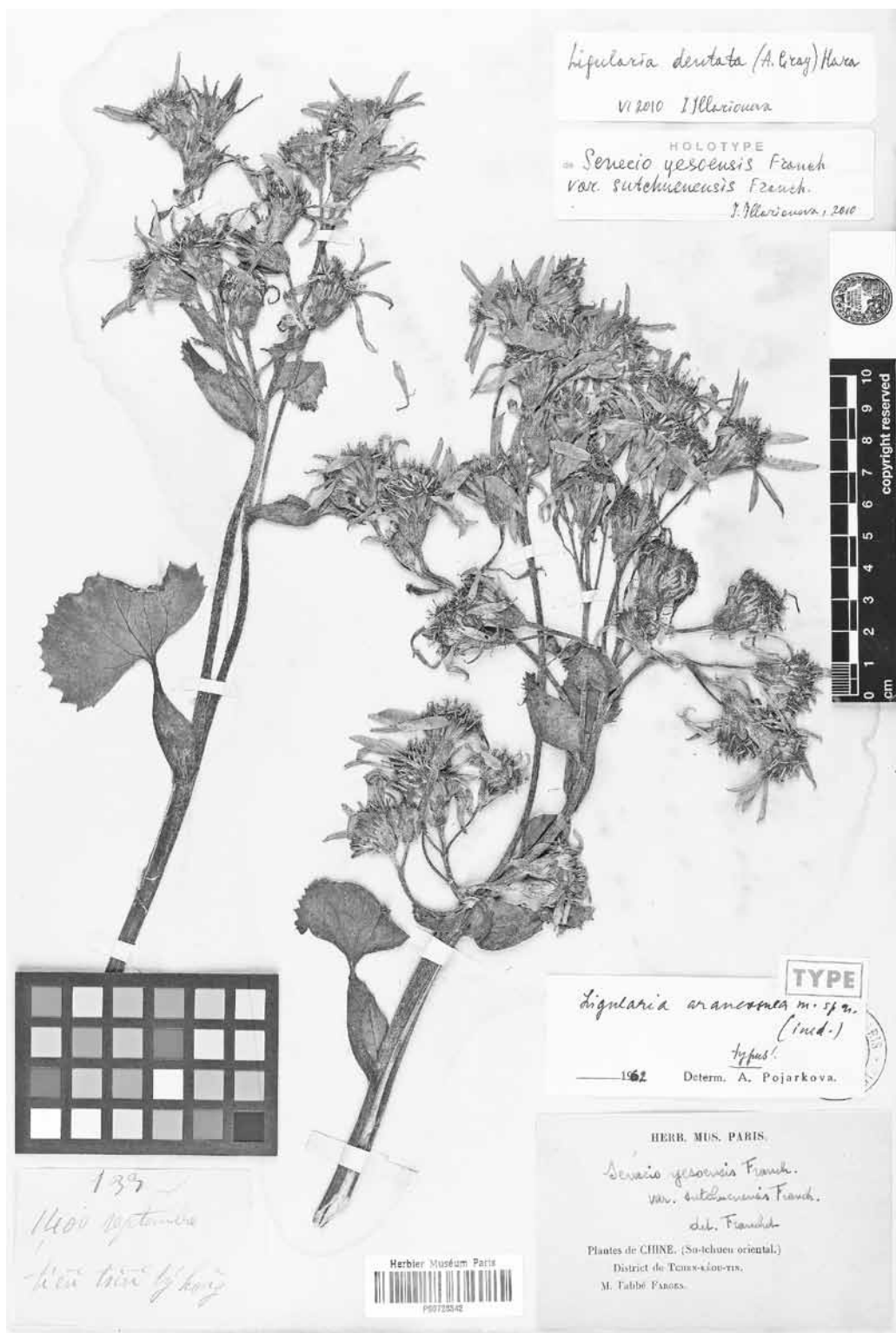


Fig. 4. Holotype of *Ligularia dentata* subsp. *sutchuenensis* (R. P. Farges 133, P00723342).

dans la montagne. 5 Sept. 1899, J. Laborde & E. Bodinier 2706 (Eoo413277–holotype!; P–isotype!).

Senecio yesoensis Franch. var. *crenifera* Franch. in Bull. Soc. Bot. Fr. **39**: 307 (1892) – *Ligularia yesoensis* (Franch.) Diels var. *crenifera* (Franch.) Diels in Bot. Jahrb. **29**: 621 (1900)–*L. hodgsonii* Hook. f. var. *crenifera* (Franch.) Hand.-Mazz. in Bot. Jahrb. **69**: 115 (1938). Lectotype (designated here): CHINA, Su-tchuen oriental, dans le district de Tchen-keou-tin, R. P. Farges s. n. (P02803224!).

Ligularia hodgsonii auct. non Hook. f. (1863): Henry in Gard. Chron., ser. **3**(32): 218 (1902), p.p.; Hand.-Mazz. in Bot. Jahrb. **69**: 115 (1938); S. W. Liu, Fl. Reipub. Popul. Sin. **77**(2): 17 (1989), p.p.; H. Koyama in K. Iwats. & al., Fl. Jap. **IIIb**: 40 (1995), p.p. quoad pl. sin.; T. Min, Fl. Yunnan. **13**: 472 (2004).

Distribution: China (Gansu, Shaanxi, Hubei, Hunan, Guizhou, Sichuan, Yunnan, and Guangxi), northern Vietnam (Hoa Binh Province, Mai Chau District, near Pa Co village) and eastern Myanmar (Taunggyi).

Note: Sometimes it is cultivated in botanical gardens. This subspecies may produce hybrids with the type subspecies.

Subsect. 2. **Retusae** (S. W. Liu) I. D. Illar., **stat. nov.** – *Ligularia* sect. *Corymbosae* ser. *Retusae* S. W. Liu in Bull. Bot. Res., Harbin **5**(4): 64 (1985); S. W. Liu, Fl. Reipub. Popul. Sin. **77**(2): 19 (1989).

Type: *Ligularia retusa* DC.

This subsection includes 27 species, distributed in China, India, Bhutan, Myanmar and Nepal.

Subsect. 3. **Lapathifoliae** (S. W. Liu) I. D. Illar., **stat. nov.** – *Ligularia* sect. *Corymbosae* ser. *Lapathifoliae* S. W. Liu in Bull. Bot. Res., Harbin **5**(4): 64 (1985); S. W. Liu, Fl. Reipub. Popul. Sin. **77**(2): 41 (1989).

Type: *Ligularia lapathifolia* (Franch.) Hand.-Mazz.

This subsection includes 10 species, distributed in China, India, Bhutan and Nepal.

Ligularia sect. **Subracemosae** I. D. Illar. in Bot. Zhurn. (St. Petersburg) **98**(9): 1151 (2013).

Type: *Ligularia hodgsonii* Hook. f.

Senecio groupe *Ligularia* B. *Euligularia* 3. *Corymbosi* Franch. in Bull. Soc. Bot. Fr. **39**: 290 (1892), p.p. – *Ligularia* sect. *Corymbosae* (Franch.) Hand.-Mazz. in Bot. Jahrb. **69**: 107 (1938), p.p.; Pojark., Fl. URSS, **26**: 798 (1961), p.p.; S. W. Liu in Bull. Bot. Res., Harbin **5**(4): 64 (1985), p.p.; S. W. Liu, Fl. Reipub. Popul. Sin. **77**(2): 13 (1989), p.p. – *L.* sect. *Euligularia* ser. *Corymbosae* (Franch.) Kitam. in Mem. Coll. Sci. Kyoto Univ., ser. Biol. **16**(3): 197 (1942), p.p.

Ligularia sect. *Ligularia* ser. *Ligularia* H. Koyama in Mem. Fac. Sci. Kyoto Univ., ser. Biol. **2**(1): 44 (1968), p.p.; Barkalov, Pl. Vasc. Orient. Extr. Soviet. **6**: 200 (1992), p.p. – *L.* sect. *Ligularia* H. Koyama in K. Iwats. & al., Fl. Jap. **IIIb**: 39 (1995), p.p.

This section includes two species.

1. **Ligularia hodgsonii** Hook. f., Curtis Bot. Mag. ser. **3**(20), tab. 5417 (1863); Henry in Gard. Chron., ser. **3**(32): 218 (1902), p.p.; Makino in Bot. Mag. (Tokyo) **19**: 153 (1905); Koidz. in Bot. Mag. (Tokyo) **24**: 264 (1910), p.p.; Matsum., Index Pl. Jap. **2**(2) : 656 (1912); Hand.-Mazz. in Bot. Jahrb. **69**: 115 (1938), p.p.; Kitam. in Mem. Coll. Sci. Kyoto Univ., ser. Biol. **16**(3): 197 (1942), p.p.; Pojark., Fl. URSS, **26**: 798 (1961); Ohwi, Fl. Jap.: 879 (1965), p.p.; Worosch., Fl. Soviet Far East: 428 (1966); H. Koyama in Mem. Fac. Sci. Kyoto Univ., ser. Biol. **2**(1): 46 (1968); in K. Iwats. & al., Fl. Jap. **IIIb**: 40 (1995), p.p.; S. W. Liu, Fl. Reipub. Popul. Sin. **77**(2): 17 (1989), p.p.; Barkalov, Pl. Vasc. Orient. Extr. Soviet. **6**: 200 (1992), p.p. – *Senecillis hodgsonii* (Hook. f.) Kitam. in Acta Phytotax. Geobot. **8**: 82 (1939). Type: JAPAN. Island Yezo, near Hakodadi [= Hakodate], C. P. Hodgson s.n. (K000843706–holotype!; Fig. 5).

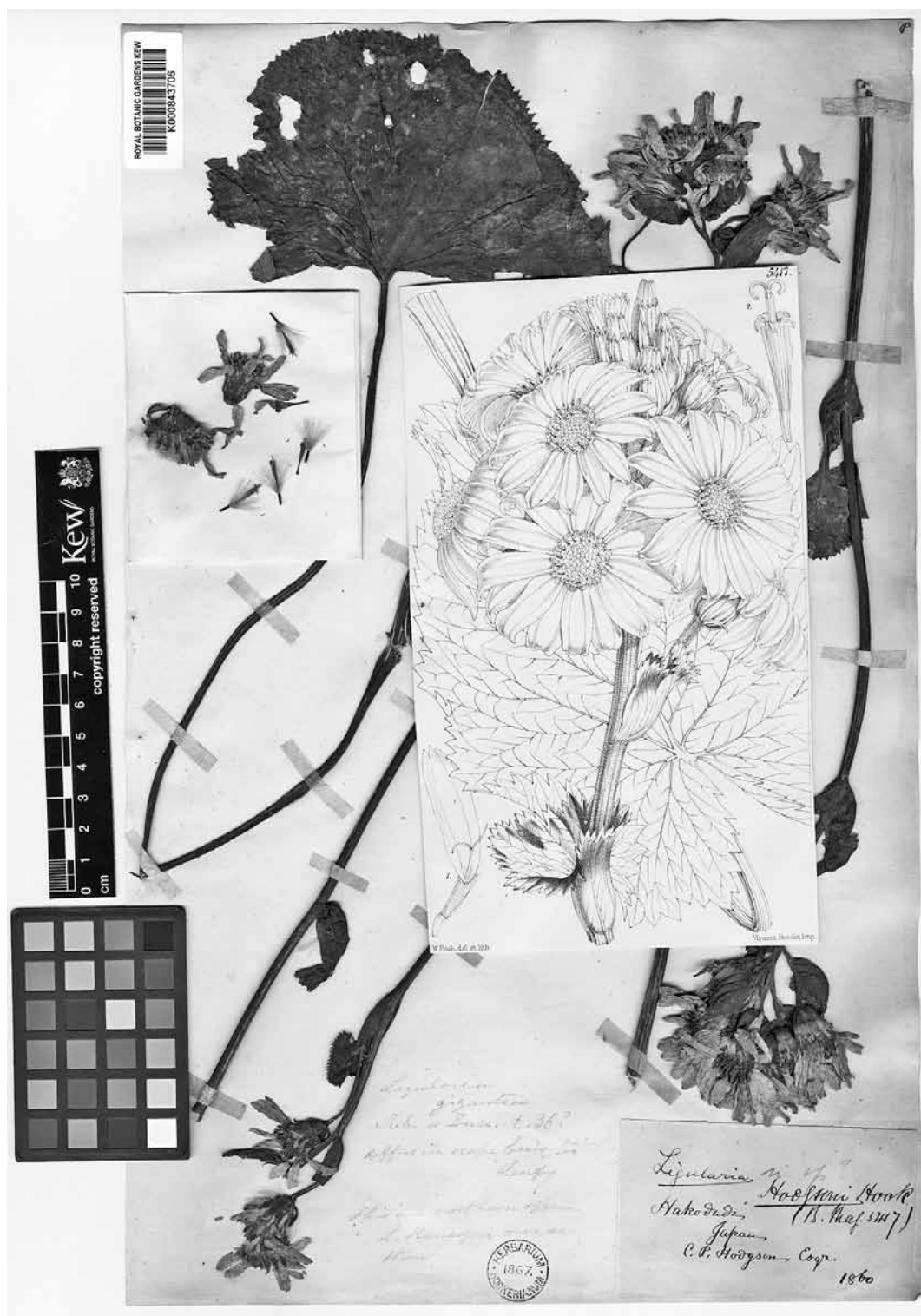


Fig. 5. Holotype of *Ligularia hodgsonii* (C. P. Hodgson s.n., K000843706).

Ligularia hodgsonii Hook. f. var. *calthaefolia* (Maxim.) Koidz. in Bot. Mag. (Tokyo) **24**: 264 (1910), p.p. quoad pl. jap.

Ligularia calthaefolia auct. non Maxim. (1870): Matsum., Index Pl. Jap. **2**(2): 656 (1912).

Senecio yesoensis Franch. in Bull. Soc. Bot. Fr. **39**: 306 (1892). Lectotype (designated here): JAPAN. Nippon. Hakkoda, 6 July 1886, Faurie 916 (P02665483!; P, K–isolectotype!).

Distribution: Russian Far East (southern Kuril Islands: Kunashir, Shikotan, Iturup, Urup, and Habomai Isl.) and Japan.

2. *Ligularia trichocephala* Pojark., Fl. URSS **26**: 800, 886 (1961). Type: RUSSIA. Sachalin australis in vicinitate opp. Jushno-Sachalinsk, in angustis Tankovoje jugi Sudzuski, in declivibus montium, 600–700 m s. m. 22 July 1948, M. G. Popov s.n. (LE–holotype!).

Ligularia hodgsonii Hook. f. var. *sachalinensis* Koidz. in Bot. Mag. (Tokyo) **24**: 264 (1910); Kitam. in Mem. Coll. Sci. Kyoto Univ., ser. Biol. **16**(3): 197 (1942) – *Senecillus hodgsonii* Hook. f. var. *sachalinensis* (Koidz.) Kitam. in Acta Phytotax. Geobot. **8**: 82 (1939). Type: RUSSIA. Sachalin, Serrako (TI).

Ligularia hodgsonii auct. non Hook. f. (1863): Ohwi, Fl. Jap.: 879 (1965), p.p.; Worosch., Keys Pl. Soviet Far East: 570 (1982); Barkalov, Pl. Vasc. Orient. Extr. Soviet. **6**: 200 (1992), p.p.; H. Koyama in K. Iwats. & al., Fl. Jap. **IIIb**: 40 (1995), p.p.

Distribution: Russian Far East (central and southern Sakhalin Isl. and Moneron Isl.) and Japan (Rebun Isl., Rishiri Isl. and north of Hokkaido).

Note: Plants of this species usually have well-marked dark-brown hairs on the involucre bracts, unlike its closely related species *L. hodgsonii*, involucre bracts of which are without hairs or, very rarely, with short hairs only. Most often the hairs are fairly dense sometimes sparse. Plants from Moneron Isl. have slightly pubescent involucre. Specimens from Rebun

are heterogeneous in the pubescence – with pubescence on involucre or with almost glabrous involucre. These islands are located on the junction of distribution areas of both *L. trichocephala* and *L. hodgsonii*, thus hybrids may occur there.

In KUN I found a specimen with densely pubescent involucre bracts which was collected on the coast in the north of Hokkaido (near Wakkanai City). *Ligularia trichocephala* was not recorded for this area before.

Kitamura (1942) reported *L. hodgsonii* Hook. f. var. *sachalinensis* Koidz. for Sakhalin, Rebun and also for Rishiri Isl. I have seen only one specimen from Rishiri Island at LE. This specimen has glabrous involucre bracts. However, I believe in the occurrence of typical *L. trichocephala* plants on this island.

Some authors (Woroshilov 1982, Barkalov 1992) do not recognise *L. trichocephala* as a good species and put it as a synonym to *L. hodgsonii*. However, I believe that *L. trichocephala* should be regarded as a good species because plants with dark-brown hairs on involucre have separate distribution area, also the anatomical structure of *L. trichocephala* achenes differs from *L. hodgsonii* by the structure of outer wall surface of exocarp and by a number of layers of sclerenchymatous cells in the pericarp (Illarionova 2008).

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I. Illarionova : メタカラコウ属 (キク科) *Corymbosae* 節と *Subracemosae* 節の分類学的ノート

キク科メタカラコウ属の *Corymbosae* 節に認められていた 3 列をそれぞれ亜節 (subsect. *Calthifoliae* (S. W. Liu) I. D. Illar., subsect. *Lapathifoliae* (S. W. Liu) I. D. Illar., subsect. *Retusae* (S. W. Liu) I. D. Illar.) に格上げした。トウゲブキ *Ligularia hodgsonii* Hook. f. は花序の性質にもとづき, *Subracemosae* I. D. Illar. 節に所属する。すなわち, トウゲブキの花序は散房状あるいは幅の広い円錐状で, 頭花は求頂的に咲くが, *Corymbosae* 節の種では求基的に咲く。トウゲブキは日本と千島列島に分布し, 中国には知られていない。

カラフトトウゲブキ *L. trichocephala* Pojark. (= *L. hodgsonii* var. *Sachalinensis* Koidz.) はしばしばトウゲブキと同種とされる。しかし, これは総苞に暗褐色の毛

が生えるもので, まとまった分布域をもつ。さらに, 解剖学的にも, 外果皮の外壁が平滑で, 中果皮に柔細胞の列が多数ある (Illarionova 2008) ことから, 独立した種と考えられる。カラフトトウゲブキはサハリン (中部, 南部), モネロン (海馬) 島, 礼文島, 利尻島, 北海道 (稚内) に分布する。

L. dentata (A. Gray) H. Hara にはマルバダケブキ subsp. *dentata* と subsp. *sutchuenensis* (Franch.) I. D. Illar. の 2 亜種を認めた。 *L. dentata* subsp. *sutchuenensis* は中国西南部及び中部, ミャンマー, ベトナムに分布し, 頭花が小型であること (直径 5–8 cm, 総苞は直径 0.6–1.5 cm) で基本亜種 subsp. *dentata* と区別される。

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