

Taxonomic Studies of *Cirsium* (Asteraceae) in Japan III.
Cirsium occidentalinipponense, sp. nov. with special reference to the
Lectotypification of *Cirsium borealinipponense* Kitam.

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Abstract A new species of *Cirsium*, *C. occidentalinipponense* Kadota, is described here based on the collection from Mt. San'nomine, the Ryohaku Mountain Range, central Honshu. *Cirsium occidentalinipponense* is characterized by having 1) 7(–8)-seriate involucreal phyllaries, 2) the presence of glandular bodies on inner phyllaries, 3) slightly ascending or more or less recurved phyllaries and 4) corolla throats nearly equal in length to tubes. Differences among this new species and two closely related species, *C. borealinipponense* and *C. okamotoi*, are shown in the text. Lectotypification and synonymy of *C. borealinipponense* Kitam. are also given in this paper.

Key words: *Cirsium borealinipponense*, *Cirsium occidentalinipponense* sp. nov., Honshu, lectotypification, the Ryohaku Mountain Range.

In June of 1996, some specimens of *Cirsium* were sent to me by T. Wakasugi of Fukui Prefecture. The specimens were collected from the alpine zone of Mt. San'nomine (2128 m in elevation), the Ryohaku Mountain Range, Fukui Prefecture. Several alpine species of *Cirsium* are recognized from the alpine zone of central Honshu (Kadota, 1995), however, any species that flowers in June has never been found in central Honshu. This fact drove him to send the *Cirsium* specimens to me. It is clarified that the thistle belongs to an undescribed taxon at the result of taxonomic examination, and consequently a new species of *Cirsium*, *C. occidentalinipponense*, is described here. Accordingly field investigation was also carried out by Mr. T. Wakasugi and his colleagues in Hakusan Mountains including Mt. San'nomine, and in Mt. Dainichidake and Mt. Washigatake of neighboring Gifu Prefecture. And it comes out that *C. occidentalinipponense* is an endemic of Mt. San'nomine of the Ryohaku Mountain Range.

Description of New Species

Cirsium occidentalinipponense Kadota, sp. nov. [Sect. *Onotrophe* (Cass.) DC. Subsect. *Schantarenisia* (Kitam.) Kadota] (Figs. 1–2)

Differt ab *Cirsio borealinipponense* phyllariis involucrorum 7(–8)-seriatis, vittis phyllariorum interiorum linearibus bene evolutis, phyllariis exterioribus ascentibus vel leniter recurvatis, faucibus corollarum plus minusve aequilongis tubis.

A perennial herb, 30–80 cm tall. Rootstock stout, horizontal; rhizomes developed. Stem slightly declining, stout, leafy, branched in the apical part, densely arachnoid and covered with short brown hairs in the upper part, in particular conspicuously densely villose with long brownish hairs at the basal part. Basal leaves deep to light green on the adaxial side and glaucous on the abaxial side, thick and slightly fleshy, persistent at anthesis and rosulate; blades narrowly elliptic to narrowly ovate in outline, 18–25 cm long, 6–8 cm broad, sparingly covered with short brownish hairs on the adaxial side, arachnoid particularly along the midribs on the abaxial side, medially pinnatilobate to 1/2 way from the midribs, with petioles (1–)4–6 cm long or subsessile; lobes 6–9-jugate, ovate to narrowly ovate, 2–4 cm long, 1–2 cm broad, with spines 1–2 mm long. Lower cauline leaves similar to basal in shape and size, widely auriculate at the base, with strong spines up to 10 mm long, upper cauline leaves smaller than the basal. Flowers in June to July. Capitula 2–4 or more in a compact raceme or aggregated, nodding, with thick, woolly and hence whitish peduncles (0–)1–4 cm long; subtending leaves 2–3, lanceolate, 1.5–3 cm long, with spines 4–9 mm long. Involucres bowl-shaped to broadly campanulate-campanulate, purplish black to deep purple, (19–)22–23 mm long, 17–21 mm (in vivo) or 33–40 mm (in sicco) in diameter, sparingly arachnoid or sometimes almost glabrous. Phyllaries 7(–8)-seriate; glandular bodies linear, on the abaxial side of all phyllaries, very glutinous; outer phyllaries narrowly ovate 9–13 mm long, half as long as the inner ones, herbaceous, terminated with spinules circ. 1 mm long, more or less ascending with gently or strongly recurved tips or sometimes appressed with suberect tips. Corollae reddish violet to pale violet, 20–22 mm long; lobes 3–4 mm long; throats 9–10 mm long; tubes 7–8 mm long, slightly shorter than the throats. Achenes brownish white, 2.8–3.1 mm; pappi sordid, 17–18 mm long. Chromosome number $2n=34$.

Japanese name: Echizen-oni-azami (nov.).

和名：エチゼンオニアザミ（新称）

TYPE: JAPAN; Honshu, Fukui Pref. (Prov. Echizen), Ono-shi, the Ryohaku Mountain Range, Mt. San'nomine alt. 1600 m, 2 July 1996, T. Wakasugi 43077 (Holotype-TNS 9027728; Isotype-TNS 9027724).

Specimens examined: JAPAN; Honshu, Fukui Pref., Ono-shi, Mt. San'nomine alt. circ. 1700 m, 23 June 1996, T. Wakasugi 43072 (TNS 9027727); Mt. San'nomine alt. circ. 1700 m, 12 July 1996, T. Wakasugi & N. Ogawa 43394–43395 (TNS 644061–644069).

Distribution: Japan, central Honshu, the Ryohaku Mountain Range, endemic (Fig. 4).

Cirsium occidentalnipponense is closely similar to *C. borealinipponense* but differs from the latter by having 7(–8)-seriate involucre phyllaries, vestigial glandu-

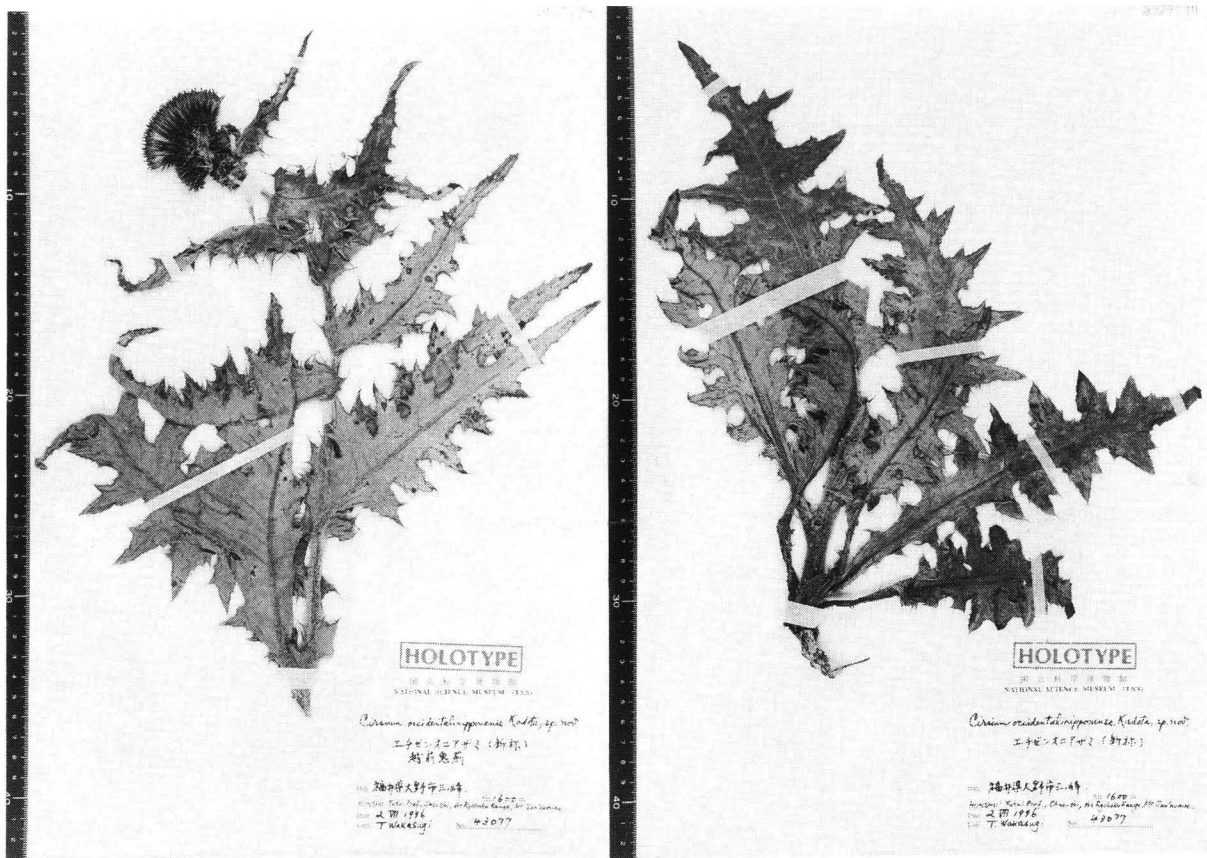


Fig. 1. Holotype of *Cirsium occidentalinipponense* Kadota (JAPAN; Honshu, Fukui Pref. (Prov. Echizen), Ono-shi, the Ryohaku Mountain Range, Mt. San'nomine alt. 1600 m, 2 July 1996, T. Wakasugi 43077, TNS 9027728). Left: upper part. Right: lower part.



Fig. 2. Habit of *Cirsium occidentalinipponense* Kadota. Photograph was taken at Mt. San'nomine (alt. circ. 1700 m) of the Ryohaku Mountain Range on 2 July 1996 by Mr. M. Tada.

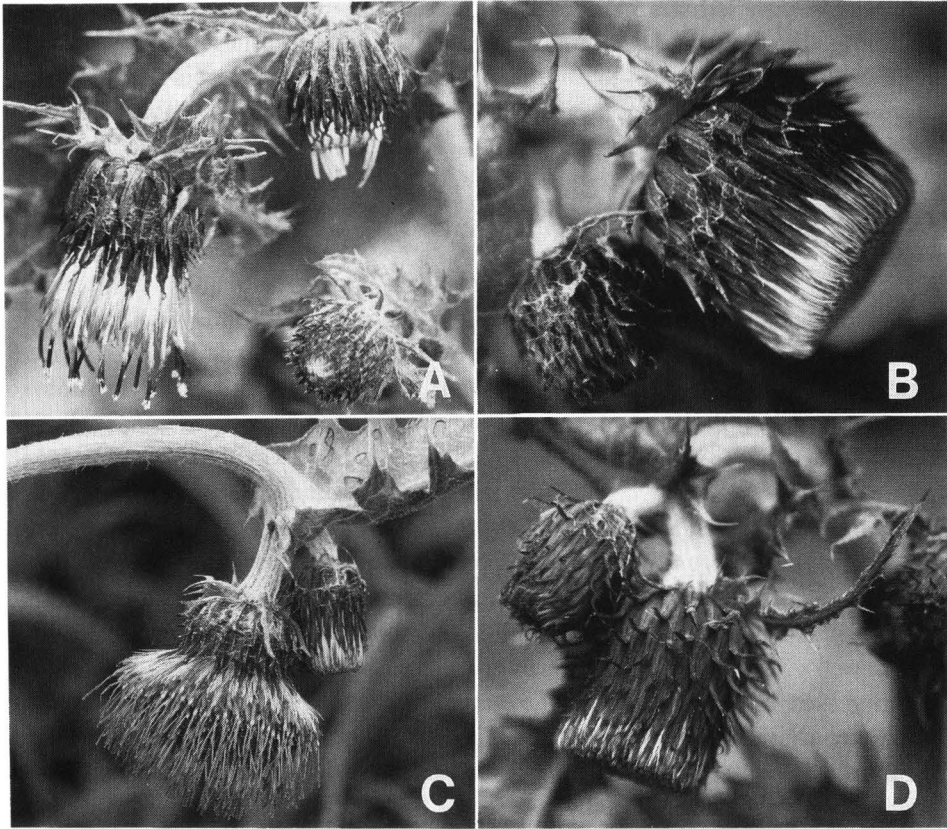


Fig. 3. Variation in the direction of involucre phyllaries and in involucre shape of *Cirsium occidentalinipponense* Kadota in vivo. All the photographs were taken in July of 1996 at Mt. San'nomine by Mr. T. Wakasugi. A. Involucre campanulate, sparingly arachnoid; all the phyllaries appressed and erect. B. Involucre broadly campanulate, sparingly arachnoid; outer phyllaries gently recurved. C. Involucre bowl-shaped, arachnoid; outer phyllaries gently recurved. D. Involucre campanulate, almost glabrous; outer phyllaries strongly recurved.

lar bodies on inner phyllaries, ascending or gently recurved outer phyllaries and throats of corollae equal in length to tubes. Although both *C. occidentalinipponense* and *C. borealinipponense* have more or less arachnoid scapes, *C. occidentalinipponense* has an inclination to bear more densely arachnoid scapes. Furthermore Involucre phyllaries is very variable in the direction of extension (Fig. 3). *Cirsium okamotoi* Kitamura is similar to *C. occidentalinipponense* in having corollae with throats equalling in length to tubers and the presens of glandular bodies on inner phyllaries, however, the former is discriminated from the latter by the series of involucre phyllaries (6-seriate vs. 7(–8)-seriate), corolla length (17–18 mm vs. 20–22 mm) and the direction of phyllaries (appressed vs. ascending to more or less recurved or some-

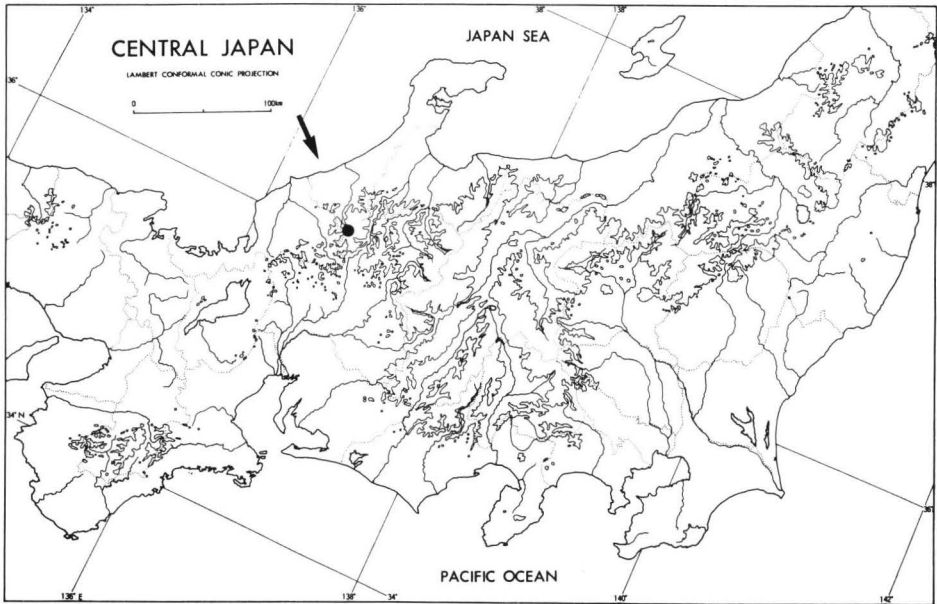


Fig. 4. Distribution of *Cirsium occidentalinipponense* Kadota.

times appressed, cf., Fig. 3). Against *C. borealinipponense* and *C. okamotoi* there is a tendency to have shorter stems for *C. occidentalinipponense* (30–100 cm or 50–150 cm vs. 20–40 cm). The restriction of habitat (*C. occidentalinipponense* grows only at windy herbal stands, see below) seems to cause the reduction in plant height of *C. occidentalinipponense*.

Cirsium occidentalinipponense has been collected only from the Ryohaku Mountain Range situated on the border between Fukui and Gifu Prefectures. Field examinations were repeatedly done in the field including the main peak of Mts. Hakusan (2702 m in elevation), Mt. Bessan (2399 m in elevation) and Mt. Dainichidake (1708 m in elevation) of the Ryohaku Mountain Range, and Mt. Washigatake (1672 m in elevation) of the Hida Highland of Gifu Prefecture, however, *C. occidentalinipponense* was not found in this region. Another *Cirsium* species, *C. borealinipponense*, was collected from Mt. Suigoyama (1558 m in elevation) situated on the Gifu Prefecture side of the Ryohaku Mountain Range. Consequently this new species is known only from Mt. San'nomine (2128 m in elevation) in the south of the Ryohaku Mountain Range up to present.

At Mt. San'nomine of the south of the Ryohaku Mountain Range, *Cirsium occidentalinipponense* was found growing on the slope (1700–1800 m in elevation) with an inclination of about 30 degrees and facing Southeast. This population was composed of about 300 flowering individuals of *C. occidentalinipponense*. This slope is located on the ridge running from the northeast to southwest and has somewhat dry

soil. This stand is not so high in elevation but results in herbal stand dominated by *Sasa kurilensis* because of strong wind during winter season (in such altitude *Fagus crenata* broad-leaved summer green forests are usually formed). The following herb and bush species were also observed to grow on the slope: *Cirsium japonicum* var. *diabolicum* (cf., Kadota, 1995), *Saussurea nikoensis* var. *sessiliflora*, *Artemisia viridissima* subsp. *japonica*, *Euphrasia insignis* var. *insignis*, *Prunella prunelliformis*, *Leucothoe grayana*, *Angelica acutiloba*, *Epilobium cephalostigma*, *Euphorbia togakusensis*, *Geranium eriostemon* var. *reinii*, *Sanguisorba hakusanensis*, *Thalictrum aquilegifolium*, *Dianthus superbus* etc.

There is a collection from Hakusan Mountains. This specimen was collected from an artificial slope of the "Hakusan-Super-Rindo" [=a Hakusan trans-mountain paved road] (Ishikawa Pref., Ishikawa-gun, Yoshitani-mura, 15 July 1989, S. Tsugaru & T. Takeuchi 12796, TNS 567629). The locality of this collection is located near Mt. Sanboiwadake (1736 m in elevation) which lies in the north of Mts. Hakusan. This plant has 6-seriate involucre and corollae with throats almost equal in length to tubes and is intermediate in gross morphology between *Cirsium occidentalinipponense* and *C. borealinipponense*. As the herbarium label says "involucre non glutinous", most of glandular bodies are present but vestigial. This individual seems to be malformed since it is usual that glandular bodies are well developed and involucre are distinctly glutinous both in *Cirsium occidentalinipponense* and *C. borealinipponense*. However, the strain without well developed glandular bodies are also found in other species of Japanese *Cirsium* (e.g., *Cirsium japonicum* DC.; Kadota, unpublished). Hence there is a probability that this kind of strain is distributed in the north of Mts. Hakusan. Further studies are needed to answer this issue.

Lectotypification of *Cirsium borealinipponense* Kitamura

The thistle species in concern was originally published by Nakai (1911) as *Cirsium japonicum* DC. subsp. *yesoense* (Maxim.) Nakai var. *nipponense* Nakai. Koidzumi (1924) later recognized this thistle as a distinct species and published the name *C. nipponense* (Nakai) Koidzumi. Koidzumi's consideration was formerly approved by Japanese botanists (e.g., Hara, 1952; Ohwi, 1972). Kitamura (1980) regarded the name *Cirsium nipponense* (Nakai) Koidz. (1924) to be a later homonym of the name *C. nipponicum* (Maxim.) Makino (1905) [= *Cnicus nipponicus* Maxim. 1874; cf., Kadota, 1993) under the ICBN (Articles 53.1 and 53.3 in Tokyo Code 1994), hence Kitamura proposed a new name, *Cirsium borealinipponense* Kitamura. Kitamura's treatment has been accepted and adopted by standard floras of Japan (e.g., Toyokuni, 1988; Kadota, 1989, 1995).

When Nakai (1911) described *Cirsium japonicum* DC. subsp. *yesoense* (Maxim.) Nakai var. *nipponense*, he cited five specimens (No. 1, monte Azumasan, G. Nakahara; No. 2, monte Chokaisan, G. Nakahara; No. 3, Fukushima, G. Nakahara

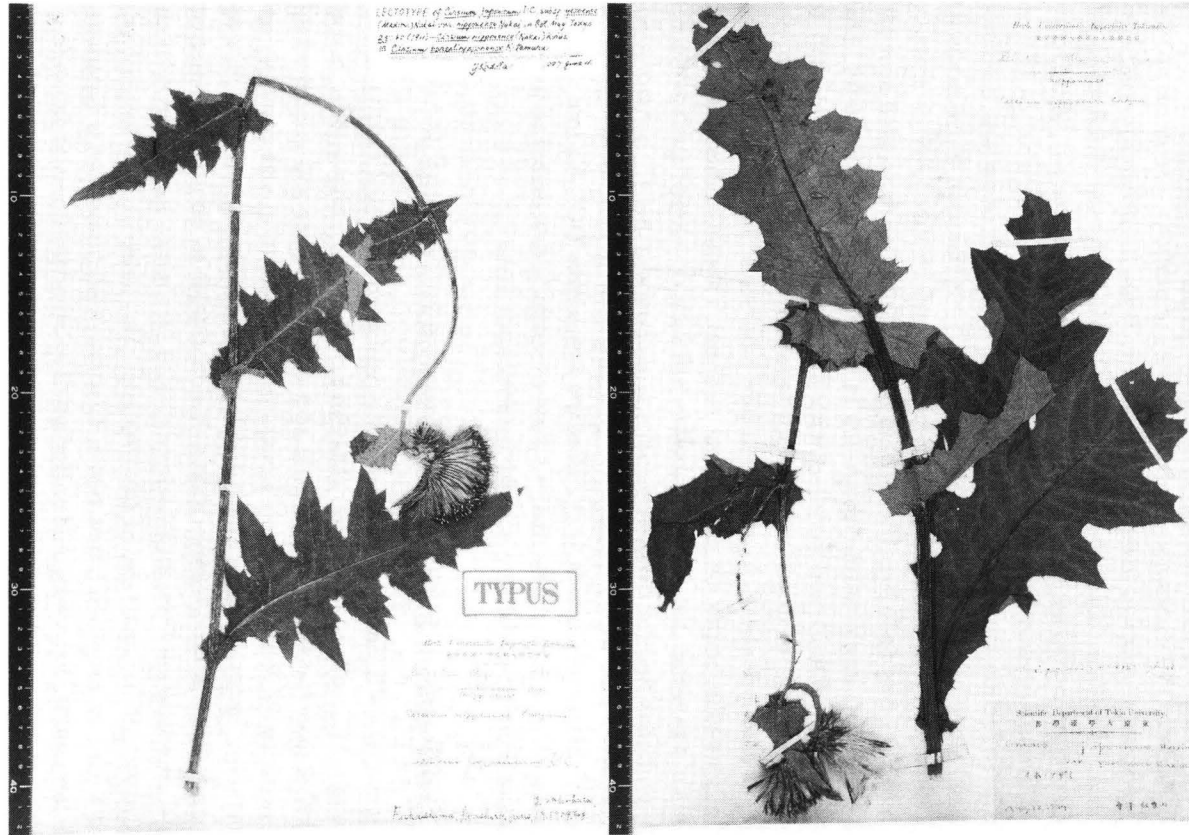


Fig. 5. Type materials of *Cirsium japonicum* DC. subsp. *yesoense* (Maxim.) Nakai var. *nipponense* [= *C. borealinipponense* Kitamura]. Left: lectotype (Honshu, “Prov. Iwashiro, Fukushima”, 19 June 1904, G. Nakahara s.n., T1; the specimen No. 3 in the present text). Right: one of the paratype specimens (Honshu, “Iidesan”, no collector’s name, 13 August 1879, T1; the specimen No. 5 in the present text). The herbarium labels of the two specimens both bear Nakai’s handwriting “*C. nipponense* Koidz.”

[Fig. 5, left]; No. 4, monte Togakushi, R. Yatabe & J. Matsumura; No. 5, monte Iidesan, no collector's name [Fig. 5, right]). All the specimens are now deposited at TI. However, these were syntypes because he did not choose the holotype specimen. These specimens (except for the specimen No. 2, see the synonymy of *C. borealinipponense*) are well agreeable to the current delimitation of *C. borealinipponense* Kitamura. Therefore one of the five specimens should be designated as the lectotype of *Cirsium borealinipponense*.

Next Nakai (1912) made a new combination of *Cirsium maximowiczii* Nakai var. *nipponense* (Nakai) Nakai, and he cited the specimens No. 3, No. 4 and No. 5 out of the five specimens. The two specimens No. 3 and No. 5 carry together Nakai's own handwriting "*Cirsium nipponense* Koidz." (Fig. 5, right and left). Hence the lectotype should be chosen from the specimens No. 3 and No. 5. In the protologue of *Cirsium japonicum* DC. subsp. *yesoense* (Maxim.) Nakai var. *nipponense* Nakai he described this taxon as "Folia pinnatifida subtus floccoso-incana demum subglabrescens". The specimen No. 3 is well agreeable with this statement. The specimen No. 3 (Fig. 5, left) should be consequently designated as the lectotype of *Cirsium japonicum* DC. subsp. *yesoense* (Maxim.) Nakai var. *nipponense* Nakai.

Cirsium borealinipponense Kitamura in Kitamura, Murata & Hori, Herb. Pl. I (ed. 51): 40, pl. 12, fig. 84 (1979), nom. tant.; Kitamura in Acta Phytotax. Geobot. **31**: 44 (1980)—Toyokuni, Alp. Fl. Jap. 112 (1988)—Kadota, Makino's New Ill. Fl. Jap. 802, t. 3207 (1989); Fl. Jap. **IIIb**: 130 (1995)—*Cirsium japonicum* DC. subsp. *yesoense* (Maxim.) Nakai var. *nipponense* Nakai in Bot. Mag. Tokyo **25**: 60 (1911), pp.—*Cirsium maximowiczii* Nakai var. *nipponense* (Nakai) Nakai in Bot. Mag. Tokyo **26**: 380 (1912), pp.—*Cirsium nipponense* Koidz. in Bot. Mag. Tokyo **38**: 93 (1924)—Kitamura, *Cirsium* Nov. Or.-Asia. 5 (1931); in Acta Phytotax. Geobot. **3**: 4 (1934); Compos. Jap. **I**: 72 (1937)—Hara, Enum. Sperm. II: 179 (1952)—Ohwi, Fl. Jap. rev. ed. 1377 (1972)—Masamune, Col. Illust. Fl. Nippon **6-II**: 317, 319 (1974)—Yamazaki, Alp. Fl. Jap. 78, pl. 106, t. 384 (1985)—Azegami, Wild Flow. Jap. **II**: 62 (1996)—LECTOTYPE (here designated): "Fukushima, Iwashiro" [JAPAN; Honshu, Fukushima Pref. (Prov. Iwashiro), Fukushima], 19 June 1904, G. Nakahara s.n. (TI; Fig. 5, left). One of the paratypes (specimens No. 5 in the text is given in Fig. 5 (right)). The collection from Mt. Chokaisan (the specimen No. 2) was regarded to belong to *Cirsium chokaiense* Kitamura (1937).

Cirsium maximowiczii Nakai var. *glutinosum* Nakai in Bot. Mag. Tokyo **26**: 380 (1912), pp. As already stated by Kitamura (1937), the typical variety of Nakai's *Cirsium maximowiczii* is *C. aomorense* Nakai sensu Kadota (1995). The illustration (Ic. Pl. Koisik. **I-2**: 43, t. 22, 1912) drawn under the name of *C. japonicum* DC. subsp. *yesoense* Maxim. β . *nipponense* Nakai is also *C. aomorense* Nakai because this plant has an erect head and its involucre is not glutinous. Hence

Nakai's *C. maximowiczii* is a mixtute of *C. borealinipponense* and *C. aomorense*.

Cirsium nipponense Koidz. var. *spinulosum* Kitamura, Compos. Jap. I: 74 (1937), **syn. nov.**

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