

TWO NEW SPECIES OF *SAUSSUREA* SUBGENUS *ERIOCORYNE* (ASTERACEAE) FROM THE NEPAL HIMALAYA

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Two new species, *Saussurea bhutkesh* and *S. kanaii*, belonging to subgenus *Eriocoryne* (DC.) Hook.f., are described from the Nepal Himalaya. *S. bhutkesh* differs from *S. nishiokae* Kitam. in having uniseriate scattered phyllaries and golden yellow hairs on the leaves. *S. kanaii* differs from *S. topkegolensis* H. Ohba & S. Akiyama in having conspicuously lacinate leaves with dense white tomentose hairs on the abaxial surface. A key is provided to the Nepalese species of the subgenus.

Keywords. *Compositae*, new species.

INTRODUCTION

Saussurea DC. subgenus *Eriocoryne* is distributed in the Himalaya and Central Asia and is characterized by the unbranched hollow flowering stems with terminal synflorescence (Lipschitz, 1979). During our studies two new species were discovered in the Nepal Himalaya.

***Saussurea bhutkesh* K. Fujikawa & H. Ohba, sp. nov. Fig. 1.**

Saussureae nishiokae Kitam. primo aspectu maxime similis, sed capitulo phyllariis uniseriatis laxae sparseque circum cincto, foliis pilis aureis obtectis et habitu plietesiali bene differt.

Type: Nepal, Sagarmatha zone, Solukhumbu district, Chhomalung Base Camp – Rato Odara, 27°47'N, 86°55'E, 4820m, 18 viii 1995, *F. Miyamoto, M. Amano, H. Ikeda, K. Arai, T. Komatsu & C. Joshi* 9584205 (holo. TI; iso. E, KATH).

Polycarpic herb, rhizomes little branched. Synflorescence, upper half of stem and cauline leaves covered with dense white woolly multicellular hairs. *Flowering stems* erect, solitary, simple, 10–29cm tall, clavate, hollow, 0.3–1.5cm across at middle, base with persistent dead leaves. *Rosulate leaves* petiolate; petioles expanded, 1.7–9 × 0.2–1cm, glabrous or with scattered hairs, reddish purple, with 4–10 parallel lateral veins; lamina spatulate or narrowly oblong to oblong, 2–15 × 0.5–2.1cm, apex acute; margins dentate with mucronate teeth 1–2.5mm long; adaxial surface dull green with reddish purple midrib, tomentose with dense golden yellow and white multicellular hairs; abaxial surface pale dull green with reddish purple midrib, with sparse to dense golden yellow multicellular hairs. *Lower cauline leaves* petiolate,

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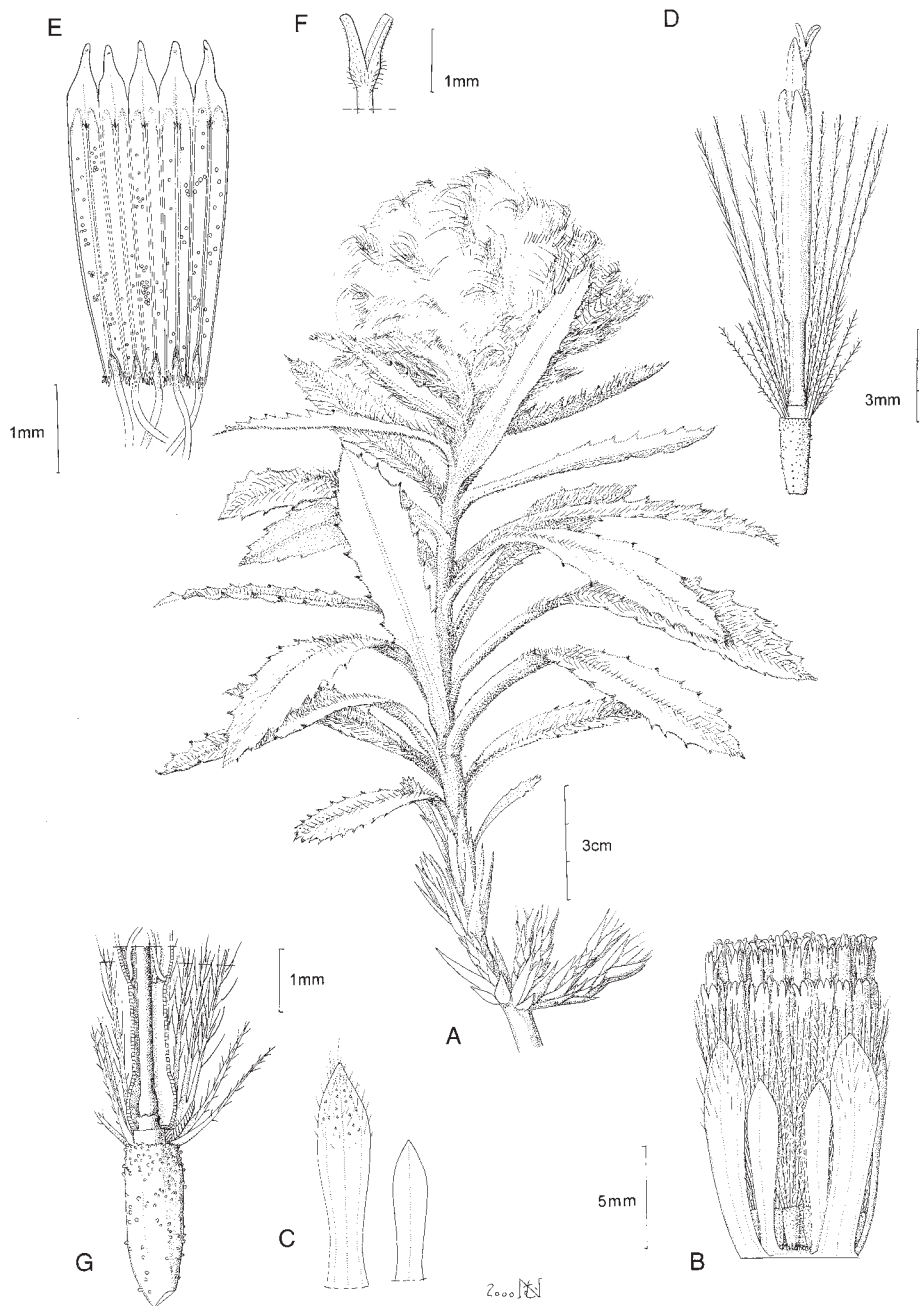


FIG. 1. *Saussurea bhutkesh*. A, habit; B, capitulum; C, involucral phyllaries; D, floret (removed front pappus); E, opened stamens (adaxial side); F, style branches; G, opened corolla showing pistil base. (C same scale as B) Drawn by Mutsuko Nakajima.

upper ones sessile; petiole expanded, up to 7.5cm long, gradually decreasing in length upwards, reddish purple to pale green, glabrous or with scattered to dense hairs, with 4–10 parallel lateral veins; lamina narrowly elliptic to oblong, 2–25 × 0.5–2.8cm, apex acute; margins dentate with mucronate teeth 1–4mm long; adaxial surface dull green; abaxial surface pale dull green; both surfaces tomentose with dense golden yellow and white multicellular hairs.

Synflorescence 1.3–5.5cm across, concealed at least until flowering time. *Capitula* sessile, 0.5–1.5cm across, closely clustered on the flat stem apex. *Involucre* tubular. *Phyllaries* in a single whorl, scattered, linear to lanceolate, 5–9.5 × 0.6–1.5mm, acute, 3–7-veined, margins membranous, cream-coloured, apex dark to purplish green, with scattered hairs and glandular hairs on upper half to third of abaxial surface. *Receptacle* convex, sparsely papillate round margin; papillae c.0.3mm long.

Corolla actinomorphic, 8.6–12.1mm long, pale to bright purple; tube 1.7–3.8 × 0.4–0.7mm; limb (including lobes) 5.7–8.6 × 0.9–1.5mm; lobes 1.4–2.4 × 0.3–0.6mm, bright purple to red-purple, erect at flowering. *Anthers* sagittate, 3.2–5.5mm long; tails 0.5–1.4mm long, apex minutely incised. *Style* 9.5–14.5mm long; branches 0.8–1.4mm long, shaft 0.1–0.5mm long, abaxial side of branches and shaft hairy. *Disc* c.0.4mm tall. *Achenes* when young narrowly elliptic to oblong, 2.4–3.8 × 0.7–1.2mm, longitudinally 4- or 5-angled, densely papillate. *Pappus* biseriate; outer series caducous, with scabrid bristles, 1–3.9mm long, white to cream; inner series persistent, 12–20, plumose, 8.2–11mm long, base connate, white to cream. *Chromosome number* $2n=36$. *Flowering* late August to September.

Distribution and habitat. Himalaya (East Nepal). In subnival zone, on sandy or stony places and screes, 4440–4820m.

Additional specimens examined. NEPAL. Sagarmatha zone: Solukhumbu district, Chhomalang Base Camp – Rato Odara, 27°47'N, 86°55'E, 18 viii 1995, F. Miyamoto *et al.* 9580336 (KATH, TI), 4750m, F. Miyamoto *et al.* 9588192 (KATH, TI); around Dig Kharka, 27°44'N, 86°51'E, 4770m, 14 viii 1997, M. Wakabayashi *et al.* 9730261 (KATH, TI); around Dudh Kund, 27°42'N, 86°50'E, 4440m, 25 viii 1995, F. Miyamoto *et al.* 9588238 (KATH, TI); Rato Odara – a pass – Chhomalang Base Camp, 27°43'N, 86°54'E, 4800m, 11 viii 1995, F. Miyamoto *et al.* 9580267 (KATH, TI); around Tangnag, 27°43'N, 86°50'E, 4650m, 12 viii 1997, M. Wakabayashi *et al.* 9730240 (A, E, KATH, TI), 4700m, 19 viii 1997, M. Wakabayashi *et al.* 9730312 (KATH, TI), 4700m, 20 viii 1997, M. Wakabayashi *et al.* 9730313 (K, KATH, L, MO, TI, TNS).

Saussurea bhutkesh has been collected from several localities in East Nepal, as shown in Ohba & Ikeda (2000). The epithet is the Nepalese word meaning a shaggy monster.

This species is similar to *Saussurea nishiokae* in having densely papillate achenes, receptacles with sparse papillae along margins, narrowly elliptic to oblong dentate leaves and tubular involucre, but differs in the uniseriate scattered phyllaries, leaves with golden yellow hairs and the polycarpic habit. *S. nishiokae* is monocarpic, and has 3- or 4-seriate imbricate phyllaries and leaves with white arachnoid hairs. In subgenus *Eriocoryne*, life-span is constant for each species. Monocarpic species like *S. gossipiflora* D. Don and *S. nishiokae* have undeveloped rhizomes without

any axillary or adventitious buds. The polycarpic species like *S. simpsoniana* and *S. bhutkesh* have slender rhizomes which branch and produce aerial shoots. Some aerial shoots become floriferous but others remain sterile until next flowering. We made a field survey of the populations of *S. gossipiphora* and allied species in Jaljale Himal, Hinku Valley and Mustang in Nepal between 1997 and 1999, and the results showed no exceptions to this life-span. The chromosome number $2n = 36$ was counted from shoot apices (voucher specimen: *Wakabayashi et al.* 9730261: KATH, TI). The same chromosome number is found in *S. nishiokae* and *S. gossipiphora* (Amano & Ohba, 2000).

Saussurea kanaii K. Fujikawa & H. Ohba, **sp. nov.** **Fig. 2.**

Ex affinitate *Saussureae topkegolensis* H. Ohba et S. Akiyama foliis conspicue laciniatissimis infra dense albotomentosis satis diagnoscenda.

Type: Nepal, Dhaulagiri zone: Mustang district, Yak Kharka, 28°45'N, 83°38'E, 4420m, 31 viii 1999, *K. Fujikawa* 9920102 (holo. TI; iso. E, KATH).

Monocarpic herb with elongate thickening root, rhizomes not branched. Synflorescence, upper half of stem and cauline leaves covered with dense white woolly multicellular hairs. *Flowering stems* erect, solitary, simple, 3–16cm tall, clavate, hollow, 0.5–1.5cm across at middle, base with persistent dead leaves. *Rosulate leaves* petiolate; petioles expanded, 0.9–2.4 × 0.1–0.5cm, glabrous or with scattered hairs, reddish purple to pale green with 4–10 parallel lateral veins; lamina lanceolate to oblong, 1.2–6.5 × 0.5–1.8cm, apex acute; margins laciniate; lobes 3–9mm long, 6–15 pairs on each side of midrib, with or without mucronate teeth, margins often lobulate; adaxial surface bright green to dark green with pale green midrib, glabrous or with scattered hairs along veins and margins; abaxial surface pale dull green with pale green midrib, tomentose with white multicellular hairs. *Lower cauline leaves* petiolate, upper ones sessile; petiole expanded, to 5.4cm long, gradually decreasing in length upwards, glabrous or with scattered to dense hairs, with 4–10 parallel lateral veins; lamina lanceolate to oblong, 1.5–10.2 × 0.5–2.0cm, apex acute; margins laciniate; lobes 3–10mm long, 6–20 pairs on each side of midrib, apex with or without mucronate teeth, margins often lobulate; adaxial surface pale dull green to dark green with dark purple midrib, glabrous or with scattered hairs along veins and margins; abaxial surface pale dull green with pale green midrib, tomentose with dense white multicellular hairs.

Synflorescence 2–6cm across, exposed at flowering time. *Capitula* 0.5–1.8cm across, clustered loosely on obovoid top of stem with very short peduncle. *Involucre* campanulate. *Phyllaries* 3- or 4-seriate, imbricate, the outer longer than the inner, lanceolate to ovate, 11–21 × 1.6–3.1mm, apex acute, 3–7-veined, herbaceous, blackish purple to dull green; abaxial side with dense hairs and scattered glandular hairs; adaxial side with hairs on upper half to third; inner phyllaries linear or lanceolate to ovate, 9–12 × 1.1–2.1mm, apex acute, 3–5-veined, margins membranous,

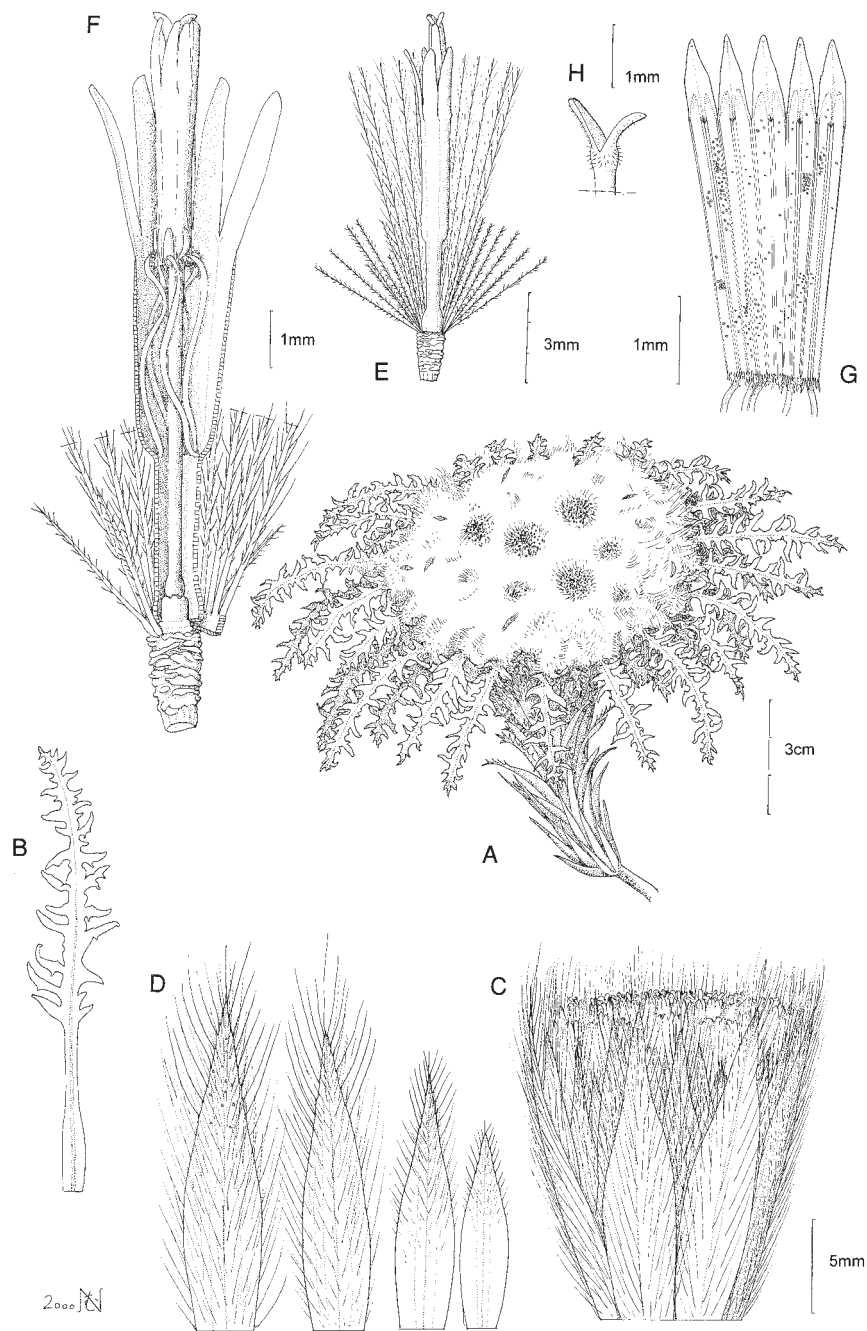


FIG. 2. *Saussurea kanaii*. A, habit; B, leaf ($\times \frac{1}{2}$); C, capitulum; D, outer, middle and inner involucre phyllaries; E, floret (removed front pappus); F, opened corolla; G, opened stamens (adaxial side); H, style branches. (D same scale as C) Drawn by Mutsuko Nakajima.

cream-coloured; abaxial side with dense hairs on upper third. *Receptacle* convex, with dense 1.2–3mm long setae round the margin.

Corolla actinomorphic, 8.9–10.7mm long, pale purple to red-purple; tube 2.9–3.9 × 0.3–0.6mm; limb (including lobes) 5.8–7 × 0.8–1.3mm; lobes 1.9–2.9mm long, bright purple to red-purple, erect at flowering. *Anthers* sagittate, 3.5–4.9mm long; tails 0.5–1.1mm long, apex minutely incised. *Style* 8.4–10.5mm long; branches 0.6–1.2mm long, shaft 0.2–0.5mm long, abaxial side of branches and shaft hairy. *Disc* c.0.5mm tall. *Achenes* when young elliptic to oblong, 1.8–2.9 × 0.7–1.3mm, longitudinally 4- or 5-angled, smooth or sparsely papillate on upper part. *Pappus* biseriate; outer series caducous, with scabrid bristles, 1.5–6.1mm long, white to cream; inner series persistent, 10–17, plumose, 7.9–11.8mm long, base connate, white to cream. *Chromosome number* $2n=32$. *Flowering* late August to September.

Distribution and habitat. Himalaya (Central Nepal). In subnival zone, on stony places and screes, 4300–4600m.

Additional specimens examined. NEPAL. Dhaulagiri zone: Mustang district, around Alubari, 28°45'N, 83°39'E, 4300m, 23 viii 1994, *S. Noshiro et al.* 9485528 (KATH, TI); around Yak Kharka, 28°45'N, 83°38'E, 4420m, 1 ix 1999, *K. Fujikawa* 9920117 (KATH, TI), 3 ix 1999, *K. Fujikawa* 9920121 (A, KATH, TI).

Collecting localities for *S. kanaii* are shown in Fujikawa (2000). We have named this species in honour of Dr Hiroo Kanai, former director of the Botany Division, National Science Museum, Tokyo, for his contribution to studies of the Himalayan flora.

Saussurea kanaii is similar to *S. topkegolensis* in having sparse capitula on an obovoid stem apex and a monocarpic habit, but differs in the laciniate leaves densely covered with white tomentose hairs on the abaxial surface. *S. topkegolensis* has interruptedly dentate to pinnatilobed leaves with glabrous or scattered hairs on the abaxial surface. In *S. topkegolensis* the corolla is 7.3–8.7mm long, whereas in this species it is 8.9–10.7mm long. The distribution of *S. topkegolensis* is Central and East Nepal, while that of *S. kanaii* is Central Nepal. The chromosome number $2n=32$ was counted from shoot apices (voucher specimens: *Fujikawa* 9920102 and 9920121: KATH, TI). The chromosome number is the same as those of *S. topkegolensis* and *S. simpsoniana* (Field. & Gardner) Lipsch. (Amano & Ohba, 2000).

Although the Nepalese species of subgenus *Eriocoryne* present some taxonomic problems, they can be identified from the following key. The structure, variation and stability of some morphological characters will be discussed in a separate paper.

Key to the species of Saussurea DC. subgenus Eriocoryne in Nepal

- 1a. Leaves dentate, laciniate or pectinate with more than 4 teeth or lobes on each side, acuminate or acute at apex _____ 2
 1b. Leaves entire or with 3 or 6 lobes in apical part, obtuse or rounded at apex _____
 _____ **S. tridactyla**; **S. gnaphalodes**

- 2a. Stems with clavate apex; capitula loosely arranged in upper half of stem _____ **S. spicata**
- 2b. Stems with flat, convex or obovoid apex; capitula congested at apex _____ 3
- 3a. Receptacles with sparse papillae 0–0.5mm long _____ 4
- 3b. Receptacles with dense setae 1.2–3.0mm long _____ 6
- 4a. Leaves pectinate; outer pappus plumose; achenes smooth — **S. laminamaensis**
- 4b. Leaves dentate; outer pappus scabrous; achenes papillate _____ 5
- 5a. Phyllaries uniseriate; leaves with golden yellow hairs _____ **S. bhutkesh**
- 5b. Phyllaries 3- or 4-seriate, imbricate; leaves with white hairs _____ **S. nishiokae**
- 6a. Synflorescence concealed by woolly hairs at flowering; outer phyllaries shorter than inner phyllaries (innermost c.1.8 times longer than outermost) _____ **S. gossiphora**
- 6b. Synflorescence exposed at flowering; outer phyllaries longer than or nearly as long as inner phyllaries _____ 7
- 7a. Leaves lacinate; abaxial surface with dense white hairs _____ **S. kanaii**
- 7b. Leaves interruptedly dentate to pinnatilobed; abaxial surface glabrous or with sparse white hairs _____ 8
- 8a. Capitula closed, sessile; involucre tubular _____ **S. simpsoniana**
- 8b. Capitula interrupted, short pedunculate; involucre campanulate _____ **S. topkegolensis**

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