Systematic Studies of Asian *Saussurea* (*Asteraceae*) V.
Two New Species from Eastern Hokkaido, Japan and Sakhalin, Russia

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Two new species, *Saussurea hamanakaensis* Kadota and *S. shiretokoensis* Sugaw. ex Kadota, are described from eastern Hokkaido (northern Japan) and Sakhalin, respectively. *Saussurea hamanakaensis* is different from *S. duiensis* F. Schmidt by having 5-seriate involucral phyllaries, narrowly but distinctly winged stem, more shallowly incised corolla-lobes and cauline leaves devoid of cobwebby hairs on the abaxial side. *Saussurea hamanakaensis* occurs in moors of eastern Hokkaido, Japan. *Saussurea shiretokoensis* is distinguished from both *S. duiensis* and *S. hamanakaensis* by having outer and middle involucral phyllaries with caudate apices and is known from maritime herbal stands of Sakhalin.

**Key words:** Japan, Hokkaido, new species, Sakhalin, *Saussurea duiensis*, *Saussurea hamanakaensis*, *Saussurea shiretokoensis*.


In 1974 Goda (1981) found unfamiliar plants of *Saussurea* in Hamanaka Moor, Hamanaka-cho, Akkeshi-gun, Kushiro Subprefecture, Hokkaido, northern Japan. He supposed the plants to belong an undescribed species and sent specimens to Dr. Hiroshige Koyama, enrolled in Kyoto University at that time, for determination. Koyama identified the plants as *Saussurea acuminata* Turcz. subsp. *duiensis* (F. Schmidt) Kitam. [= *S. duiensis* F. Schmidt] and told to him that Goda’s finding was the first report for this species in Japan. Goda (1981) published the record with a photograph and a line drawing in his work based on Koyama’s determination. One of the specimens collected by Goda in 1974 is also kept in TNS (Y. Goda 120, TNS 334831). However, any plants belonging to ‘*S. duiensis*’ had never been collected from eastern Hokkaido since the time of Goda’s discovery. While *S. duiensis* has not been recognized in Japan (Kitamura 1937, 1980, 1981, Masamune 1974, Ito 1981, Takita 1987, Koyama 1995) except for Ito and Hinoma (1987).

In July 2010 the plants in question were obtained from Nemuro Subprefecture, eastern Hokkaido, by Ms. Yachiyo Takashima and her colleagues. However, they collected the plants from a single locality. Hence I asked Mr. Shun Umezawa to do a thorough survey in eastern Hokkaido in order to understand the occurrence of the plants. Consequently he found other
Fig. 1. Type of *Saussurea hamanakaensis* Kadota (JAPAN: Hokkaido. Kushiro Subpref., Akkeshi-gun, Hamanaka-cho, 3 Aug. 2010, S. Umezawa s.n., TNS 1114462, holotype).
localities and collected an enough amount of specimens of the plants.

Taxonomic comparison was subsequently done between the plants from eastern Hokkaido and *S. duiensis* from Sakhalin. As a result it is concluded that the plants from eastern Hokkaido represent a distinct species from *S. duiensis* F. Schmidt. The plants from eastern Hokkaido are described as a new species, *Saussurea hamanakaensis*, after the locality name of the discovery.

During the comparative studies of *S. hamanakaensis* and the *Saussurea* species from Sakhalin “*Saussurea shiretokoensis*” (Sugawara 1937, 1940) was revised. “*Saussurea shiretokoensis* Sugaw.” was ascribed to a nomen nudum because the name was not accompanied by Latin descriptions nor type designation.

A Shigezo Sugawara collection is preserved at the Herbarium of Field Science Center for Northern Biosphere, Hokkaido University (SAPT). The specimens “Sakhalin, Kita-Shiretoko Peninsula, Funakoshi, 11 Aug. 1927, S. Sugawara 13993” quoted by Sugawara (1940, p. 1881) as *S. shiretokoensis* were not found even in this collection. However, the specimens agree with the description in Japanese and the line drawing of *S. shiretokoensis* (Sugawara 1940; tab. 864) have been located in SAPT. These specimens are provided with outer and middle involucral phyllaries with caudate apices and consequently are significantly different from *S. duiensis*. Then *S. shiretokoensis* is here described as a distinct species with accompanying typification and Latin description.

**Taxonomic treatment**


*Saussurea hamanakaensis* Kadota, sp. nov. [Figs. 1, 2]


Differt a *Saussurea duiensis* phyllariis involucrorum 5-seriatis, caule anguste alato, corollis non profunde lobatis, foliis ventraliter non araneosis.

**Type:** JAPAN. Hokkaido, Kushiro Subpref., Akkeshi-gun, Hamanaka-cho [detailed locality data concealed for plant protection], 3 August 2010, S. Umezawa s.n. (TNS 1114462–holotype, Fig. 1; TNS 114463–isotype).

A slender, herbaceous perennial, 60–140 cm tall. Rhizome oblique, ca. 1.5 cm in diameter, with string-like roots. Stem erect, striate, narrowly but clearly winged, glandular-dotted in the upper part, 2–5 times branched; wings up to 2 mm wide. Basal leaves withering at anthesis. Lower cauline leaves subcoriaceous, narrowly lanceolate, 10–15 cm long, 1–2 cm wide, serrate, glabrous on the adaxial side, densely glandular-dotted on the abaxial side, cuneate at base, acuminate at apex: petioles 2–4 cm long, amplexicaul, glabrous. Upper cauline leaves linear to narrowly lanceolate, 5–10 cm long, 3–8 mm wide, serrate to entire, acuminate at apex, amplexicaul, similarly glandular-dotted to the lower cauline leaves, sessile and amplexicaul. Flowers in July to August, with 10–20 capitula, arranged in a compact corymb; peduncles 2–7 mm long in the terminal corymb, ascending,
sparingly glandular-dotted. Involucres narrowly cylindrical, 4–5 mm in diameter, 8–10 mm long, sericeous; phyllaries 5-seriate; outer phyllaries broadly ovate to ovate, 2–3 mm long, cuspidate; inner phyllaries lanceolate, 8–10 mm long, acuminate; setae 2 mm long. Corollae pale purplish violet, 10 mm long; lobes 3 mm long, throats 1 mm long; tubes 6 mm long; anthers 4 mm long, purplish black. Pappi 2-whorled, inner 8 mm long, outer 3 mm long, grayish white. Achenes 3.5–4 mm long, glabrous, slightly reddish brown.

Japanese name: Konsen-tôhiren (nom. nov.).


Note: Saussurea hamanakaensis resembles S. duiensis in having narrowly cylindrical involucres and numerous heads arranged in a compact corymb. However, S. hamanakaensis is clearly discriminated from S. duiensis by having 1) 5-seriate involucral phyllaries (Fig. 2D), 2) narrowly winged stem, 3) shallowly lobed corollae, 4) leaves without cobwebby hairs. The
cauline leaves and the stem are densely covered with golden glandular dots (Fig. 2C) and they are very glutinous in the living state. *Saussurea duiensis* is similar to *S. hamanakaensis* in having glandular-dotted leaves and the stem. In Hokkaido, Japan, the other species of ser. *Amurensia*, *S. riederi* Herder, *S. sachalinensis* F. Schmidt and *S. yesoensis* Franch. are distinguished from *S. hamanakaensis* by the absence of glandular dots on leaves and stems.

*Saussurea hamanakaensis* grows along the edge of moors (Takashima pers. comm., Umezawa pers. comm.; Fig. 2B). While *S. duiensis* occurs in herb-stands and/or along the edge of woodlands (Sugawara 1940, Lipschitz 1962, 1979, Barkalov 1993). In this way the two species are different in habitat preference.

**Saussurea shiretokoensis** Sugaw. ex Kadota, sp. nov. [Fig. 3]


Differt a *Saussurea duiensis* et *S. hamanakaensis* phyllariis involucrorum exterioribus et mediis apice caudatis; a *S. sachalinensis* foliis anguste ovato-lanceolatis infra glandulo-punctatis.

**Type:** RUSSIA. Sakhalin [Karafuto]. Shikka [Shisuka] Subpref., Chirie-gun, Chirie-mura, Funakoshi (currently no villages, near Peskovskiy), 10 Aug. 1927, S. Sugawara 22976 (SAPT–holotype; Fig. 3). Funakoshi, 10 August 1927, S. Sugawara 22975, 22977 (SAPT–isotypes).

A perennial herb, 12–30 cm high. Rootstock suberect, 4–6 mm in diameter. Stem erect, simple, pubescent with multicellular hairs in the upper half, glabrous in the lower half. Basal leaves withered at anthesis. Lower cauline leaves subscabrid, narrowly ovato-lanceolate, 7–9.5 cm long, 1.5–2 cm wide, serrate with awn-shaped teeth, acuminated at apex, roundish at base, sparingly arachnoid on the adaxial side, densely glandular-dotted on the abaxial side, devoid of cobwebby hairs, long petiolate; petioles 5–9 cm long, winged, amplexicaul at base. Middle cauline leaves oblanceolate to narrowly ovate, 5–9 cm long, 0.8–2 cm wide, similarly serrate to the lower ones, short-petiolate; petioles 0.5–1.5 cm long or subsessile, winged. Upper cauline leaves narrowly oblanceolate, 3–5 cm long, ca. 5 mm wide, subentire, sessile. Inflorescence terminal, corymbose, 10–15-flowered; peduncles 3–5 mm long, thick, densely pubescent with brownish multicellular hairs and glandular-dotted; bracts foliaceous, narrowly lanceolate, acuminate, entire. Involute cornicles narrowly cylindrical, 5–6 mm in diameter, with linear bracteoles. Involute phyllaries 5-seriate, tinged dark purplish black along the margin and at base, sericeous and ciliate-margined, herbaceous; outermost phyllaries narrowly ovate, 2–3 mm long, caudate at apex; middle ones narrowly ovato-lanceolate, 6–7 mm long, shortly acuminate; innermost ones narrowly ovato-lanceolate, ca. 1 cm long, acute at apex. Florets purplish pink. Corollae purplish violet, 12 mm long; lobes 6 mm long; throats 1 mm long; tubes 6 mm long; anthers 4 mm long, purplish black. Pappi 2-whorled, inner 10 mm long, outer 2 mm long, grayish white.

Japanese name: Shiretoko-azami (Sugawara 1937).

和名: シレトコアザミ（菅原 1937）

**Distribution:** Central Sakhalin (Karafuto). Endemic.

**Habitat:** Maritime herb-stands (Sugawara 1940). Other specimens examined: RUSSIA. Sakhalin [Karafuto]. Esutori Subpref., Nayoshi-gun, Chiriemura, Funakoshi (currently no villages, near Peskovskiy), 10 Aug. 1927, S. Sugawara 22976 (SAPT–isotypes).

Note: *Saussurea shiretokoensis* is different from *S. duiensis* and *S. hamanakaensis* by having outer and middle involucral phyllaries...
Fig. 3. Type of *Saussurea shiretokoensis* Sugaw. ex Kadota (RUSSIA: Sakhalin, Sikka Distr., Funakoshi, 10 Aug. 1927, S. Sugawara 22976, SAPT, holotype). Right bottom corner inset shows the inflorescence of the right individual.
with caudate apices. Saussurea sachalinensis F. Schmidt is similar to S. shiretokoensis in having caudate involucral phyllaries but the former is distinguished from the latter by having leaves glandular-dotted on the abaxial side.

Saussurea shiretokoensis has not been recognized to the flora of Sakhalin (Miyabe and Miyake 1915, Kudo 1927, Voroschilov 1982). Barkalov (1993) treated S. shiretokoensis as a synonym of S. duiensis. Lipschitz (1962, 1979) regarded S. shiretokoensis as a closer species to S. duiensis based on Sugawara’s line drawing because he could not understand the description written in Japanese. Lipschitz (1962) also stated that S. shiretokoensis might be of hybrid origin between S. duiensis and S. sachalinensis due to the shapes of involucral phyllaries and cauleine leaves. The hybridity of S. shiretokoensis remains unsolved and it must be qualified in the field.

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Literatures cited
門田裕一：アジア産トウヒレン属（キク科）の分類学的研究

V. 北海道東部とサハリンからの2新種

北海道東部とサハリン（樺太）から、キク科トウヒレン属トウヒレン節の2新種、コンセントウヒレン

Saussurea hamanakaensis Kadota

とシレトコアザミ

Saussurea shiretokoensis Sugaw. ex Kadota

をそれぞれ記載した。

コンセントウヒレンはこれまでススヤアザミ

Saussurea duiensis F. Schmidt [＝Saussurea acuminata Turcz. subsp. duiensis (F. Schmidt) Kitam.]

と考えられてきたものである。コンセントウヒレンはススヤアザミとは次の点で異なる。①総苞片は5列で、②茎には狭いが明瞭な翼があり、③花冠の切れ込みが浅く、④葉の下面には腺点のみでクモ毛がない。

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V. サハリンの固有種

シレトコアザミはサハリンの固有種で、総苞片の先端が尾状に尖る点でナガバキタアザミに似るが、葉の下面に腺点を密布する点でナガバキタアザミとは異なる別の一群である。

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