



## Two new synonyms of *Ligularia nelumbifolia* (Asteraceae, Senecioneae)

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### Abstract

Critical observations on both herbarium specimens (including type material) and living plants demonstrate that *Ligularia duciformis*, *L. konkalingensis* and *L. nelumbifolia* (Asteraceae, Senecioneae) are conspecific. We therefore place the former two names into the synonymy of *L. nelumbifolia*. Lectotypification is proposed for *L. konkalingensis*.

**Key words:** China, Compositae, lectotypification, taxonomy

### Introduction

*Senecio nelumbifolius* Bureau & Franchet (1891: 74) was described on the basis of a single collection, *G. Bonvalot & Henry d'Orléans s.n.* (P; Fig. 1), from Ta-t sien-lou (= Kangding), western Sichuan, China. In the protologue, the author stressed that it was very well characterized by the peltate form of the leaves (the basal ones in particular) and the large size of the plant. Handel-Mazzetti (1925) transferred it to *Ligularia* Cassini (1816: 198) as *L. nelumbifolia* (Bureau & Franchet 1891: 74) Handel-Mazzetti (1925: 27). This treatment has since been almost generally accepted (Handel-Mazzetti 1936, 1938a, b, Hu 1967, Anonymous 1975, Lauener 1976, Wu 1984, Liu 1989, 2005, Chen & Li 1994, Min 2004, Liu & Illarionova 2011, Chen 2016), with the geographical range of *L. nelumbifolia* recorded to include southern Gansu, western Hubei, southwestern and western Sichuan, and northeastern and northwestern Yunnan (Liu & Illarionova 2011). Kitamura (1939) treated *Senecio nelumbifolius* as *Senecillis nelumbifolia* (Bureau & Franchet) Kitamura (1939: 87), but *Senecillis* Gaertner (1791: 453) was later sunk as a section of *Ligularia*, i.e. *L. sect. Senecillis* (Gaertner) Kitamura (1942: 187), and thus the name *Senecillis nelumbifolia* was placed into the synonymy of *L. nelumbifolia*. Handel-Mazzetti (1938a) stressed that the leaves of *L. nelumbifolia* were not always peltate.

*Senecio duciformis* Winkler (1895: 155) was described on the basis of two collections, *G.N. Potanin s.n.* (3 June 1893) (CAL, K, LE, PE; some sheets are shown in Fig. 2) and *G.N. Potanin s.n.* (9 August 1893) (LE, P; Fig. 3), respectively from Kangding and Hung-kiao (= Hongqiao, belonging to Xiaojin), western Sichuan, China. In the protologue, the author stated that it was closely related to *S. dux* Clarke (1889: 40) (= *Ligularia dux* (Clarke 1889: 40) Ling (1937: 3)), but differed by having 6-flowered (vs. 4-flowered) capitula and soft, white (vs. rigid, dark brownish) pappus. Handel-Mazzetti (1936) recognized it as a distinct species and transferred it to *Ligularia* as *L. duciformis* (Winkler 1895: 155) Handel-Mazzetti (1936: 1135). This treatment has since almost generally been accepted (Handel-Mazzetti 1938a, 1938b, Hu 1967, Anonymous 1975, Wu 1984, Liu 1989, 2005, Chen & Li 1994, Li *et al.* 2000, Min 2004, Liu & Illarionova 2011, Chen 2016), with the geographical range of *L. duciformis* recorded to include southern Gansu, Ningxia (Jingyuan), Shaanxi, northern and southwestern Sichuan, and northwestern Yunnan (Liu & Illarionova 2011). As with the case of *Senecio nelumbifolius*, Kitamura (1939) also once treated *Senecio duciformis* as *Senecillis duciformis* (Winkler) Kitamura (1939: 87). According to Handel-Mazzetti (1938a), *L. duciformis* was closely similar to *L. nelumbifolia*, differing by having pappus as long as corolla tube (vs. exceeding the base of corolla limb), corolla limb totally extending from involucre (vs. slightly overtopping involucre), 4–5 (vs. 5–7) phyllaries, and 4–6 (vs. 5–8, rarely up to 12) florets. Liu (1989) and Liu & Illarionova (2011) keyed out *L. duciformis* from *L. nelumbifolia* by the corolla limb extending (vs. slightly extending) from involucre, and pappus as long as or slightly shorter than (vs. longer than) corolla tube, not mentioning their differences in phyllary and floret number.

*Ligularia konkalingensis* Handel-Mazzetti (1938a: 112) was described on the basis of two collections from western Sichuan, *J.F. Rock 16416* (B, US; the two US sheets, which Handel-Mazzetti (1938a) obviously did not see, are shown in Fig. 4A, B, and a fragment from the B sheet and now kept in W is shown in Fig. 4C) from Mount Konka (= Gongga Shan, a mountain mainly situated between Kangding and Jiulong) and *G. Forrest 22430* (K000974639; Fig. 4D) from Muli, with the B sheet of the former designated as the type. According to Handel-Mazzetti (1938a), *L. konkalingensis* had 5 phyllaries and 6 florets and it was closely similar to both *L. nelumbifolia* and *L. duciformis*, but differed by having very densely reddish-brown hispidulous stem, inflorescence and involucre (vs. softly velutinous-tomentulose and sparsely glandular pilose stem and inflorescence, and glabrous involucre). Since its description *L. konkalingensis* has been recognized by all later authors, including Hu (1967), Liu (1989), Chen & Li (1994), and Liu & Illarionova (2011), with its geographical range recorded to include Batang, Gongga Shan and Muli in western Sichuan (Liu & Illarionova 2011). According to Liu (1989) and Liu & Illarionova (2011), *L. konkalingensis* is most closely similar to *L. nelumbifolia*, differing only by having dorsally densely yellow shortly pilose (vs. glabrous) involucre.

Meanwhile, Handel-Mazzetti (1938a) considered two collections from Muli, *G. Forrest 22196* (E, K) and *G. Forrest 22430* (E, K), to be mixture. He referred *G. Forrest 22196* (E00499853; Fig. 5A) and *G. Forrest 22430* (E00499852, Fig. 5B) to *Ligularia duciformis* and cited *G. Forrest 22430* (K000974639; Fig. 4D) as the paratype of *L. konkalingensis*. He treated *G. Forrest 22196* (E00510880, K; Fig. 6) as representing a hybrid between *L. konkalingensis* × *L. duciformis*, although he mentioned that he was not sure if this might actually indicate the intergradation between *L. duciformis*, *L. nelumbifolia* and *L. konkalingensis*, which was to be confirmed in nature. On the K sheet of *G. Forrest 22196* (Fig. 6B), Handel-Mazzetti annotated that only the plant on the left belonged to *L. konkalingensis* × *L. duciformis*, while the synflorescence on the right belonged to *L. duciformis*.

Handel-Mazzetti (1938a) pointed out that Winkler (1895) was apparently unaware of the description of *Senecio nelumbifolius* (= *Ligularia nelumbifolia*) when he described *S. duciformis* (= *L. duciformis*) as new. It seems to us that Handel-Mazzetti (1936, 1938a) did not see the type material of *S. duciformis* when he transferred it to *Ligularia*, and that Liu (1989) and Liu & Illarionova (2011) did not compare the type material of *L. nelumbifolia*, *L. duciformis* and *L. konkalingensis*.

In this paper, based on critical observations of both herbarium specimens (including type material) and living plants, we demonstrate that *Ligularia duciformis*, *L. konkalingensis* and *L. nelumbifolia* are conspecific. We therefore place the former two names into the synonymy of *L. nelumbifolia*. Lectotypification is proposed for *L. konkalingensis*.

## Material and methods

We critically examined herbarium specimens or high-resolution images of relevant specimens of *Ligularia* in CDBI, CPU, E, HIB, HITBC, HX, IBK, IBSC, K, KUN, LE, NAS, P, PE, SZ, US, W, and WUK. We also conducted field observations in southern Gansu, northwestern and southwestern Sichuan, and northwestern Yunnan, China, and examined 12 populations in total.

## Results and discussion

The type specimen of *Ligularia nelumbifolia* (Fig. 1) has 5 phyllaries 7–9 mm long, 1.5–2.1 mm wide, and glabrous outside, (4–) 5–7 florets 7–7.5 mm long (tube 3–3.5 mm; limb 3.5–3.7 mm), and white or yellowish pappus 5–5.5 mm long, slightly longer than corolla tube. The type specimens of *L. duciformis* (Figs. 2, 3) have 4–5 phyllaries 7–9 mm long, 1.5–2.5 mm wide, and glabrous or, apparent in the specimens from Hung-kiao, shortly yellow pilose outside, (4–) 5–7 (–8) florets 7–7.5 mm long (tube (3–) 3.5–3.8 mm; limb 3.5–3.9 mm), and white or yellowish pappus 4–5.7 mm long, slightly longer than corolla tube. The type specimens of *L. konkalingensis* (Fig. 4) have (4–) 5 phyllaries 8–10 mm long, 1.5–2.5 mm wide, and shortly yellow pilose outside, 5–7 florets 6–7.5 mm long (tube 2.5–3.8 mm; limb 3–3.8 mm), and white or yellowish pappus 4.5–5 mm long, slightly longer than corolla tube. In all studied specimens of these three taxa, the corolla limb is slightly extending from involucre (only a little more obviously extending in the specimen W1937-0000415, a fragment from *J. F. Rock 16416* (B); Fig. 4C). The pubescence on both stem and involucre varies greatly, from glabrous to densely pilose. The branches of inflorescence are always densely pilose.



FIGURE 1. Holotype (mounted on four sheets) of *Ligularia nelumbifolia*.



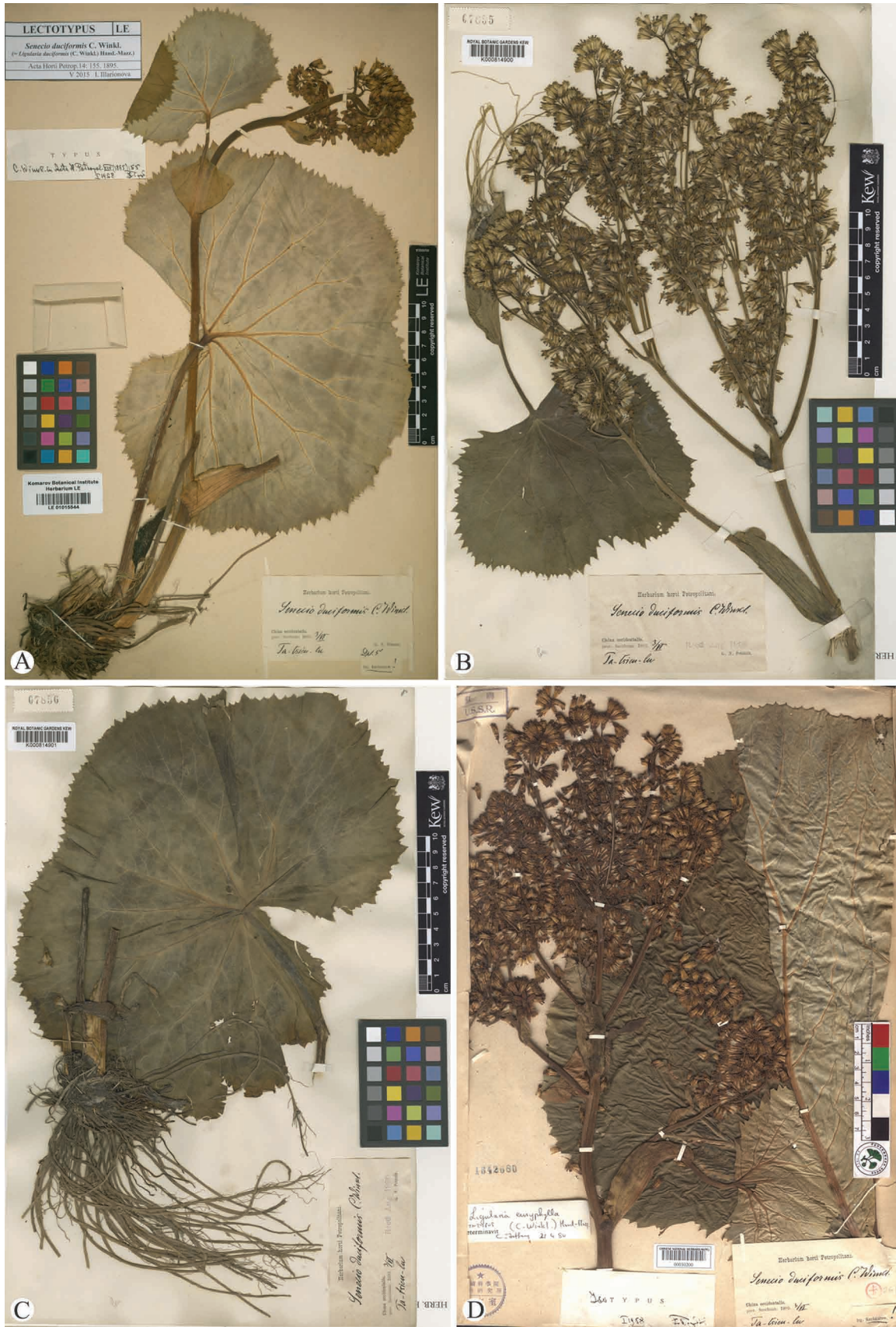


FIGURE 2. Lectotype (A) and islectotype (B–D) sheets of *Ligularia duciformis* (= *L. nelumbifolia*).





FIGURE 3. Syntype sheets of *Ligularia duciformis* (= *L. nelumbifolia*).

These results, together with our observations on living plants in the field (Figs. 7–12), indicate that none of those characters previously used to distinguish between *Ligularia nelumbifolia*, *L. duciformis* and *L. konkalingensis* are reliably diagnostic. The number of phyllaries is fairly constant, being 4 or 5. The number of florets ranges from (4) 5–7 (–8) (we have not as yet seen any specimens with 12 florets as Handel-Mazzetti (1938a) mentioned, and he did not refer to the material on which his statement was based). There are no essential differences with respect to the relative length between pappus, corolla and involucre, with the pappus always slightly longer than corolla tube, particularly obviously so at late flowering stage (Figs. 10C, D, 11B, C), and the corolla limb always somewhat extending from involucre (Figs. 7D, 8D, 9C, 10B, 11B, C). The pubescence on stem (Figs. 7C, 8B, 9B, 12A), inflorescence (Figs. 7D, 8D, 9D, 12A) and involucre (Figs. 7D, 8D, 9C, D, 10B–D, 11B, C, 12B) is highly variable within and between populations, and the variations are not correlated with each other, nor with other characters and geographical range. The stem, inflorescence and involucres in plants of one population from Muli in western Sichuan are all densely brownish pilose (Fig. 8), but in plants of another population from Muli the stem, inflorescence and involucres are densely or sparsely white pilose (Fig. 9). The stem and inflorescence in plants of the population from Zhugqu in southeastern Gansu are densely white pilose, but the involucres are subglabrous (Fig. 12). The variation of the involucre pubescence is very apparent in plants of one population from Daocheng in western Sichuan; the involucres are subglabrous (Fig. 10B), sparsely white pilose (Fig. 10C) or densely white pilose (Fig. 10D). Similar variation of the involucre pubescence also occurs in plants of one population from Yajiang in western Sichuan (Fig. 11). In the plants of the other observed populations, including four from western Sichuan (Jinchuan, Litang, Maoxian, Xichang) and two from northwestern Yunnan (Zhongdian), the involucres, just like those in the plants from the Kangding population (Fig. 7), are glabrous.

From the results of our field observations, we do not agree with Handel-Mazzetti (1938a) that the collection *G. Forrest* 22196 represents a hybrid between *Ligularia konkalingensis* × *L. duciformis*. The two specimens, having brownish pilose involucres, lie within the variation range of *L. nelumbifolia* as clarified above. All the sheets of this and another collection, *G. Forrest* 22430, which Handel-Mazzetti (1938a) regarded to be mixture of *L. duciformis* and

*L. konkalingensis* × *L. duciformis* or *L. duciformis* and *L. nelumbifolia* respectively, should belong to *L. nelumbifolia*. They just indicate the variability of *L. nelumbifolia* within and between populations.



FIGURE 4. Lectotype (A), islectotype (B, C) and paratype (D) sheets of *Ligularia konkalingensis* (= *L. nelumbifolia*).



As stated in the protologue, the type of *Ligularia konkalingensis*, *J.F. Rock 16416*, should be kept in B, with a fragment in W. The specimen in B was very likely destroyed during World War II. The fragment, including a portion of an inflorescence and a leaf, is stored now in W (W1937-0000415; Fig. 4C). The paratype, *G. Forrest 22430*, is placed in K (K000974639; Fig. 4D). There are two sheets of *J.F. Rock 16416* kept in US (US 00115979, US 00115980; Fig. 4A, B). Because the holotype in B was lost, a lectotype should be designated (McNeill & al. 2012: Art. 9.11). The specimen US 00115979 (Fig. 4A) is relatively complete and matches the original description well and thus is here designated as the lectotype of *L. konkalingensis*.

## Taxonomic treatment

***Ligularia nelumbifolia*** (Bureau & Franchet) Handel-Mazzetti (1925: 27). *Senecio nelumbifolius* Bureau & Franchet (1891: 74). *Senecillis nelumbifolia* (Bureau & Franchet) Kitamura (1939: 87). Figs. 1–12.

Type:—CHINA. Sichuan: Kangding (= Ta-t sien-lou). *G. Bonvalot & Henry d'Orléans s.n.* (P00836354! P00836355! P00836356! P04264215!) (The type specimen is mounted on four sheets). Fig. 1.

= *Ligularia duciformis* (Winkler) Handel-Mazzetti (1936: 1135), **syn. nov.** *Senecio duciformis* Winkler (1895: 155). *Senecillis duciformis* (Winkler) Kitamura (1939: 87).

Type:—CHINA. Sichuan: Kangding (Ta-t sien-lu), 3 June 1893, *G.N. Potanin s.n.* (lectotype LE01015544!, designated by Illarionova (2007: 340), isolectotypes CAL248056!, K000814900!, K000814901!, PE00030200!). Fig. 2.

= *Senecio moisonii* Léveillé (1915: 16).

Type:—CHINA. Yunnan: Huize, Ta-hai, alpine meadows, 3200 m a.s.l., July 1912, *E.E. Maire s.n.* (holotype E00413242!; isotypes E00413243!, E00413244!).

= *Ligularia konkalingensis* Handel-Mazzetti (1938a: 112), **syn. nov.**

Type:—CHINA. Sichuan: Gongga Shan (= Mount Konka), Risonquembra, Konkaling, 4800 m a.s.l., June 1928, *J.F. Rock 16416* (lectotype, here designated, US00115979!). Fig. 4A.



FIGURE 5. Two sheets of *G. Forrest 22196* (E), which have been previously referred to *Ligularia duciformis*.



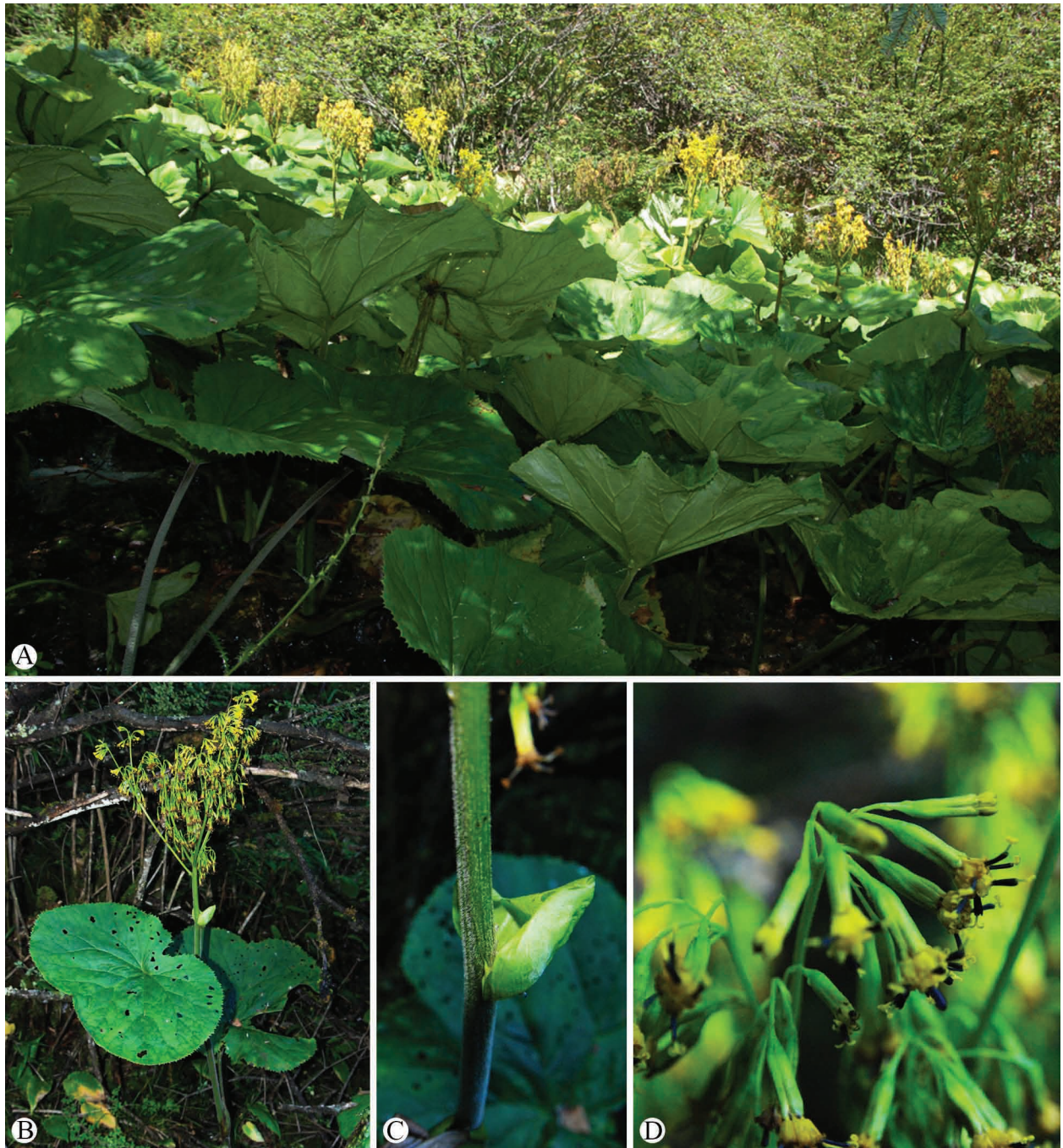
**FIGURE 6.** Two sheets of *G. Forrest* 22196 (E, K), which have been previously referred to *L. konkalingensis* × *L. duciformis*. Note that the synflorescence on the right of the K sheet was annotated by Handel-Mazzetti as belonging to *L. duciformis*.

Perennial herbs, robust. Stem erect, 60–150 cm tall, to 1 cm in diameter at base, glabrous or shortly yellow pilose proximally, glabrous, slightly or densely yellow pilose, or sometimes brown pilose, distally. Basal leaves petiolate; petiole glabrous or white arachnoid-puberulous and shortly yellow pilose, 10–50 cm long, base enlarged sheathed; leaf blade reniform or sometimes peltate, 5–30 × 13–50 (–80) cm, abaxially glabrous or white arachnoid-puberulous and shortly yellow pilose along veins, adaxially glabrous, palmately veined, abaxially with prominent reticulate veins, margin sharply irregularly dentate, apex rounded; sinus ca. 1/3 as long as leaf blade, basal lobes suborbicular or orbicular. Distal stem leaves petiolate; petiole 4–20 cm long; sheath enlarged, 4–6 × 2–4 cm, glabrous or white arachnoid-puberulous and shortly yellow pilose, mouth of sheath entire; leaf blade reniform, margin denticulate, apex retuse. Distalmost stem leaves only sheathed. Compound corymbs spreading; branches numerous, divaricate, white arachnoid-puberulous and shortly yellow pilose or sometimes brown pilose; foliose and supplementary bracts linear-subulate, minute; peduncles densely shortly yellow pilose, to 2 cm long, often curved. Capitula numerous. Involucre narrowly cylindrical, 7–10 (–12) × 2.5–4 (–6) mm, outside glabrous or shortly yellow pilose, or sometimes densely yellow pilose; phyllaries 4–5, in 2 rows, oblong, 1.5–2.5 (–3) mm wide, white ciliate, apex triangular-acute, inner ones broadly membranous at margin. Florets (4–) 5–7 (–8), yellow, all tubular, (6–) 7–8 (–9) mm long (tube 2.5–4 mm long; limb 3–4 mm long), slightly extending from involucre. Pappus white or yellowish, 4–6 mm, slightly longer than corolla tube. Achenes cylindrical, 5–7 mm long.

**Distribution and habitat:**—*Ligularia nelumbifolia* is distributed in southern Gansu (Zhugqu), western Hubei (Fangxian, Shennongjia, Xingshan), Ningxia (Guyuan, Jingyuan, Longde), Shaanxi (Taibai), northwestern and southwestern Sichuan, and northeastern and northwestern Yunnan, China (Fig. 13). It grows on stream banks or in forest understories, grasslands and alpine meadows at elevations between 1900–4800 m above sea level.

**Phenology:**—Flowering in July to September; fruiting in August to September.

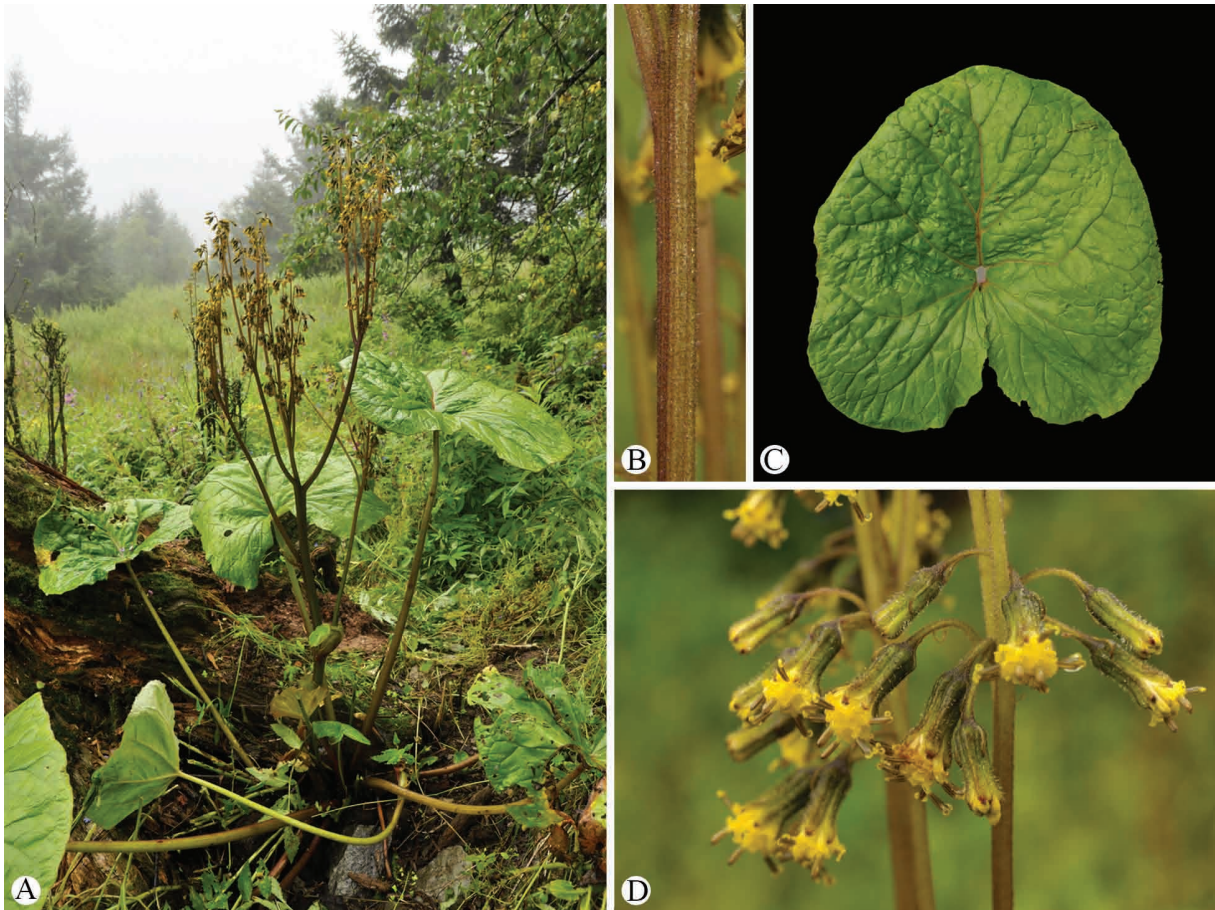




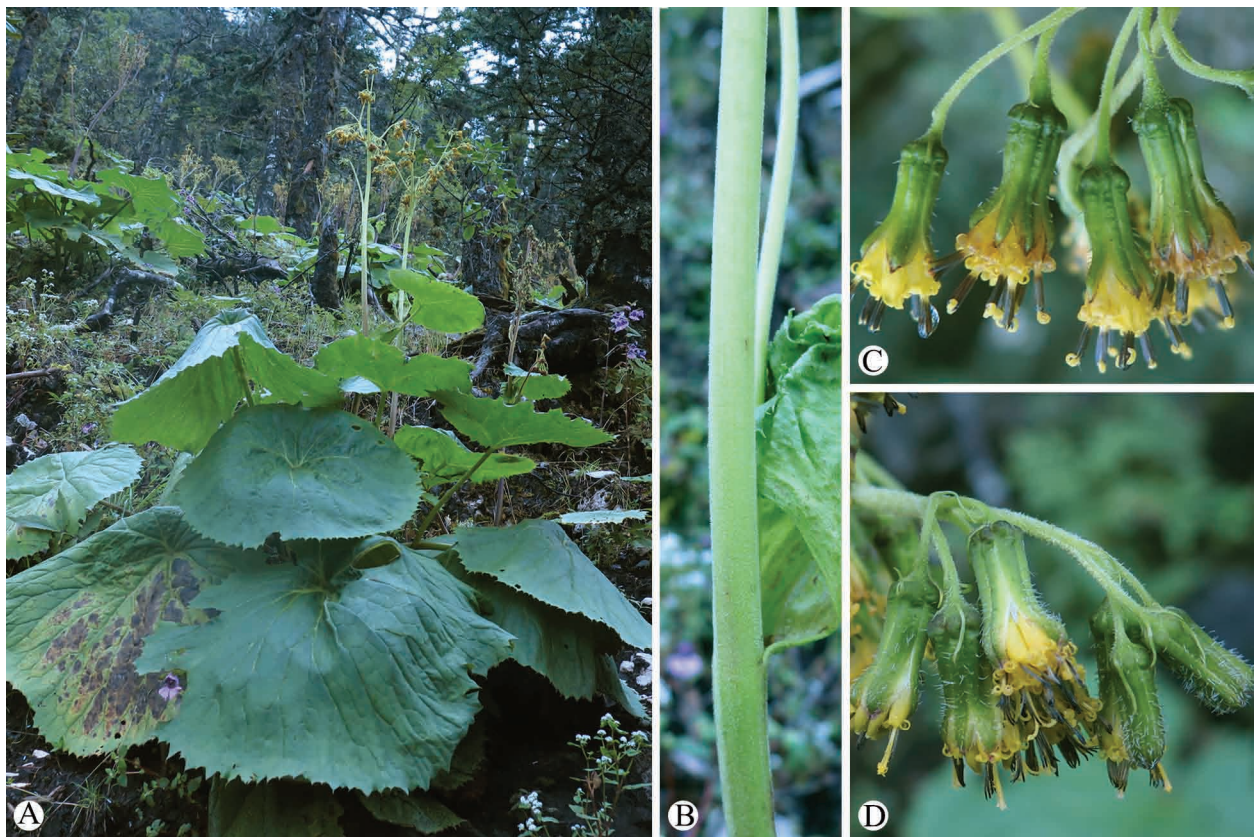
**FIGURE 7.** *Ligularia nelumbifolia* in the wild (China, Sichuan, Kangding). A. Habitat. B. Habit. C. Portion of stem. D. Portion of synflorescence.

**Additional specimens examined:**—CHINA. Gansu: Zhugqu, *Bailongjiang Exped.* 550 (PE), *Y.C. Ho* 828 (WUK), *T.J. Tong & M. Tang* 80 (IBSC). Hubei: Fangxian, *E.H. Wilson* 2369 (K, W); Shennongjia, *Hubei Shennongjia Plant Exped.* 22891 (HIB, PE), *Z.E. Zhao* 5272 (HIB); Xingshan, *C.M. Hu* 798 (HIB). Ningxia: Guyuan, *J.X. Yang & Y.J. Guo* 7081 (WUK); Jingyuan, *Ningxia Med. Plant Group* 3-281 (WUK), *T.P. Wang* 13467 (WUK), *T.P. Wang* 17067 (WUK), *Q.Z. Xue* 241 (WUK); Longde, *P. Pelliot & L. Vaillant* 1109 (P), *T.P. Wang* 13190 (WUK). Shaanxi: Taibai, *W.Y. Hsia* III-450 (PE). Sichuan: Baoxing, *Z.P. Song* 38618 (KUN, NAS, PE, SZ, WUK); Barkam, *H. Li & J.X. Zhou* 74411 (IBSC, NAS, SZ); Batang, *Anonymous* 1627 (CDBI); Daocheng, *Y.S. Chen* 9644 (PE), *Qinghai-Xizang Exped.* 4023 (CDBI, PE), *C. Ren et al.* 545 (IBSC); Dawu, *C.T. Kuan* 5-0615 (NAS); Dujiangyan, *D.Z. Fu & Z.L. Zhao* 87-2387 (HX); Ebian, *Q.L. Zhang* 64111 (IBSC), *Z.X. Zhao* 385 (KUN); Emei, *Students Group* W-2008081112 (SZ); Hongyuan, *S.Y. Chen et al.* 5704 (SZ); Jinchuan, *8<sup>th</sup> Forest Management Team* 3672 (IBSC), *8<sup>th</sup> Forest Management Team* 4904 (IBSC), *H. Li* 78145 (K, PE), *T.J. Tong & M. Tang* 225 (IBSC); Kangding, *D.E. Boufford et al.* 42651 (P,





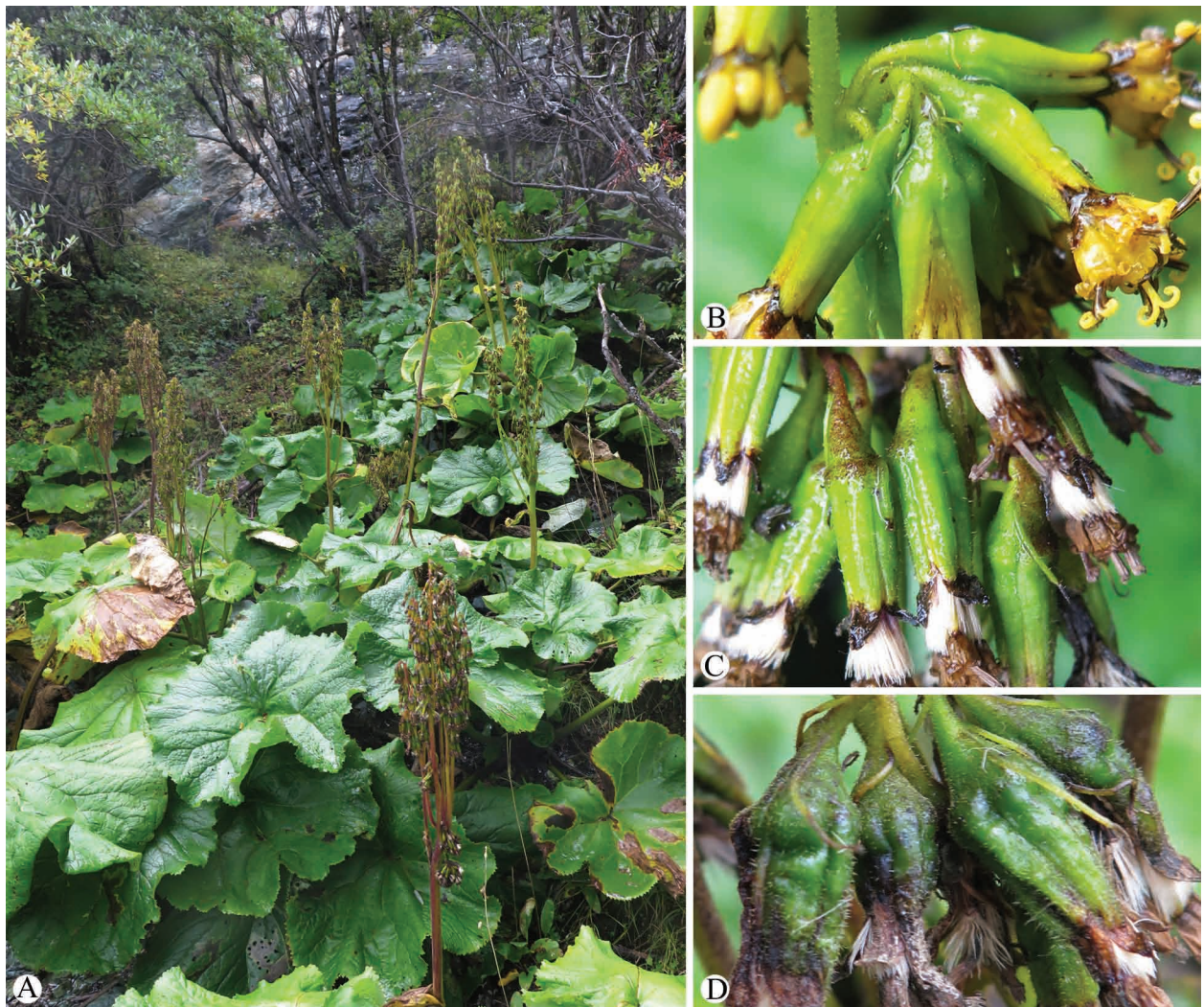
**FIGURE 8.** *Ligularia nelumbifolia* in the wild (China, Sichuan, Muli). A. Habitat and habit. B. Portion of stem. C. Basal leaf (adaxial surface). D. Portion of synflorescence.



**FIGURE 9.** *Ligularia nelumbifolia* in the wild (China, Sichuan, Muli). A. Habitat and habit. B. Portion of stem. C, D. Portion of synflorescences.



PE), *D. Chamberlain CEE435* (E), *K.L. Chu 7074* (NAS, PE), *McLaren's Collectors AC51* (E, LE, P), *R.P. Mussort 222* (P), *G.N. Potanin s.n.* (K), *A.E. Pratt 481* (K, P), *H. Smith 10574* (W), *J.A. Soulié 194* (P), *J.A. Soulié 776* (P), *M. Tang & L. Wang 158* (IBSC), *B.Q. Xu & Y.H. Tong 1103* (IBSC); Litang, *Sichuan Veget. Exped. 3699* (CDBI, PE); Lixian, *B.Q. Xu & Y.H. Tong 0902* (IBSC); Luding, *Y. Tang & Y.H. He 1483* (CDBI); Maoxian, *D.Z. Deng 2030* (SZ), *X.F. Gao & Y.L. Peng 1725* (CDBI), *X.F. Gao et al. 2534* (CDBI), *T.J. Tong & M. Tang 180* (IBSC); Mianning, *S.K. Wu 2275* (KUN, PE); Muli, *G. Forrest 22430* (E, K), *C. Ren et al. 421* (IBSC), *C. Ren et al. 492* (IBSC), *Q.S. Zhao et al. 8428* (CDBI, SZ); Puge, *Y. Hong & L. Wang 436* (IBSC); Songpan, *W.P. Fang 4086* (E), *Songpan Group 1531* (KUN, PE), *H. Weigold s. n.* (W); Wenchuan, *9<sup>th</sup> Group 1250* (SZ), *9<sup>th</sup> Group 1251* (SZ), *X.J. He et al. 150158* (SZ), *D.Q. Li 684* (SZ), *L. Wang & Y.P. Zeng 831* (IBSC), *X. Wei 03-4-1697* (SZ); Xiangcheng, *T.T. Yu 13279* (KUN, PE), *Qinghai-Xizang Exped. 4023* (PE), *Qinghai-Xizang Exped. 4784* (CDBI, PE); Xiaojin, *Y.S. Chen 7345* (PE), *Forest Department 10035* (PE), *X.J. He & Q.S. Zhao 187576* (SZ), *X.J. He & Q.S. Zhao 188677* (SZ), *G.N. Potanin s.n.* (P); Yajiang, *C.T. Kuan 60216* (IBSC), *C.T. Kuan C-116* (PE), *C.T. Kuan C-166* (IBSC), *C. Ren et al. 632* (IBSC), *H.L. Zhang 63-148* (IBSC). Yunnan: Heqing, *J.M. Delavay 4253* (P); Huize, *NE Yunnan Exped. 237* (KUN); Ninglang, *X. Gong 12355* (KUN); Qiaojia, *H. Wang et al. 03-1280* (KUN), *B.X. Sun et al. 1045* (KUN); Weixi, *J.F. Rock 17160* (P); Zhongdian, *Anonymous s.n.* (HITBC), *D.E. Boufford et al. 42014* (KUN), *E. Raab-Straube et al. 336* (KUN), *G. Forrest 28868* (E), *M. Tang et al. 1196* (IBSC), *M. Tang et al. 1231* (IBSC), *Q.E. Yang & H.Z. Kong 98-120* (PE), *Q.E. Yang & H.Z. Kong 98-274* (PE), *Q.E. Yang & H.Z. Kong 98-285* (PE), *T.T. Yu 12218* (PE), *T.T. Yu 13645* (E, KUN, PE), *T.T. Yu 13739* (E, KUN, PE), *T.T. Yu 13796* (E, KUN), *X.G. Zhao 93007* (CPU).



**FIGURE 10.** *Ligularia nelumbifolia* in the wild (China, Sichuan, Daocheng). A. Habitat and habit. B–D. Portion of synflorescences.





FIGURE 11. *Ligularia nelumbifolia* in the wild (China, Sichuan, Yajiang). A. Habitat and habit. B, C. Portion of synflorescences.



FIGURE 12. *Ligularia nelumbifolia* in the wild (China, Gansu, Zhugqu). A. Portion of stem. B. Synflorescence.



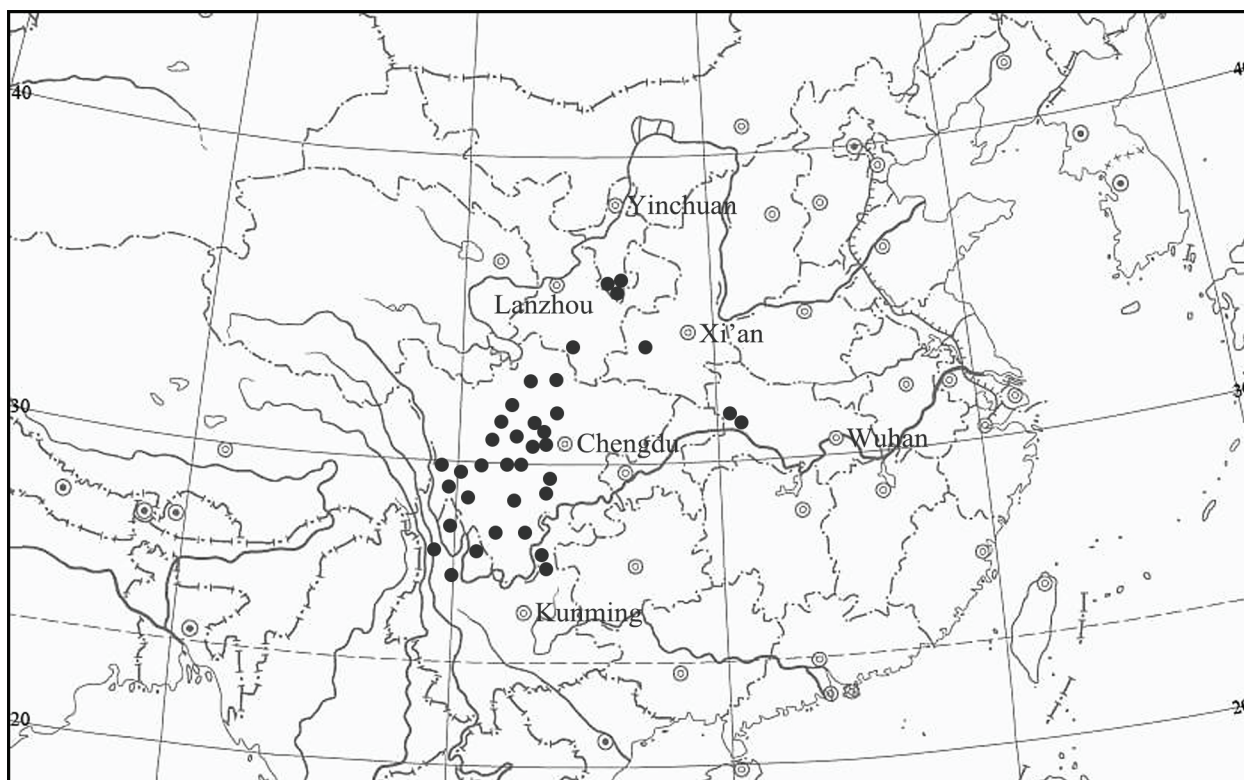


FIGURE 13. Distribution of *Ligularia nelumbifolia* (●).

**Notes:**—Several collections, including *S.K. WU* 2741 (KUN, PE), *T.T. Yu* 7102 (KUN, PE, WUK) and *Q.S. Zhao* 6342 (CDBI) from Muli, southwestern Sichuan, *E.D. Liu et al.* 2222 (KUN) from Luquan, northeastern Yunnan, *K.M. Feng* 2102 (KUN, PE), *Q.E. Yang & H.Z. Kong* 98-534 (PE) and *Zhongdian Exped.* 1447 (KUN, PE) from Zhongdian, northwestern Yunnan, are very similar to *Ligularia nelumbifolia* in general aspect, but differ in having 3 phyllaries and 2–3 florets. Further studies are needed to determine if these collections should be referred to *L. nelumbifolia* or *L. tongkyukensis* Handel-Mazzetti (1938c: 288), or even represent a hitherto undescribed species. *Ligularia tongkyukensis*, described from Nyingchi, southeastern Xizang (Tibet) and characterized by, among other characters, having 3 phyllaries and 3 florets, is currently known only from the type material and imperfectly understood yet.

Based on the corymbose inflorescence and palmately veined leaves, Liu (1989) placed *Ligularia nelumbifolia* in *L.* sect. *Corymbosae* (Franchet 1892: 290) Handel-Mazzetti (1938a: 107) ser. *Retusae* Liu (1985: 64). From a morphological perspective, however, this series as currently defined seems to be quite heterogeneous pending a re-circumscription. Ren & Yang (2014) has reduced *L. kangtingensis* Liu (1985: 69) from this series to the synonymy of *L. hookeri* (Clarke 1876: 69) Handel-Mazzetti (1938a: 127), which, according to Liu (1985, 1989), belongs to *L.* sect. *Ligularia* ser. *Ligularia*. It seems that only *Ligularia retusa* Candolle (1838: 314), the type species of this series, and its two morphologically closest relatives, *L. cremanthodioides* Handel-Mazzetti (1925: 13) and *L. phoenicochaeta* (Franchet 1893: 295) Handel-Mazzetti (1925: 13), should be retained within *L.* ser. *Retusae*. One or even more new series may be proposed to accommodate the remaining species, including *L. nelumbifolia*.

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