

Taxonomic Studies of *Cirsium* (*Asteraceae*) in Japan XXVI. Five New Species from Hokkaido and Honshu, Northern to Central Japan

Yuichi KADOTA^{a,*} and Norihito MIURA^b

^aDepartment of Botany, National Museum of Nature and Science,
4-1-1, Amakubo, Tsukuba, 305-0005 JAPAN;

^bHoshizaki Institute for Wildlife Protection, Hoshizaki Green Foundation,
Shinji-ko Lake Green Park, 1664-2, Sono-cho, Idzumo, 691-0076 JAPAN

*Corresponding author: ykadota58@gmail.com

(Accepted on March 24, 2021)

Five new species of *Cirsium* (*Asteraceae*) from Hokkaido and Honshu, Japan are described. They all belong to *Cirsium* sect. *Onotrophe* (Cass.) DC. and are narrow endemics. *Cirsium kubikialpicola* Kadota (subsect. *Praticola* Kadota) described from Mt. Tenguhara-yama (on the border between Niigata Pref. and Nagano Pref., Honshu) is different from *C. babanum* Koidz. by being gynodioecious and smaller in habit, 5–6-seriate involucrel phyllaries, smaller capitula and shorter florets. *Cirsium renehydrophilum* Kadota (subsect. *Reflexae* (Kitam.) Kadota) described from the Renge-onsen spa (Niigata Pref., Honshu) is discriminated from *C. myokoense* Kadota by smaller habit, less branched stem with a few branches, narrower cylindrical involucrel, 11–12-seriate, strongly recurved involucrel phyllaries, and smaller and smooth achenes. *Cirsium muramatsui* Kadota (subsect. *Tuberosae* Kitam.) described from the Chita Peninsula (Aichi Pref., Honshu) is distinguished from *C. suzukaense* Kitam. by being gynodioecious with 11–12-seriate involucrel phyllaries and smaller florets 15–16 mm long. *Cirsium verum* Kadota (subsect. *Nipponocirsium* Kitam. emend. Kadota) described from the campus of Tokyo Woman's Christian University (Tokyo Pref., Honshu) is discriminated from *C. yukiuenoanum* Kadota by having medially pinnatifid to coarsely serrate cauline leaves, non auriculate petiole bases, cylindrical to campanulate involucrel, ascending branches and shorter achenes. *Cirsium yachiyotakashimae* Kadota (subsect. *Borealicola* Kitam. ser. *Glandulosae* Kadota) described from Shibetsu-cho (Nemuro Subpref., Hokkaido) is distinguished from *C. boreale* Kitam. by having 6–7-seriate, ascending or patent involucrel phyllaries, smaller involucrel and shorter florets.

(Continued from Bull. Natn. Mus. Nat. Sci., Ser. B, 40(2): 73–94, 2014)

Key words: *Cirsium kubikialpicola*, *Cirsium muramatsui*, *Cirsium renehydrophilum*, *Cirsium verum*, *Cirsium yachiyotakashimae*, Hokkaido, Honshu, Japan, narrow endemic, new species.

The genus *Cirsium* Mill. (*Asteraceae*) is very diverse in the Japanese Archipelago. More than 123 species have been recognized so far (Kadota 1995, 2009, 2017, Kadota and Miura

2013, 2014). However, it is clear from field examinations that many species still remain to be described. Here five species of *Cirsium* from Hokkaido and Honshu, Japan are described.

They are all narrow endemics.

Chromosome Counts

Material for each species was collected in the field and were planted in the nursery of Hoshizaki Institute for Wild Life, Hoshizaki Green Foundation, Idzumo-shi, Shimane Prefecture. The materials were examined for chromosome study according to Miura and Iwatsubo (2014). The results are summarized in Fig. 11. Voucher specimens are deposited in the Herbarium, Department of Botany, National Museum of Nature and Sciences (TNS).

Taxonomic treatment

Subsect. *Praticola* Kadota in K.Iwats. & al., Fl. Jap. **3b**: 125 (1995).

1a. *Cirsium kubikialpicola* Kadota, **sp. nov.**
[Figs. 1, 2]

Cirsium kubikialpicola Kadota is different from *C. babanum* Koidz. by having a smaller habit and is gynodioecious, 5–6-seriate involucre phyllaries, smaller capitula 13–17 mm long and shorter florets 13–15 mm long.

Type: JAPAN. Honshu. Niigata Pref., Myōkō-shi, Mt. Tenguhara-yama, alt. 2175 m, 25 August 2018, Y.Kadota 0185311 (TNS01307633; Fig. 1).

Gynodioecious, herbaceous perennials, 40–60 cm tall. Rootstock stout, horizontal to oblique, 1–3 cm in diameter, with cord-like roots. Stem almost erect, leafy, arachnoid and pubescent with purplish brown, short, multicellular hairs, simple to five-times branched usually in the upper part. Basal leaves persistent at anthesis, deep green, herbaceous, pubescent with pale brown, short, multicellular hairs on the abaxial side; petioles 11–16 cm long, pubescent with short, yellowish multicellular hairs; blades elliptic to obovate in outline, 12–20 cm long, 6–7 cm broad, medially pinnatilobate, 4–8-jugate, with sharp spines 1–2 mm long; lobes ovate, 1–4 cm long, 1–2.5 cm broad. Cauline leaves short-petioled to sessile; blades narrowly obovate to obovate in outline, 12–20 cm long, 4–10 cm broad, medially to

shallowly pinnatilobate, 4–10-jugate, pubescent with long, whitish adpressed hairs especially on the veins on the abaxial side, with 3–5 mm strong spines. Flowers in August to September. Capitula solitary or rarely three, nodding, glabrous; peduncles 5–50 cm long, arachnoid and covered with short, purplish brown hairs. Involucres broadly cylindrical to campanulate, 13–17 mm long, 12–14 mm (*in vivo*) and 25–50 mm (*in sicco*) in diameter, tinged purplish brown, glabrous; subtending leaves 3–5, linear to lanceolate, 7–12 mm long. Involucral phyllaries 5–6-seriate, herbaceous, recurved; glandular bodies linear, vestigial, eglutinous; outer phyllaries ovate with caudate tips, 6–7 mm, clearly shorter than the inners. Corollae pale violet in bisexual heads and deep pink in female heads, 13–15 mm long; lobes 3–4 mm long; throats 5–6 mm long; tubes 5–6 mm long, as long as the throats. Achenes dark purplish brown, 4 mm long; pappus 11–13 mm long.

Chromosome number: $2n = 2x = 34$ (Fig. 11A).

Additional specimens examined: JAPAN. Honshu. Niigata Pref., Myōkō-shi, Mt. Tenguhara-yama, alt. ca. 2000 m, 4 Sept. 2017, H.Matsui s.n. (TNS01287604); Mt. Tenguhara-yama, alt. 2175 m, 25 Aug. 2018, Y.Kadota 0185302–0185315 (TNS01307623, 0130725, 0130727–0130737).

New Japanese name: Tenguhara-azami.

新和名：テングハラアザミ

Distribution: JAPAN. Honshu (Mt. Tenguhara-yama, the Kubiki Mountain Range on the border between Myōkō-shi, Niigata Pref. and Otari-mura, Nagano Pref.; Fig. 12, triangle). Endemic to Japan. The Kubiki Mountain Range is located in the heavy snow area on the Japan Sea side of Honshu.

Habitat: In mesic alpine meadow.

Note: An allied species, *Cirsium babanum* Koidz. [= *C. otayae* Kitam. var. *babanum* (Koidz.) Kitam.] is located around the Hakuba-Ōike pond, in the Tsugaike moor and in the vicinity of the Renge-onsen spa of the northernmost part of the Hida Mountain Range (a different mountain system from the Kubiki



Fig. 1. Type of *Cirsium kubikialpicola* Kadota (Mt. Tenguhara-yama, Niigata Pref., Honshu, 25 August 2018, Y.Kadota 0185311 (TNS01307633).

Mountain Range) and grows in wetlands or on the damp ground.

1b. *Cirsium kubikialpicola* Kadota f. *albiflorum* Kadota, f. nov.

Different from the typical form by the white florets.

Type: JAPAN. Honshu. Niigata Pref., Myōkō-shi, Mt. Tenguhara-yama, alt. 2175 m, 25 August 2018, Y.Kadota 0185316



Fig. 2. *Cirsium kubitalpicola* Kadota. A. Habit. B. Hermaphroditic capitulum. C. Female capitulum. D. Achene and pappus. Mt. Tenguhara-yama, Niigata Pref., Honshu, on 25 Aug. 2018.

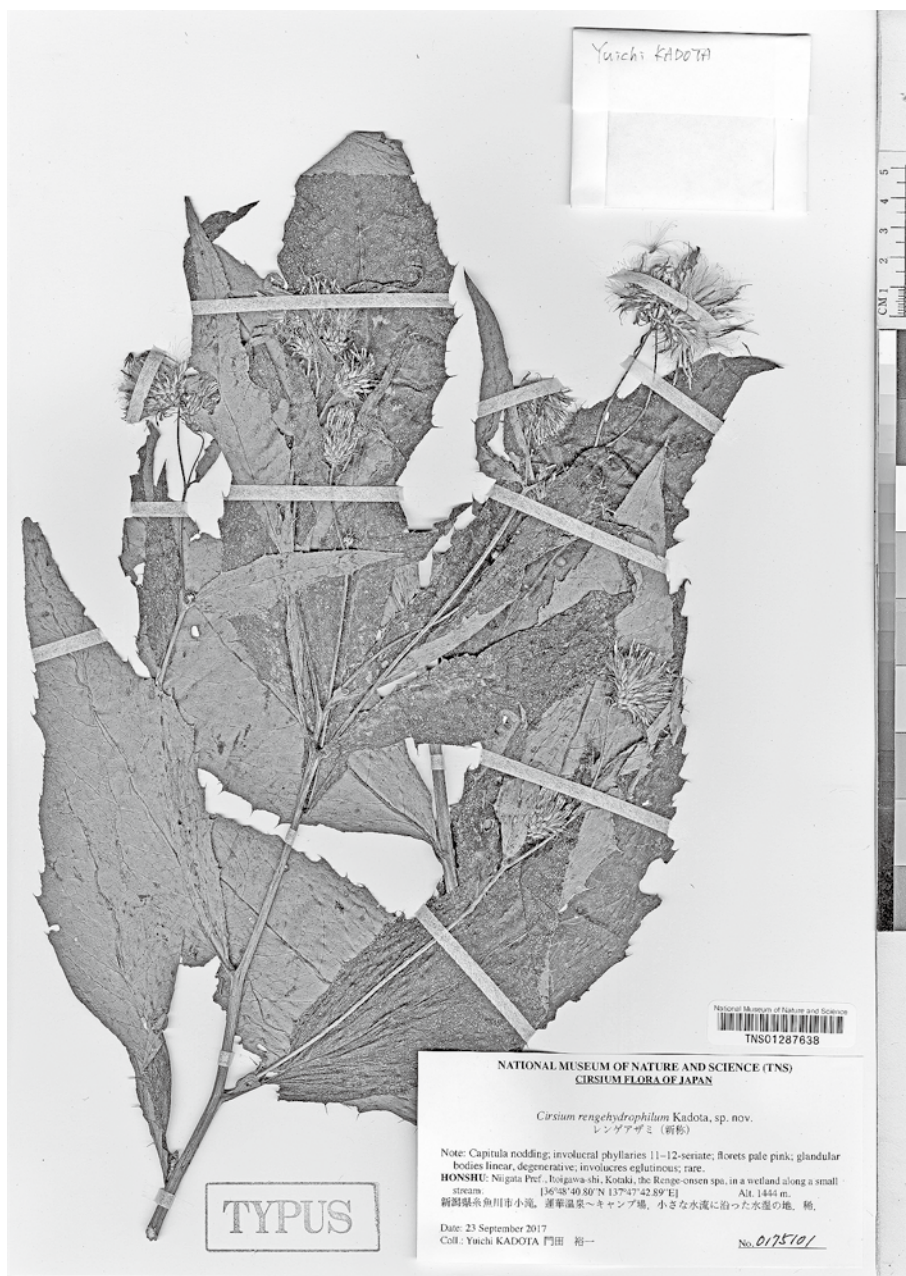


Fig. 3. Type of *Cirsium renehydrophilum* Kadota (in the vicinity of Renge-onsen spa, Niigata Pref., Honshu, 23 September 2017, Y.Kadota 0175101, TNS01287638).

(TNS01307626–holotype).

New Japanese name: Shirobana-tenguhara-azami.

新和名：シロバナテングハラアザミ

Subsect. *Reflexae* (Kitam.) Kadota in K.Iwats. & al., Fl. Jap. **3b**: 148 (1995).

2. *Cirsium renehydrophilum* Kadota, sp. nov. [Figs. 3, 4]

Cirsium renehydrophilum Kadota is



Fig. 4. *Cirsium rengedrophilum* Kadota. A. Habit. B. Hermaphrodite capitulum. C. Part of stem showing sessile cauline leaves. In the vicinity of Renge-onsen spa, Niigata Pref., Honshu, on 23 Sept. 2017.

discriminated from *C. myokoense* Kadota by its smaller habit, less branched stem with few branches, narrower cylindrical involucre, 11–12-seriate, strongly recurved involucre phyllaries, and smaller and smooth achenes.

Type: JAPAN. Honshu. Niigata Pref., Itoigawa-shi, Kotaki, in the vicinity of the Renge-onsen spa, in a wetland along a small stream, alt. 1444 m, 23 September 2017, Y.Kadota 0175101 (TNS01287638; Fig. 3).

Hermaphrodite, herbaceous, delicate perennials, 1–1.5 m tall. Rootstock stout, horizontal, up to 2 cm in diameter, with cord-like roots. Stem suberect, 2–3 times branched in the upper part, leafy, sparingly covered with short brownish, multicellular hairs in the upper part. Basal leaves withered at anthesis. Middle cauline leaves slightly bluish green on the adaxial side, membranous, neither auriculate nor amplexicaul, short petiolate to sessile; petioles 0–0.5 cm long; blades narrowly ovate to narrowly elliptic in outline, 15–20 cm long, 4–6 cm broad, almost glabrous on both sides and sparingly pubescent with short brownish-multicellular hairs along the veins on the abaxial side, shallowly to medially pinnatifid to minutely dentate, if pinnatifid, 5–8-jugate; lobes narrowly ovate, 0.5–3 cm long, 0.5–1.5 cm broad, with weaker spines 1–3 mm long (hardly causing physical pain). Upper cauline leaves narrowly elliptic, minutely dentate, sessile. Flowers in September. Capitula 2–3 in a loose raceme or solitary, nodding, with peduncles 2–7 cm long; subtending leaves 2–3, lanceolate to linear, 0.3–1 cm long, with sharp spines ca. 1 mm long. Involucres narrowly cylindrical, 13–16 mm long, 5–8 mm (*in vivo*) and 13–15 mm (*in sicco*) in diameter, almost glabrous. Phyllaries 11–12-seriate, strongly recurved; glandular bodies linear on the inner involucre phyllaries, vestigial, eglutinous; middle phyllaries sometimes provided with spinules along the margin; outer phyllaries ovate with long acuminate tips, 6–10 mm long, clearly shorter than the inner ones, herbaceous, tipped

with sharp spines ca. 1 mm long. Corollae pale violet, 15–16 mm long; lobes 3–4 mm long; throats 5–6 mm long; tubes 6–8 mm, longer than the throats. Achenes pale yellowish brown, 2.5 mm long; pappus sordid, 11–14 mm long.

Chromosome number: $2n = 2x = 34$ (Fig. 11B).

Additional specimens examined: **JAPAN.** Honshu. Niigata Pref., Itoigawa-shi, Kotaki, Renge-onsen spa, 29 Sept. 2002, Y.Kadota 203032–203047 (TNS 730669–730681); Renge-onsen spa, alt. 1444 m, 23 Sept. 2017, Y.Kadota (TNS).

New Japanese name: Renge-azami.

新和名：レンゲアザミ

Distribution: JAPAN. Honshu (near the Renge-onsen spa, the northernmost part of the Hida Mountain Range, Niigata Pref.; Fig. 12, disc). Endemic to Japan.

Habitat: Herbaceous stands among the trees along streams of water, always immersed in the water. The locality was restricted to the very narrow area which is located in the range from the Renge-onsen hot spa to the campsite.

Note: In the western part of Niigata Prefecture three species are recognized in subsect. *Reflexae*. The distinction among the species is as follows:

Key to the species of subsect. *Reflexae* in the western part of Niigata Prefecture

1A. Involucre phyllaries strongly recurved; glandular bodies present but vestigial; involucre eglutinous

2A. Involucres narrowly cylindrical, 5–8 mm in diam. (*in vivo*); involucre phyllaries 11–12-seriate; achenes pale yellowish, 2.5 mm long, smooth *C. renehydrophilum*

2B. Involucres cylindrical, 8–10 mm in diam. (*in vivo*); involucre phyllaries 9–10-seriate; achenes grayish brown, 3.5 mm long, ribbed *C. myokoense*

1B. Involucre phyllaries adpressed; glandular bodies present, well-developed; involucre glutinous *C. kagamontanum*

Subsect. *Tuberosae* Kitam. in Acta Phytotax.



Fig. 5. Type of *Cirsiium muramatsui* Kadota (Taketoyo-cho, Chita-gun, Aichi Pref., Honshu, 28 October 2018, Y.Kadota 0189020, TNS01310021).

Geobot. 3: 5 (1934), p.p.

3. *Cirsiium muramatsui* Kadota, **sp. nov.**
[Figs. 5, 6]

Cirsiium muramatsui Kadota is distinguished from *C. suzukaense* Kitam. by having

gynodioecious habit, 11–12-seriate involucrellal phyllaries and smaller florets 15–16 mm long.

Type: JAPAN. Honshu. Aichi Pref., Chita-gun, Taketoyo-cho, Fuki, near the Besso-ike pond, alt. 57 m, 28 October 2018, Y.Kadota



Fig. 6. *Cirsium muramatsui* Kadota. A. Habit. B. Hermaphrodite capitulum. C. Female capitulum. D. Bisexual floret (left) and female floret (right). In female florets the syngenesious stamens are degenerate (= do not produce pollen grains) and remain inside of the corollae. E. Achenes. Taketoyo-cho, Chita-gun, Aichi Pref., Honshu, on 28 Oct. 2018.

0189020 (TNS01310021; Fig. 5).

Gynodioecious, perennial herbs, 100–240 cm tall. Stem erect, well branched from the middle part, covered with brownish multicellular hairs in the lower part; branches ascending. Basal leaves withered at anthesis. Middle cauline leaves dull grayish green on the adaxial side, herbaceous, rough, glabrous on both sides, sessile, semiamplexicaul; blades broadly obovate, 18–25 cm long, 7–16 cm broad, deeply pinnatilobate, 4–7-jugate; lobes narrowly ovate, 2–8 cm long, 0.5–1 cm broad, with sharp spines 1–5 mm long. Flowers in October to November. Capitula 2–3 in a loose raceme or solitary, with peduncles (0.3–)4–8 cm. Involucres cylindrical, 17–18 mm long, 9 mm (*in vivo*) and 13–20 (*in sicco*) mm in diameter in bisexual heads, 15 mm long, 7.5–8 mm (*in vivo*) and 9–15 (*in sicco*) mm in diameter in female heads glabrous; subtending leaves 2–5, linear, 5–10 mm long, with sharp spines 1–2 mm long. Involucral phyllaries 11–12-seriate, appressed with ascending tips; glandular bodies lie on the midribs of the inner and middle involucral phyllaries, linear, somewhat developed, glutinous or sometimes glandular bodies vestigial and eglutinous; outer phyllaries narrowly ovate with acute tips, 2–5 mm long. Corollae pale violet, 15–16 mm long; lobes 3–4 mm long; throats 5–6 mm long; tubes 6–7 mm long in bisexual heads. Corollae deep reddish violet, 15 mm long; lobes 4 mm long; throats 5–6 mm long; tubes 5–6 mm long in female heads. Achenes ivory, 4 mm long, pappus sordid, 12–15 mm long in bisexual heads; 3.5 mm long, pappus 10–12 mm long in female heads.

Chromosome number: $2n = 4x = 68$ (Fig. 11C).

Additional specimens examined: **JAPAN**. Honshu. Aichi Pref., Chita-shi, Sōri, near the Sōri-ike pond, 25 Nov. 2017, M.Muramatsu 29138 (TNS01287599); the Sōri-ike pond, alt. 16 m, 28 Oct. 2018, Y.Kadota 0189000–0189002 (TNS0130003–0130008); the Sōri-ike pond, 18 Nov. 2018, M.Muramatsu 30186–30187 (TNS01310013–01310014). Chita-gun, Taketoyo-cho, Fuki, the Besso-ike pond, alt. 60 m, 5 Nov. 2016, M.Muramatsu 28425–28426 (TNS).

New Japanese name: Chita-azami.

新和名：チタアザミ

Distribution: JAPAN. Honshu (the Chita Peninsula, Aichi Pref.; Fig. 12, diamond).

Etymology: The specific epithet is dedicated to Mr. Masao Muramatsu who is the discoverer of this new species.

Note: Regarding the chromosome number of *Cirsium suzukaense* the number $n = 17$ was reported (Aishima 1934). However, it is clarified that the chromosome number of *C. suzukaense* is $2n = 4x = 68$ based on our new count of the material from Moriyama-ku, Nagoya-shi, Aichi Pref. (Fig. 11D). There is a possibility that the Aishima's material (1934) was misidentified.

Kadota (2017) denoted that *Cirsium suzukaense* had 11–12-seriate involucral phyllaries. However, this was erroneous. Correctly *C. suzukaense* has 8–9-seriate involucral phyllaries.

Subsect. *Nipponocirsium* Kitam. in Acta Phytotax. Geobot. **3**: 4 (1934), p.p., emend. Kadota in Kadota & Miura in Bull. Natn. Mus. Nat. Sci., Ser. B, **40**(2): 78 (2014).

4. *Cirsium verum* Kadota, **sp. nov.**

[Figs. 7, 8]

Cirsium verum Kadota is discriminated from *C. yukiuenoanum* Kadota by having medially pinnatilobate to coarsely serrate cauline leaves, non-auriculate petiole bases, cylindrical to campanulate involucre, ascending branches and shorter achenes.

Type: JAPAN. Honshu. Tokyo Pref., Sugunami-ku, Zenpukuji, at the campus of Tokyo Woman's Christian University, alt. 53 m, 13 July 2018, Y.Kadota 0185201 (TNS01310041–01310053; Fig. 7).

Gynodioecious, perennial herbs, 150–240 cm tall. Rootstock stout, horizontal; rhizomes well-developed. Stem erect, stout, striate, leafy, glabrous, well branched from the middle part more than 10 times; branches ascending at an acute angle. Basal leaves withered at anthesis. Middle cauline leaves deep grayish green on



Fig. 7. Type of *Cirsium verum* Kadota (at the campus of Tokyo Woman's Christian University, Zenpukuji, Sugunami-ku, Tokyo Pref., Honshu, 13 July 2018, Y.Kadota 0185201, TNS01310041)

the adaxial side, chartaceous, petioles 3–4 cm long to subsessile, semiamplexicaul; blades narrowly elliptic to broadly elliptic in outline, 35–40 cm long, 11–28 cm wide, almost glabrous

on both sides, medially pinnatilobate to coarsely serrate; lobes, if pinnatilobate, 4–12-jugate, narrowly ovate, 5–15 cm long, 2–5 cm wide, with sharp spines 3–7 mm long. Flowers in June



Fig. 8. *Cirsium verum* Kadota. A. Habit. B. Hermaphrodite capitulum. C. Female capitulum. D. Bisexual floret (left) and female floret (right). In female florets the corollae do not open and the syngenesious stamens remain inside of the corollae. E. Achenes and pappi. At the campus of Tokyo Woman's Christian University, Zempukuji, Suginami-ku, Tokyo Pref., Honshu, on 13 July 2018.

to November. Capitula 3–4 in a loose raceme, erect; peduncle 3–8 cm long; subtending leaves 5–7 including a prominently long one, linear to narrowly lanceolate, 0.5–3 cm long, with weak spines 2 mm long. Involucres cylindrical to campanulate, green, 17–22 mm long, 9–12 mm (*in vivo*) or 10–15 mm (*in sicco*) in diameter, sparingly arachnoid. Phyllaries 11–12-seriate, chartaceous, more or less recurved; glandular bodies linear, on the midrib of the inner phyllaries, vestigial, eglutinous; outer phyllaries ovate with acuminate apices, ca. 10 mm long, shorter than the inner ones, terminated with weak spines ca. 1 mm long. Corolla pale violet in aphyroditic heads, 16–18 mm long; lobes 4 mm long; throat 5–6 mm long; tube 7–8 mm long, longer than the throat deep violet in female heads, 12–15 mm long; lobes 2–3 mm long; throat 5–6 mm long; tube 6–7 mm long, longer than the throat. Achenes grayish brown tinged pale reddish purple, ca. 3.5 mm long; pappus sordid, 10–12 mm long.

Chromosome number: $2n = 4x = 68$ (Fig. 11E).

Additional specimens examined: JAPAN. Honshu. Tokyo Pref., Suginami-ku, Zenpukuji, at the campus of Tokyo Woman's Christian University, alt. 53 m, 13 July 2018, Y.Kadota 018202–018207 (TNS01310026–01310039); the same locality, 12 Oct. 2018, Y.Kadota 0187101–0187102 (TNS01308150–01308155).

New Japanese name: Zenpukuji-azami.

新和名：ゼンブクジアザミ

Distribution: JAPAN. Honshu (exclusively at the campus of the Tokyo Woman's Christian University, Suginami-ku, Tokyo Pref., Kanto District; Fig. 12, square). Endemic to Japan. The occurrence in the Zenpukuji park neighboring to the Tokyo Woman's Christian University is due to transplantation from the university.

Habitat: Growing along the margin of warm-temperate woods and in herb stands of the basal zone.

Etymology: The specific epithet '*verum*' is derived from the Latin phrase 'Quaecunque sunt vera' included in Novum Testamentum (New Testament), which is the motto of the Tokyo

Woman's Christian University. Because the occurrence of *Cirsium verum* is restricted to the campus of the university. The Japanese name is also derived from the locality of the university.

Note: *Cirsium verum* was found at the center of the Megalopolis Tokyo in 2016. It is not clear why such a new species has been recently discovered in the biggest city.

The first author was a part-time lecturer of Tokyo Women's Christian University in the first term of the year 2016 and weekly attended the University. He noticed the occurrence of a thistle shortly after the beginning of the course. Later it became apparent that the thistle has no radical leaves at anthesis and flowered in July. In Tokyo Prefecture it has been known that the other thistle lacking radical leaves at anthesis is *C. incomptum* (Maxim.) Nakai ('Tai-azami' in Japanese). However, *C. incomptum* has nodding heads and flowers in September at earliest. In 2017, the phenology of *C. verum* was also confirmed as July. It is clarified afterwards that *C. verum* flowers also in October.

After delivering lectures on *Cirsium verum* with the cooperation of the Suginami-ku staff, the first author called attendants to the presence of the thistle and asked the audience to look out for it in the Suginami-ku area and he himself inquired into the occurrence of the thistle in the ward. However, the thistle in question was not found except for the previously known localities.

Subsect. *Nipponocirsium* endemic to Japan is composed of ten species at the moment in which four species distributed on the Pacific Ocean side are closely related to *C. verum*. The distinguishing points are as follows:

Key to *Cirsium verum* and its allied species

1A. Involucral phyllaries 8–9-seriate; glandular bodies narrowly oblanceolate to lanceolate or linear, usually vestigial and eglutinous but occasionally slightly glutinous

2A. Blades of middle cauline leaves pinnatisect to deeply pinnatilobate, with strong spines longer than 5 mm; involucre

campanulate to cylindrical, 12–15 mm in diam. (*in vivo*); involucrel phyllaries recurved to ascending at an acute angle; dioecious

..... *C. muraii*

2B. Blades of middle cauline leaves pinnatisect to deeply pinnatilobate or coarsely serrate, with spines 3–5 mm long; gynodioecious

3A. Involucres campanulate, 12–15 mm in diam. (*in vivo*); involucrel phyllaries strongly recurved to patent; blades of middle cauline leaves rarely coarsely serrate; achenes ivory white, purple-striate, 4 mm long

..... *C. sendaicum*

3B. Involucres campanulate, 15–18 mm in diam. (*in vivo*); involucrel phyllaries recurved to subpatent, rarely ascending at an acute angle; blades of middle cauline leaves frequently coarsely serrate; achenes grayish brown, 4–4.5 mm long

..... *C. nipponicum*

1B. Involucrel phyllaries 11–12-seriate; glandular bodies linear, vestigial and eglutinous; gynodioecious

4A. Blades of middle cauline leaves medially pinnatilobate to coarsely serrate; petioles non-auriculate at base; involucres cylindrical to campanulate; branches of the stem ascending at an acute angle; achenes 3.5 mm long

..... *C. verum*

4B. Blades of middle cauline leaves pinnatisect to deeply pinnatilobate or sometimes coarsely serrate; petioles auriculate at base; involucres narrowly cylindrical; branches of the stem divaricate; achenes 4.5 mm long

..... *C. yukiuenoanum*

Subsect. *Borealicola* Kitam. in Acta Phytotax. Geobot. 3: 7 (1934).

Ser. *Glandulosae* Kadota in Kadota & Miura in Bull. Natn. Mus. Nat. Sci., Ser. B, 39: 117 (2013).

5. *Cirsium yachiyotakashimae* Kadota, sp. nov. [Figs. 9, 10]

Cirsium yachiyotakashimae Kadota is discriminated from *C. boreale* Kitam. by having 6–7-seriate, ascending or patent involucrel

phyllaries, smaller involucres and shorter florets.

Type: JAPAN. Hokkaido. Nemuro Subpref., Shibetsu-gun, Shibetsu-cho, the Ichani Karikariusu Site, in a wetland, alt. 25 m, 17 July 2017, Y.Kadota 0172001 (TNS01287738–01287746; Fig. 9).

Gynodioecious, perennial herbs, 130–240 cm tall. Rootstock stout, erect to oblique, 1.5–3 cm in diameter, with cord-like roots. Stem erect, pubescent with short, dark brownish, multicellular hairs in the lower half, winged, 1–4 times branched in the upper part; branches elongated, ascending at an acute angle. Basal and lower cauline leaves withered at anthesis. Middle cauline leaves yellowish green on the adaxial side, soft and somewhat fleshy, pubescent with short, dark brownish, multicellular hairs along veins on both sides, with petioles 5–10 cm long or subsessile to sessile, winged, auriculate and amplexicaul; blades broadly ovate to broadly elliptic or elliptic, 19–40 cm long, 7–14 cm broad, shallowly to medially pinnatilobate to coarsely dentate or minutely dentate and subentire; lobes, if pinnatilobate, 5–8-jugate; lobes ovate to narrowly ovate, 3–11 cm long, 1–6.5 cm broad, with weak spines 2–3 mm long. Flowers in July to August. Capitula 2–3 in a loose raceme or solitary, nodding; peduncles 1–15 cm long, arachnoid and covered with short, dark brownish, multicellular hairs. Involucres bowl-shaped to campanulate, 11–13 mm long, 13–21 mm (*in vivo*) and 20–45 mm (*in sicco*) in diameter, green, sparingly arachnoid; subtending leaves 3–5, narrowly ovate to linear, 10–15 mm long. Involucrel phyllaries 6–7-seriate, ascending to spreading; outer phyllaries narrowly ovate, 10–15 mm long; glandular bodies lie on the inner and the middle phyllaries, narrowly lanceolate, whitish, vestigial, eglutinous. In bisexual heads florets pale violet, 16–18 mm long; lobes 4–5 mm long; throats 5 mm long; tubes 7–8 mm long; achenes pale purplish brown, 4.5–5 mm long; pappus 11–15 mm long. In female heads florets pale violet, 15–16 mm long; lobes 4–6 mm long; throats 4–5 mm



Fig. 9. Type of *Cirsium yachiyotakashimae* Kadota (the Ichani Karikariusu Site, Shibetsu-cho, Nemuro Subpref., Hokkaido, 17 July 2017, Y.Kadota 0172001, TNS01287745).

long; tubes 6–7 mm long; achenes pale purplish brown, 4 mm long; pappus 10–13 mm long.

Chromosome number: $2n = 4x = 68$ (Fig. 11F).

Additional specimens examined: JAPAN. Hokkaido.

Nemuro Subpref., Shibetsu-gun, Shibetsu-cho, the Ichani Karikariusu Site, in a wetland, alt. 25 m, 17 July 2017, Y.Kadota 0172002–017207 (TNS01287729–01287737, 01287747–01287753); the Ichani Karikariusu Site, 1 Aug. 2019, Y.Kadota (TNS).

New Japanese name: Kariusu-azami.



Fig. 10. *Cirsium yachiyotakashimae* Kadota. A. Habit. B. Hermaphrodite capitulum. C. Female capitulum. D. Part of stem showing well developed wing. At the Ichani Karikariusu Site, Shibetsu-cho, Nemuro Subpref., Hokkaido, 1 Aug. 2019.

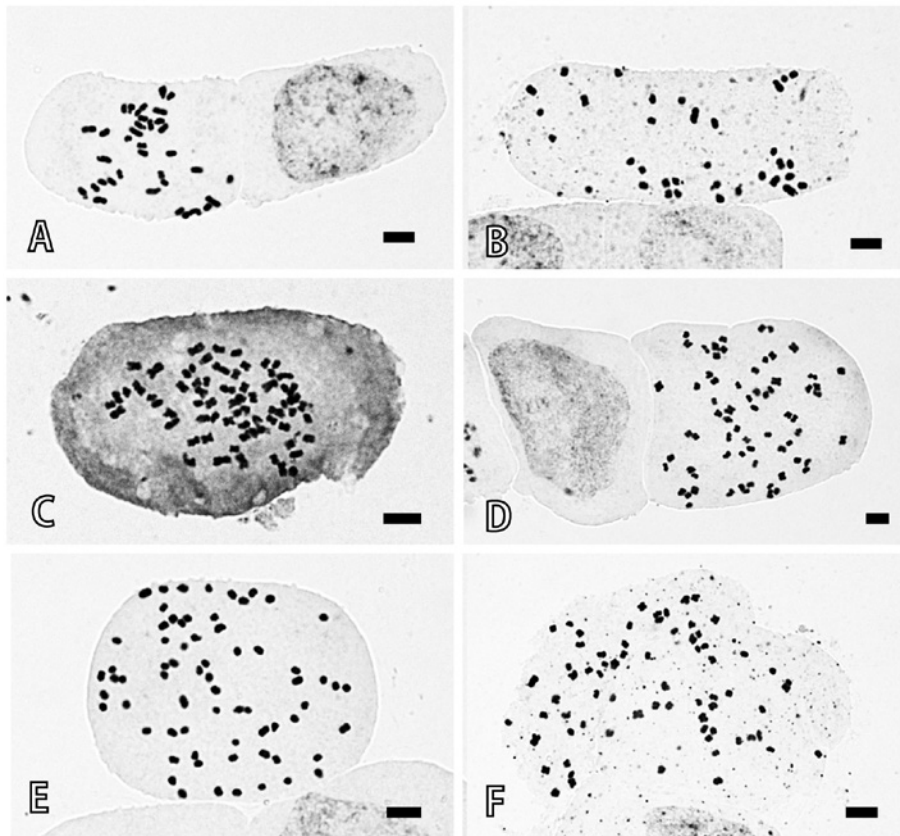


Fig. 11. Somatic chromosomes of five new and a related species of *Cirsium*. A. *C. kubikialpicola* ($2n = 2x = 34$). Y.Kadota 0185310 (TNS01307632). B. *C. renehydropilum* ($2n = 2x = 34$). Y.Kadota 0175103 (TNS01287640). C. *C. muramatsui* ($2n = 4x = 68$). Y.Kadota 0189021 (TNS01310018). D. *C. suzukaense* ($2n = 4x = 68$). M.Muramastu 30205 (TNS01310012). E. *C. verum* ($2n = 4x = 68$). Y.Kadota 0185206 (TNS01310036). F. *C. yachiyotakashimae* ($2n = 4x = 68$). Y.Kadota 0172005, 0172007 (TNS01287731, 01287729). Scale: 5 μm .

新和名：カリウスアザミ

Distribution: JAPAN. Hokkaido (restricted to the Ichani Karikariusu Site, Shibetsu-cho, Nemuro Subpref.; Fig. 12, star). Endemic to Japan.

Habitat: On the shady damp ground under summer-green woods.

Etymology: The specific epithet is dedicated to Ms. Yachiyo Takashima who is the discoverer of this new species.

The authors wish to show their cordial thanks to Mr. Hiroshi Matsui and Mr. Takaaki Fujimoto for their help of the field survey of *Cirsium*

kubikialpicola and *C. renehydropilum*; to Mr. Masao Muramatsu for his guidance to the locality of *C. muramatsui*; to Prof. Nobuo Ishii, Ms. Miki Okubo and Ms. Yasuko Sato for their support to our study of *C. verum*; to Ms. Yachiyo Takashima and Ms. Kazue Matsushita (Miyano) for their assistance to the field examinations of *C. yachiyotakashimae*; to the curators for their permission to access the specimens of KYO, TI and TNS; to Ms. Sharma Junko Okuyama for her mounting herbarium specimens.

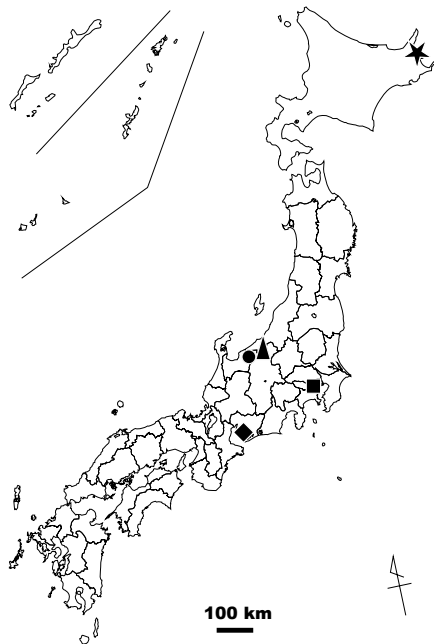


Fig. 12. Distribution of *Cirsium kubikialpicola* (triangle), *C. muramatsui* (diamond), *C. renehydropilum* (circle), *C. verum* (square) and *C. yachiyotakashimae* (star).

門田裕^a, 三浦憲人^b: 日本産アザミ属の分類学的研究
XXVI. 北海道と本州からの5新種

北海道と本州のアザミ属(キク科)に5新種と1新品種を記載した。いずれもナンブアザミ節 *Sect. Onotrophe* (Cass.) DC. の種でいずれも狭分布種である。テングハラアザミ *Cirsium kubikialpicola* Kadota(ダイニチアザミ亜節 *Subsect. Praticola* Kadota)は頸城山地の天狗原山(新潟県と長野県の県境に位置する)の固有種で、ダイニチアザミ *C. babanum* Koidz. から、全体小型で雌性両全性異株であること、総苞片が5-6列であることなどで異なる。両者には生育地にも違いがみられ、テングハラアザミは中性の高山草原に生えるのに対して、ダイニチアザミは池畔や湿地に生える。染色体数 $2n=34$ 。天狗原山の群落には白花をつける個体が見出され、新品種シロバナテングハラアザミ *C. kubikialpicola* f. *albiflorum* Kadota と名付けた。レンゲアザミ *C. renehydropilum* Kadota (カガノアザミ亜節 *Subsect. Reflexae* (Kitam.) Kadota)は新潟県糸魚川市の蓮華温泉周辺の固有植物で、ミョウコウアザミ *C. myokoense* Kadota から、全体小型で茎の分枝が少なく、総苞が狭筒形で、総苞片が11-12列で、瘦果が淡黄色で長さ2.5 mm、表面は平滑であることなどで異なる。染色体数 $2n=34$ 。チタアザミ *C. muramatsui* Kadota(ヒメアザミ亜節 *Subsect. Tuberosae* Kitam.)は愛知県知多半島の固有種で、スズカアザミ *C. suzukaense*

References

- Aishima T. 1934. Chromosome numbers in the genus *Cirsium* I. Bot. Mag. (Tokyo) **48**: 150-151.
- Kadota Y. 1995. *Cirsium*. In: Iwatsuki K., Yamazaki T., Boufford D.E. and Ohba H. (eds.), Flora of Japan **3b**: 119-151. Kodansha, Tokyo.
- Kadota Y. 2009. Taxonomic studies of *Cirsium* (Asteraceae) in Japan XIX. Two new species from Honshu, central Japan. Bull. Natn. Mus. Nat. Sci., Ser. B, **35**(1): 41-49.
- Kadota Y. 2017. *Cirsium*. In: Ohashi H., Kadota Y., Murata J., Yonekura K. and Kihara H. (eds.), Wild Flowers of Japan **5**: 216-254. Heibonsha, Tokyo (in Japanese).
- Kadota Y. and Miura N. 2013. Taxonomic studies of *Cirsium* (Asteraceae) in Japan XXIV. Five new species from Hokkaido, northern Japan. Bull. Natn. Mus. Nat. Sci., Ser. B, **39**(3): 107-129.
- Kadota Y. and Miura N. 2014. Taxonomic studies of *Cirsium* (Asteraceae) in Japan XXV. Identity of *Cirsium nipponicum* (Maxim.) Makino and two new species from Tohoku District, northern Japan. Bull. Natn. Mus. Nat. Sci., Ser. B, **40**(2): 73-94.
- Miura N. and Iwatsubo Y. 2014. Chromosome studies of *Meehanium moutis-koyae* and *M. urticifolia* in Japan. Cytologia **79**: 371-377.

Kitam. から、雌性両全性異株であり、総苞片が11-12列で、小花が小さいことで区別される。染色体数 $2n=68$ 。ゼンブクシアザミ *C. verum* Kadota(キタカミアザミ亜節 *Subsect. Nipponocirsium* Kitam. emend. Kadota)は東京都杉並区善福寺の東京女子大学構内とそこから移植された善福寺公園にのみ知られているアザミで、この亜節では総苞片が11-12列で雌性両全性を示す点でマルモリアザミ *C. yukiuenoanum* Kadota に似るが、中部の茎葉の葉身が羽状中裂~粗い鋸歯縁となり、葉柄の基部が耳状には抱茎せず、分枝した枝が鋭角的に斜上し、総苞が筒形~鐘形で、瘦果がより小型であることで区別される。染色体数 $2n=68$ 。カリウスアザミ *C. yachiyotakashimae* Kadota (チシマアザミ亜節コバナアザミ列 *Subsect. Borealicola* Kitam. Ser. *Glandulosae* Kadota)は北海道標津町・伊茶仁カリウス遺跡付近の固有種で、近縁なコバナアザミ *C. boreale* Kitam. から、総苞片が6-7列で斜上~開出し、総苞と小花が小さいことで区別される。カリウスアザミの生育地は夏緑樹で被われたうす暗い湿地である。染色体数 $2n=68$ 。

^(a)国立科学博物館植物研究部,

^(b)ホシザキ野生生物研究所)