



## Taxonomic and nomenclatural notes on *Ligularia ghatsukupa*, *L. leesicotal* and *L. rumicifolia* (Asteraceae, Senecioneae)

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### Abstract

We clear up the taxonomic and nomenclatural confusion involving *Ligularia ghatsukupa*, *L. leesicotal* and *L. rumicifolia* (Asteraceae, Senecioneae). The independent specific status of *Ligularia leesicotal*, which has been previously placed in synonymy within *L. rumicifolia*, is reinstated. *Ligularia rumicifolia* (Good) S. W. Liu (1985) is the correct author citation, not *L. rumicifolia* S. W. Liu (1985). *Ligularia ghatsukupa* is found to be conspecific with *L. rumicifolia* and is thus synonymized.

**Key words:** Compositae, new synonymy, taxonomy, Xizang

### Introduction

The genus *Ligularia* Cassini (1816: 198) (Asteraceae, Senecioneae) is distributed in Asia and Europe, with about 140 species being recognized (Liu & Illarionova 2011). China is the largest center of the species diversity in the genus. In the recently published *Flora of China* vol. 20–21, 123 species (89 endemic) are recorded. It is regrettable, however, that the FOC account of *Ligularia* is far from satisfactory. One of the major reasons, as demonstrated by the recent work of Ren & Yang (2013a, b, c, 2014), is the lack of critical examination of the type material in many taxa. The taxonomic and nomenclatural confusion involving *Ligularia ghatsukupa*, *L. leesicotal* and *L. rumicifolia*, which we will attempt to clear up below, is another case in point.

### Material and methods

For morphological comparisons, we critically checked herbarium specimens or high-resolution images of specimens in BM, E, HNWP, IBSC, KUN, PE and TNS, and made field observations in Xizang, China.

### Taxonomic notes on *Ligularia ghatsukupa*, *L. leesicotal* and *L. rumicifolia*

*Ligularia ghatsukupa* Kitamura (1953: 73) was described on the basis of a single collection, *E. Kawaguchi* SM 96917 (= *E. Kawaguchi* III) (TNS; Fig. 1), from Gonggar, Xizang, China. In the protologue, the author stated that it was a very beautiful racemose species, differing from *L. sibirica* (Linnaeus 1753: 924) Cassini (1823: 402) by the petiole without a dilated base and by the whitish pappus. Since its publication, the species has been recognized by Hu (1967), Liu (1985a, 1989), and Liu & Illarionova (2011).

*Ligularia leesicotal* Kitamura (1953: 74) was described on the basis of six collections from the neighborhood of Lhasa, Xizang, China, with *E. Kawaguchi* SM 96920 (= *E. Kawaguchi* 132) (TNS; Fig. 2) from Yamdokcho in Nagarzê being designated as the holotype. In the protologue, the author stated that this species has a corymbose, many-headed inflorescence, with the petiole of the stem leaves without a dilated sheath. Hu (1967), Koyama (1968), Anonymous

(1975) and Kitamura (1982) recognized this species, but Liu (1985a, 1989) and Illarionova (2006, 2008b) placed it in synonymy within *L. rumicifolia* Drummond (1911: 271) Liu (1985a: 832), and Liu & Illarionova (2011) placed it in synonymy within *L. rumicifolia* Liu (1985a: 832). Further on, we will discuss the problem of the author citation of *L. rumicifolia*.



FIGURE 1. Holotype sheet of *Ligularia ghatsukupa*.



FIGURE 2. Holotype sheet of *Ligularia leescotal*.

*Senecio rumicifolius* Drummond (1911: 271) was described on the basis of a single collection, *Walton s.n.* (BM, K; Fig. 3), from Yamdokcho, Nagarzê, Xizang, China. In the protologue, the author stated that the species was very

similar to *Ligularia platyglossa* Franchet (1892: 293) Handel-Mazzetti (1936: 1137) but differed by the larger heads, the whole plant, especially the raceme being far more cobwebby, the leaves broader, more obtuse, and more prominently reticulate, especially on the abaxial surface. He stressed that the breadth and texture of the leaves in *S. rumicifolius*, as well as the almost spicate inflorescence and the long-clawed ligules, were remarkable.

Good (1929) recognized *Senecio rumicifolius* but transferred it to *Cremanthodium* Benth (1873: 38) as *C. rumicifolium* (Drummond 1911: 271) Good (1929: 289). He noted that it was apparently related to *C. arnicoides* (Candolle ex Royle 1839: 60) Good (1929: 288) but had a close raceme, and that it was a very little-known species. Liu (1985a) also recognized *S. rumicifolius* but transferred it to *Ligularia* as *L. rumicifolia* (Drummond 1911: 271) Liu (1985a: 832) and, as mentioned above, placed *L. leesicotal* in its synonymy. Most notably, he described *L. rumicifolia* as having a compound corymb, which is in serious conflict with the protologue of *S. rumicifolius*. In the protologue, the species was described as having a spicate inflorescence. This treatment was adopted by Liu (1989, 2005), Chen & Li (1994), Illarionova (2006, 2008) and Liu & Illarionova (2011). From the notes given by Liu (1985a) in synonymizing *L. leesicotal* with *L. rumicifolia*, it is evident that he did not see their type material and made his taxonomic decision mainly based on the fact that their type material was collected from the same locality, i.e. Yamdokcho in Nagarzê, Xizang. The fact that he described *L. rumicifolia* as having a compound corymb indicates the Xizang specimens he had examined should all belong to *L. leesicotal*.

Our comparison of the specimens (including the type material) of *Ligularia ghatsukupa* (Fig. 1), *L. leesicotal* (Figs. 2, 4) and *L. rumicifolia* (Figs. 3, 5) shows clearly that *L. ghatsukupa* and *L. rumicifolia* are conspecific with each other whereas *L. leesicotal* is a distinctive species of its own. Liu (1985a, 1989, 2005), Chen & Li (1994), Illarionova (2006, 2008) and Liu & Illarionova (2011) totally misunderstood *L. rumicifolia*, and consequently, they misidentified all the specimens of *L. leesicotal* as *L. rumicifolia* (some of them are shown in Fig. 4). In fact, *L. leesicotal* is most readily distinguishable from *L. ghatsukupa* and *L. rumicifolia* by, among other characters, having a corymbose (vs. racemose) synflorescence. Both our survey in some major Chinese herbaria (HNWP, IBSC, KUN, PE) and fieldwork have shown that *L. leesicotal* is a fairly common species in China, primarily occurring in Xizang but occasionally also in western Sichuan and northwestern Yunnan (see below).

### Nomenclatural notes on *Ligularia rumicifolia*

Having said that *Ligularia ghatsukupa* and *L. rumicifolia* belong to the same species and must be merged, now we have to choose a correct name for the species.

When Drummond (1911) described his *Senecio rumicifolius*, he was unaware that this name was illegitimate, being a later homonym of both *S. rumicifolius* MacOwan & Bolus (1881: 392) and *S. rumicifolius* Klatt (1888: 126). When Good (1929) and Liu (1985a), respectively, transferred Drummond's *Senecio rumicifolius* to *Cremanthodium* and *Ligularia*, they also overlooked the illegitimacy of the name and thus proposed *C. rumicifolium* "(Drummond) Good" and *L. rumicifolia* "(Drummond) S. W. Liu". In the FOC account of *Ligularia*, Liu & Illarionova (2011) found the illegitimacy of the name *S. rumicifolius* Drummond, and thus treated *L. rumicifolia* not as a new combination but as a replacement name. However, should *L. ghatsukupa* have been treated as being synonymous with *L. rumicifolia*, as was done by Liu & Illarionova (2011), the name *L. ghatsukupa*, published in 1953, would have had priority over the latter.

According to Article 58.1 of the International Code of Nomenclature for algae, fungi, and plants (Melbourne Code) (McNeill *et al.* 2012), *Cremanthodium rumicifolium* "(Drummond) Good" should not be treated as a new combination but as a replacement name, and its correct author citation should be *C. rumicifolium* Good, which has priority from 1929. When Liu (1985a) transferred the species to *Ligularia*, therefore, the correct author citation should be *L. rumicifolia* (Good) S. W. Liu, and this name has priority over *L. ghatsukupa*, which has priority from 1953. It is evident that *L. ghatsukupa* must be reduced to the synonymy of *L. rumicifolia*.

### Taxonomic treatment

***Ligularia rumicifolia*** (Good) Liu (1985a: 832). *Senecio rumicifolius* Drummond (1911: 271), non MacOwan & Bolus (1881: 392), nor Klatt (1888: 126). *Cremanthodium rumicifolium* Good (1929: 289). Figs. 1, 3, 5.

Type:—CHINA. Xizang: Nagarzê, Yamdokcho, August 1904, Walton *s.n.* (holotype K, not seen, isotype BM!).



FIGURE 3. Isotype sheet of *Ligularia rumicifolia*.

*Ligularia ghatsukup* Kitamura (1953: 73), **syn. nov.**

Type:—CHINA. Xizang: Gonggar, Niyaso, 2 August 1914, *E. Kawaguchi* SM 96917 (= *E. Kawaguchi* 111) (holotype TNS!).

Perennial herbs, robust. Stem solitary or 2, erect, hollow, 15–120 cm tall, proximally glabrous, distally white arachnoid-puberulent. Basal leaves petiolate; petiole 4–20 cm long, 1–3 cm broad, thin, glabrous, base semi-amplexicaul; leaf blade ovate-oblong or broadly ovate, 8–20 cm long, 4–20 cm broad, both surfaces densely white arachnoid-puberulent when young, pinnate veins prominent on both surfaces, adaxially bright green, abaxially pale green, base truncate, margin irregularly dentate, apex rounded. Stem leaves a few; middle stem leaves smaller than basal leaves, sessile or shortly petiolate, ovate or oblong, base semi- or auriculate-amplexicaul; distal stem leaves smaller, sessile, ovate-lanceolate, clasping below. Synflorescence racemose, clustered initially, elongating gradually later, to 40 cm long; peduncles densely white arachnoid-puberulent; leaflike bracts linear-lanceolate, to 2 cm long, apex acuminate. Capitula numerous, nodding; bracts linear. Involucre broadly campanulate or hemispheric, 1.5–2 cm long, 1.5–2.5 cm broad, outside glabrous or sparsely white arachnoid-puberulent; phyllaries 8–13, in 2 rows, outside phyllaries narrowly lanceolate or oblong, 3–6 mm broad, inner ones oblong, 5–8 mm broad, apex acute. Ray florets 6–8, yellow; lamina ovate-oblong or elliptic, to 16 cm long, ca. 6.5 mm broad, apex acute, sometimes slightly 3-denticulate; tube ca. 4 mm. Tubular florets numerous, ca. 1 cm long; tube ca. 3 mm long. Achenes brown, cylindrical, 4–8 mm long. Pappus white, as long as tubular corolla.

**Distribution and habitat:**—*Ligularia rumicifolia* is distributed in Xizang, China (Fig. 6). It grows in gravelly places at elevations between 4700 and 5000 m above sea level.

**Phenology:**—Flowering from June–September; fruiting from August–October.

**Additional specimens examined:**—CHINA. Xizang: Comai, *Qinghai-Xizang Veg. Exped. 2152* (PE); Cona, *Y.S. Chen et al. 13-1246* (PE); Nagarzê, *J.S. Yang 90-600* (IBSC, KUN); Namling, *Qinghai-Xizang Exped. 7464* (HNWP, KUN, PE); Qusum, *H.H. Tong 159* (PE); Without precise locality, *C.Y. Wu et al. 75-0847* (HNWP, KUN, PE), *P.C. Tsoong 5645* (PE), *6150* (PE), *6156* (PE), *6161* (PE).

**Notes:**—*Ligularia rumicifolia* is readily referable to *L. sect. Ligularia ser. Racemiferae* (Pojarkova 1961: 893) Liu (1985: 66) in having the pinnately veined leaf blade, racemose synflorescence, and whitish pappus as long as the tubular corolla. It is distinguished in the series by the plants taller, more robust, stem to 2.8 cm in diameter at base, leaves ovate-oblong or broadly ovate, with stout midvein, capitula larger, and involucre hemispheric or campanulate, to 2.5 cm in diameter.

***Ligularia leescotal*** Kitamura (1953: 74). Figs. 2, 4.

Type:—CHINA. Xizang: Nagarzê, Pali Shan, 23 August 1914, *E. Kawaguchi SM 96920* (= *E. Kawaguchi 132*) (holotype TNS!).

*Ligularia rumicifolia* Liu (1985a: 832, 1989: 47, 2005: 457); Chen & Li (1994: 2067); Illarionova (2006: 235, 2008: 207); Illarionova & Liu (2011: 391).

Perennial herbs. Roots fleshy. Stem solitary, erect, 40–100 cm tall, at base with a circle of dense reddish brown lanate hairs, distally white lanate. Basal leaves petiolate; petiole to 18–22 cm long, white lanate, winged or not, thin, base slightly enlarged; leaf blade ovate-oblong, 10–19 cm long, 9–14.5 cm broad, both surfaces initially white lanate, later glabrous, pinnately veined, with prominent reticulate lateral veins on both surfaces, base rounded or shallowly cordate, margin minutely denticulate, apex rounded. Stem leaves a few; middle stem leaves sessile, ovate or ovate-oblong, 15–25 cm long, 15–20 cm broad, base auriculate-amplexicaul or flattened; distal stem leaves smaller, without sheath, ovate-lanceolate or ovate-triangular, base oblique, margin toothed, apex acuminate; distalmost stem leaves lanceolate or linear-lanceolate. Compound corymbs or panicles, initially clustered, later spreading; branches to 17 cm long, white lanate; leaflike bracts linear; peduncles to 3 cm long, white lanate. Capitula numerous. Involucre turbinate or campanulate-turbinate, 5–9 mm long, mouth 0.5–1 cm in diam., outside green, glabrous or initially white pubescent; phyllaries 5–8, in 2 rows, outer phyllaries elliptic or narrow oblong, apex acute; inner phyllaries oblong, margin membranous, apex acute. Ray florets 3–7, yellow; lamina linear-oblong, 1–1.6 cm long, 2–3 mm broad, apex rounded; tube 2–3 mm long. Tubular florets numerous, 5.5–6.5 mm long; tube 1–1.5 mm long. Achenes pale brown, cylindrical, 4–6 mm long. Pappus white or pale brownish, as long as tubular corolla.

**Distribution and habitat:**—*Ligularia leescotal* is distributed in Xizang, western Sichuan and northwestern Yunnan, China (Fig. 6). It is recorded to occur also in Nepal (Koyama 1968, Kitamura 1982), but we have not as yet seen any material of it from that country. It grows on grassy slopes and limestone screes or in forests and scrub at elevations between 3000 and 5900 m above sea level.

**Phenology:**—Flowering from July–August; fruiting from August–October.



**FIGURE 4.** Specimens of *Ligularia leescotal* (previously misidentified as *L. rumicifolia*). **A.** China, Xizang, Nyingchi, FLPH Tibet Exped. 12-1152 (PE). **B.** China, Yunnan, Zhongdian, Y.S. Chen 9681 (PE). **C.** China, Sichuan, Xiangcheng, D.E. Boufford et al. 28846 (E). **D.** China, Sichuan, Daocheng, Qinghai-Xizang Exped. 6000 (PE).



**FIGURE 5.** Specimens of *Ligularia rumicifolia* (previously misidentified as *L. ghatsukupa*). **A.** China, Xizang, Nagarzê, J.S. Yang 90-600 (KUN). **B.** China, Xizang, Comai, *Qinghai-Xizang Veg. Exped. 2152* (PE). **C.** China, Xizang, Qusum, *H.H. Tong 159* (PE). **D.** China, Xizang, Without precise locality, *C.Y. Wu et al. 75-847* (KUN).

**Additional specimens examined:**—CHINA. Sichuan: Daocheng, *Qinghai-Xizang Exped. 6000* (KUN); Xiangcheng, *D.E. Boufford et al. 28846* (E, P), *43184* (PE). Xizang: Banbar, *D.D. Tao 11221* (KUN, PE); Baxoi, *C.Y.*



Wu et al. 4938 (KUN); Cona, Y.S. Chen et al. 13-1168 (PE); Damxung, Y.S. Chen et al. 13-0054 (PE), D.X. Su 32 (PE); Dêngqên, J.S. Yang 91-637 (KUN, PE); Gongbo'gyamda, Y.S. Chen 9463 (PE); Gyaca, H.N. Tan 584 (PE), B.Q. Xu & Y.H. Tong XiaNh-07zx-688 (IBSC), XiaNh-07zx-752 (IBSC), XiaNh-07zx-753 (IBSC); Gyangzê, P.C. Tsoong 5717 (PE); Lhasa, Qinghai-Xizang Exped. 74-3619 (KUN, PE), Qinghai-Xizang Veg. Exped. 1868 (PE), C. Ren & M. Tang 659 (IBSC), Xizang Exped. 1789 (PE), B.Q. Xu & Y.H. Tong XiaNh-07zx-0528 (IBSC), J.S. Yang 89-041 (KUN, PE), 90-334 (KUN), Y.T. Chang & K.Y. Lang 1092 (PE), 2031 (PE); Jomda, P.C. Tsoong 7160 (PE); Lhünzhub, K.H. Fu 263 (PE), Xizang Med. Pl. Exped. 1890 (HNWP, PE); Maizhokunggar, Y.S. Chen & Z. H. Wang 9417 (PE), H.N. Tan 66 (PE); Nagarzê, C.Y. Wu et al. 75-379 (KUN, PE), 75-753 (HNWP, KUN, PE); Nangxian, FLPH Tibet Exped. 12-1105 (PE); Nêdong, Y.S. Chen et al. 13-0097 (PE), K.H. Fu 649 (PE), Qinghai-Xizang Complem. Exped. 75-1459 (KUN, PE); Nyingchi, Anonymous 2197 (PE), FLPH Tibet Exped. 12-1152 (PE), C.Y. Wu et al. 75-1154 (HNWP, KUN, PE), Xizang Med. Pl. Exped. 3570 (HNWP, PE), J.S. Yang 90-303 (IBSC, KUN, PE), Y.T. Chang & K.Y. Lang 1126 (PE); Qonggyai, Qinghai-Xizang Veg. Exped. 2157 (PE); Sog, D.D. Tao 10948 (KUN, PE); Without precise locality, Anonymous 2099 (PE), Y. Fei et al. 324 (KUN), E. Kawaguchi SM 96918 (= E. Kawaguchi 366) (TNS), E. Kawaguchi SM 96924 (= E. Kawaguchi 198) (TNS), E. Kawaguchi SM 96925 (= E. Kawaguchi 312, 313) (TNS), E. Kawaguchi SM 96926 (= E. Kawaguchi 33) (TNS); Xigazee, E. Kawaguchi SM 96923 (= E. Kawaguchi 63) (TNS). Yunnan: Zhongdian, Y.S. Chen 9681 (PE).

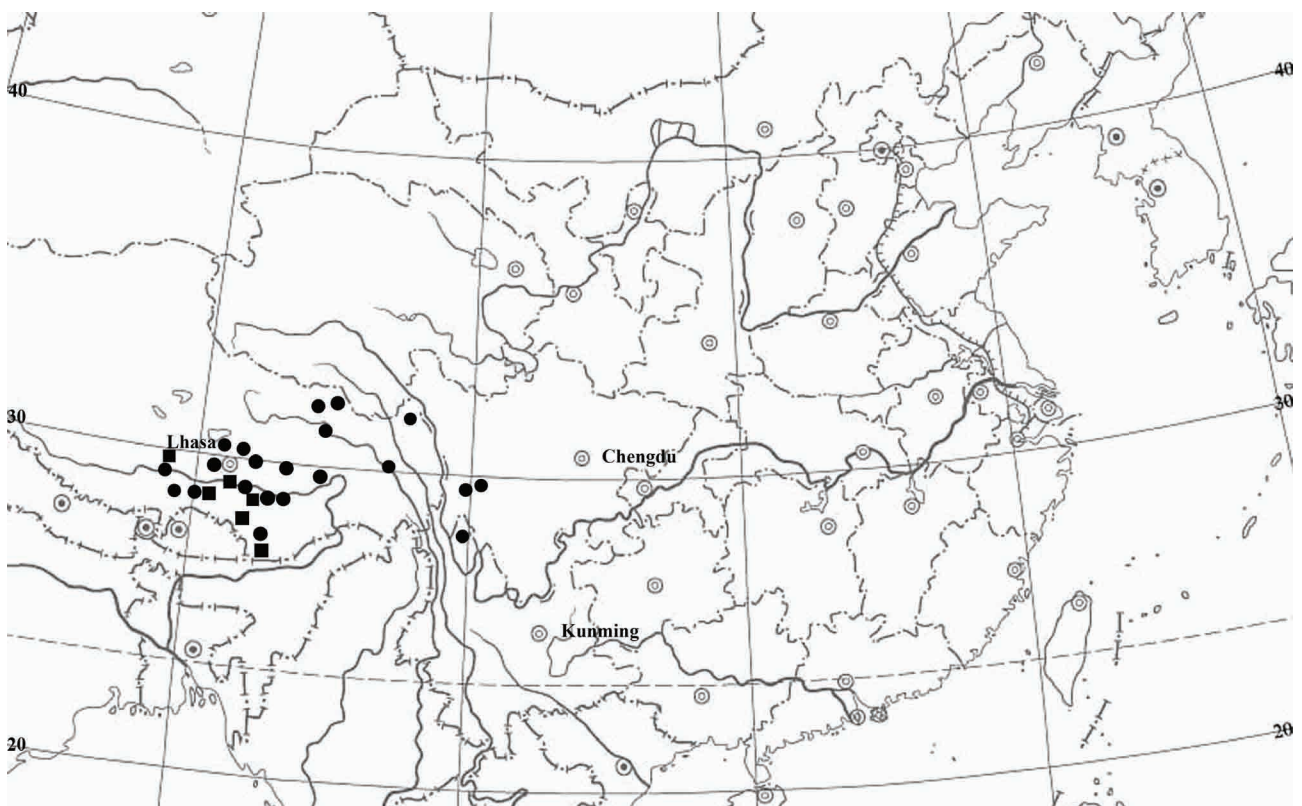


FIGURE 6. Distribution of *Ligularia rumicifolia* (■) and *L. leesicotal* (●).

**Notes:**—Koyama (1968) established a new section, *Ligularia* sect. *Erectae* Koyama (1968: 41) to accommodate *L. leesicotal*, but Liu (1985b, 1989) reduced this section to *L. sect. Stenostegia* Pojarkova (1961: 892), a treatment adopted by Illarionova (2006). However, Illarionova (2008a, b) treated *L. sect. Erectae* as a subsection of *L. sect. Stenostegia*, i.e. *L. sect. Stenostegia* subsect. *Erectae* (Koyama 1968: 41) Illarionova (2008a: 39), which includes only *L. leesicotal* (under the name *L. rumicifolia*).

In general aspect *Ligularia leesicotal* is somewhat similar to *L. songarica* (Fischer 1841: 52) Ling (1934: 532) within *L. sect. Stenostegia* subsect. *Microcephalae* Illarionova (2008b: 207) in having a circle of dense reddish brown lanate hairs at stem base, the pinnately veined leaf blade and compound corymb, but differs in the leaf blade ovate-oblong (vs. sagittate), involucre turbinate or campanulate-turbinate (vs. narrowly cylindrical), bracts linear (vs. lanceolate to subulate), and ray florets 3–7 (vs. 3 or 4).

## Acknowledgements

We are grateful to an anonymous reviewer and Dr. Alexander Sennikov, subject editor of *Phytotaxa*, for their valuable comments on the manuscript. We thank the curators of BM, E, HNWP, IBSC, KUN, PE and TNS for the permission to use their scanned images of specimens and for research facilities. This work was supported by the National Natural Science Foundation of China (grant no. 31370232).

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