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Ligularia muliensis (Asteraceae, Senecioneae) is merged with *L. tsangchanensis*

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Abstract

Observations on both herbarium specimens (including type material) and living plants demonstrate that *Ligularia muliensis* and *L. tsangchanensis* are conspecific. We therefore place *L. muliensis* into the synonymy of *L. tsangchanensis*. Lectotypifications are proposed for *L. tsangchanensis* and *L. muliensis*.

Key words: China, Compositae, lectotypification, new synonymy, taxonomy

Introduction

Senecio tsangchanensis Franchet (1893: 299) was described on the basis of four collections from northwestern Yunnan, China, namely *J.M. Delavay 631* (P; Fig. 1A) from Cang Shan in Dali, and *J.M. Delavay 3113* (P; Fig. 1B), *3976* (P; Fig. 1C), *s.n.* (P; Fig. 1D) all from Eryuan. In the protologue, the author stated that this species was well characterized by the cauline leaves as large as the basal ones, all broadly elliptic, base obtuse or truncate, never cordate. Handel-Mazzetti (1936) transferred it to the genus *Ligularia* Cassini (1816: 198) as *L. tsangchanensis* (Franchet) Handel-Mazzetti (1936: 1140). This treatment has since been generally accepted by all the later authors (Handel-Mazzetti 1938, Hu 1967, Anonymous 1975, Wu 1984, Liu 1985, 1989, 2005, Chen & Li 1994, Min 2004, Liu & Illarionova 2011, Chen 2016) but Kitamura (1939), who treated *S. tsangchanensis* as *Senecillis tsangchanensis* (Franchet) Kitamura (1939: 87). *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 tsangchanensis* was placed into the synonymy of *L. tsangchanensis*. The distributional range of *L. tsangchanensis* was largely extended to include southwestern Sichuan, northwestern and northeastern Yunnan, and southeastern Xizang (Tibet), China (Liu 1985, 1989, 2005, Chen & Li 1994, Min 2004, Liu & Illarionova 2011, Chen 2016).

Ligularia muliensis Handel-Mazzetti (1938: 117) was described on the basis of two collections, *J.F. Rock 16582* (B, US, W; Fig. 2) and *16683* (E, GH, P, W; Fig. 3), from Muli, southwestern Sichuan, China, with the former designated as the type. In the protologue, the author stated that this species was closely similar to *L. tsangchanensis*, but differed by the shorter (vs. longer) raceme with less than 10 (vs. numerous) capitula, the involucre 10 mm (vs. 6–8 mm) long, and the purely glossy white (vs. often sordid) pappus. Although Handel-Mazzetti stressed that more specimens were needed for the recognition of the two taxa as distinct species, *L. muliensis* has been recognized since its description by all the later authors (Hu 1967, Koyama 1968, Wu 1984, Liu 1989, 2005, Chen & Li 1994, Min 2004, Liu & Illarionova 2011, Chen 2016), and its distributional range was extended to include southwestern Sichuan and northwestern Yunnan, China (Wu 1984, Liu 1985, 1989, 2005, Chen & Li 1994, Min 2004, Liu & Illarionova 2011, Chen 2016). In his account of *Ligularia* in the *Flora Reipublicae Popularis Sinicae*, Liu (1989) keyed out *L. muliensis* from *L. tsangchanensis* by the shorter and laxer (vs. longer and denser) racemes with 4–13 (vs. numerous) capitula and the black-purple (vs. green, apically black-brown), dorsally pubescent (vs. glabrous) phyllaries. This was followed by Liu & Illarionova (2011) in their account of *Ligularia* in the *Flora of China*.

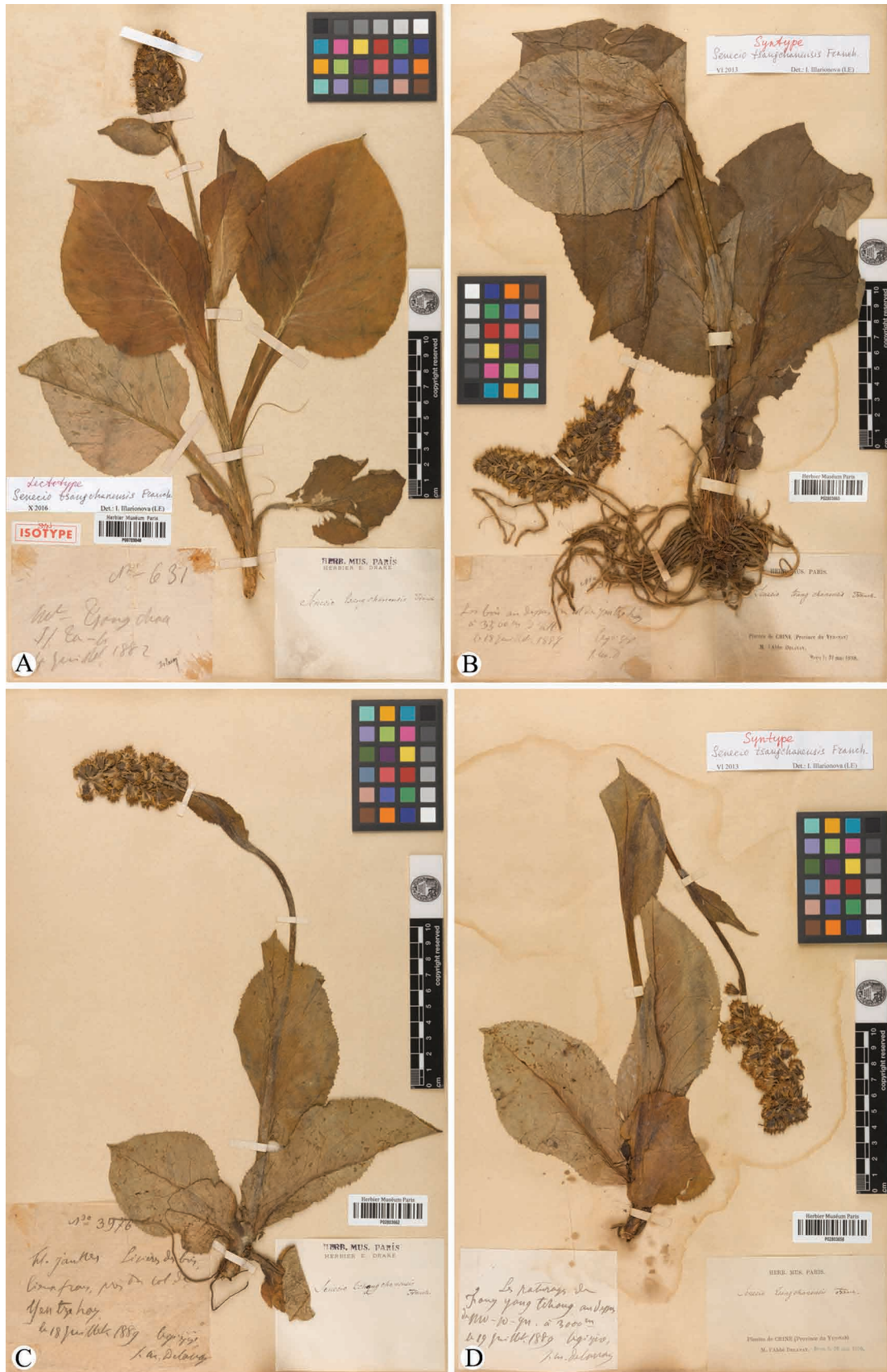


FIGURE 1. Type sheets of *Ligularia tsangchanensis*. A. China, northwestern Yunnan, Dali, Cang Shan (= Tsang-chan), *J.M. Delavay 631* (P, lectotype). B. China, northwestern Yunnan, Eryuan, Yen tse hay, *J.M. Delavay 3113* (P, syntype). C. Same locality, *J.M. Delavay 3976* (P, syntype). D. China, northwestern Yunnan, Eryuan, Mo-so-yn, *J.M. Delavay s.n.* (P, syntype).

Our careful observations on both herbarium specimens (including type material) and living plants demonstrate that *L. tsangchanensis* is widely distributed in southwestern Sichuan, southeastern Xizang, and northwestern and northeastern Yunnan, China, and is more or less variable in several morphological characters previously used to distinguish between this species and *L. muliensis*. The latter lies within the variation range of *L. tsangchanensis* and thus should be synonymized.



FIGURE 2. Lectotype sheet of *Ligularia muliensis* (= *Ligularia tsangchanensis*).



FIGURE 3. Paratype sheets of *Ligularia muliensis* (= *Ligularia tsangchanensis*). A. China, southwestern Sichuan, Muli, J.F. Rock 16683 (E). B. Same locality, J.F. Rock 16683 (GH). C. Same locality, J.F. Rock 16683 (P). D. Same locality, J.F. Rock 16683 (W).

Material and methods

For morphological comparisons, we critically examined herbarium specimens or high-resolution images of specimens in BM, CPU, E, GH, HIB, HITBC, IBSC, K, KUN, NAS, P, PE, SZ, W, and WUK. We also conducted field observations in southwestern Sichuan, northwestern and northeastern Yunnan, and southeastern Xizang, China.

Results and discussion

Morphological variability in *Ligularia tsangchanensis*, with *L. muliensis* shown to lie within its range

Our observations on both herbarium specimens and living plants indicate that *Ligularia tsangchanensis* is more or less variable in respect of the leaf shape, petiole length, raceme length, capitulum number, involucre size, phyllary number, color and pubescence, ray floret number and size, and pappus color and length. The leaves are petiolate (Figs. 1A, 5C, D, 9A, 10A) or sessile (e.g., Figs. 1B–D, 4, 5A, B), usually broadly elliptic, base obtuse or truncate (e.g., Fig. 1), sometimes broadly ovate, base shallowly cordate (Fig. 5C, D); racemes are 4–55 cm long (e.g., Figs. 6A, D, 9); capitula vary from 7 to over 130 in number (e.g., Figs. 7, 9); involucre are 3–5(–7) mm in diameter with 6–8(–10) phyllaries which are (5–)6–7(–10) mm long, green (e.g., Figs. 8C, 10B), sometimes marginally and apically black-brown (e.g., Figs. 7D, 8F, 9D), dorsally glabrous (Fig. 6C) to yellowish brown pilose (Fig. 7D) and white puberulent (Fig. 10B); pappus is often white or whitish (Fig. 6F, 8C, G), sometimes brown when dry, 3–6 mm long; ray florets vary from (1–)3–6(–9) in number, 3–12 × 1–3 mm. These variations do not show a correlation with each other or geographical distribution, although it is worth noting that the basal leaves of the specimens from southeastern Xiang (Fig. 5C, D) are, contrary to the statement by Franchet (1893) in the protologue of *L. tsangchanensis*, often shallowly cordate at the base, and that the capitula of the specimens from Tsekou in Dêqên, northwestern Yunnan, as pointed out by Handel-Mazzetti (1938), often have only one reduced ray floret (we observed two such florets in the capitula of a population from Weixi in northwestern Yunnan (Fig. 9C, D)). The significance of such variations remains to be assessed.

As shown in Figs. 2, 3, the type specimens of *L. muliensis* are plants with under-developed racemes of 7–10 capitula; the only specimen with well-developed capitula is on a paratype sheet kept in GH (Fig. 3B), which Handel-Mazzetti should not have seen. This plant (right-hand on the sheet) is 40 cm tall with about 20 capitula. All the other type specimens are 23–34 cm tall with 7–10 capitula. The type sheet kept in US (US00115984) (Fig. 2) has 10 capitula with involucre 5–7 mm in diameter, and 7–8 phyllaries which are 6–8 × 1–1.8 mm. A paratype sheet (Fig. 3C) kept in P (P04104565) has two plants. The left one has 10 capitula which are 4–5 mm in diameter, with the involucre having 7–8 phyllaries which are 6–7 × 1–1.8 mm. The right one has eight bigger capitula which are 4–7 mm in diameter, with the involucre having 7–12 phyllaries which are 7–9 × 1–2 mm. The paratype sheet (Fig. 3A) kept in E (E00499858) also consists of two plants. Their involucre are 4–7 mm in diameter, and have 7–8 phyllaries which are 7–8 × 1–2 mm. In another paratype sheet (Fig. 3D) kept in W (W1937-0000419A), the involucre are 5–7 mm in diameter, and have 8–10 phyllaries which are 8–10 × 1–2 mm. These variations are additionally illustrated in Fig. 5A, B, which show two specimens with well-developed capitula from Muli, the type locality of *L. muliensis*, and in Fig. 6, which show two populations *in situ* in Muli. It is evident that none of the morphological features used by Handel-Mazzetti (1938) to distinguish between *L. muliensis* and *L. tsangchanensis* are constant and reliable diagnostic characters. The raceme length and the number of capitula are two highly variable characters in *L. tsangchanensis* itself. Handel-Mazzetti (1938) did not understand well the variation of these two characters probably due to the scantiness of specimens of this species available to him at that time. The situation that the type specimens of *L. muliensis* used by him had exclusively under-developed capitula might also have misled him to overestimate the taxonomic value of these two characters. According to Handel-Mazzetti (1938), the pappus of *L. tsangchanensis*, in contrast to the purely glossy white pappus in *L. muliensis*, was often sordid. This character of *L. tsangchanensis* was actually mentioned, obviously based on dry herbarium specimens, by Franchet (1893) in the original Latin description of this species (i.e., “pappus sordide albus”). According to our observations on living plants in the field, the pappus of *L. tsangchanensis* is white or whitish, although sometimes brown when dry. Based on our measurements of the type specimens, the phyllaries of *L. muliensis* are 5–10 mm long, not different in length from those of *L. tsangchanensis*, which are (5–)6–7(–10) mm long. Liu (1989) and Liu & Illarionova (2011) did not follow Handel-Mazzetti (1938) to emphasize the differences between *L. muliensis* and *L. tsangchanensis* in involucre length, but they used another two characters to key out *L. tsangchanensis* from *L. muliensis*, i.e., the color and pubescence of phyllaries (green, apically black-brown, dorsally glabrous vs. black-purple, dorsally pubescent). These differences, however, are not confirmed by our observations on both herbarium specimens and living plants, and are also to some degree in conflict with the original description of *L. tsangchanensis* and of

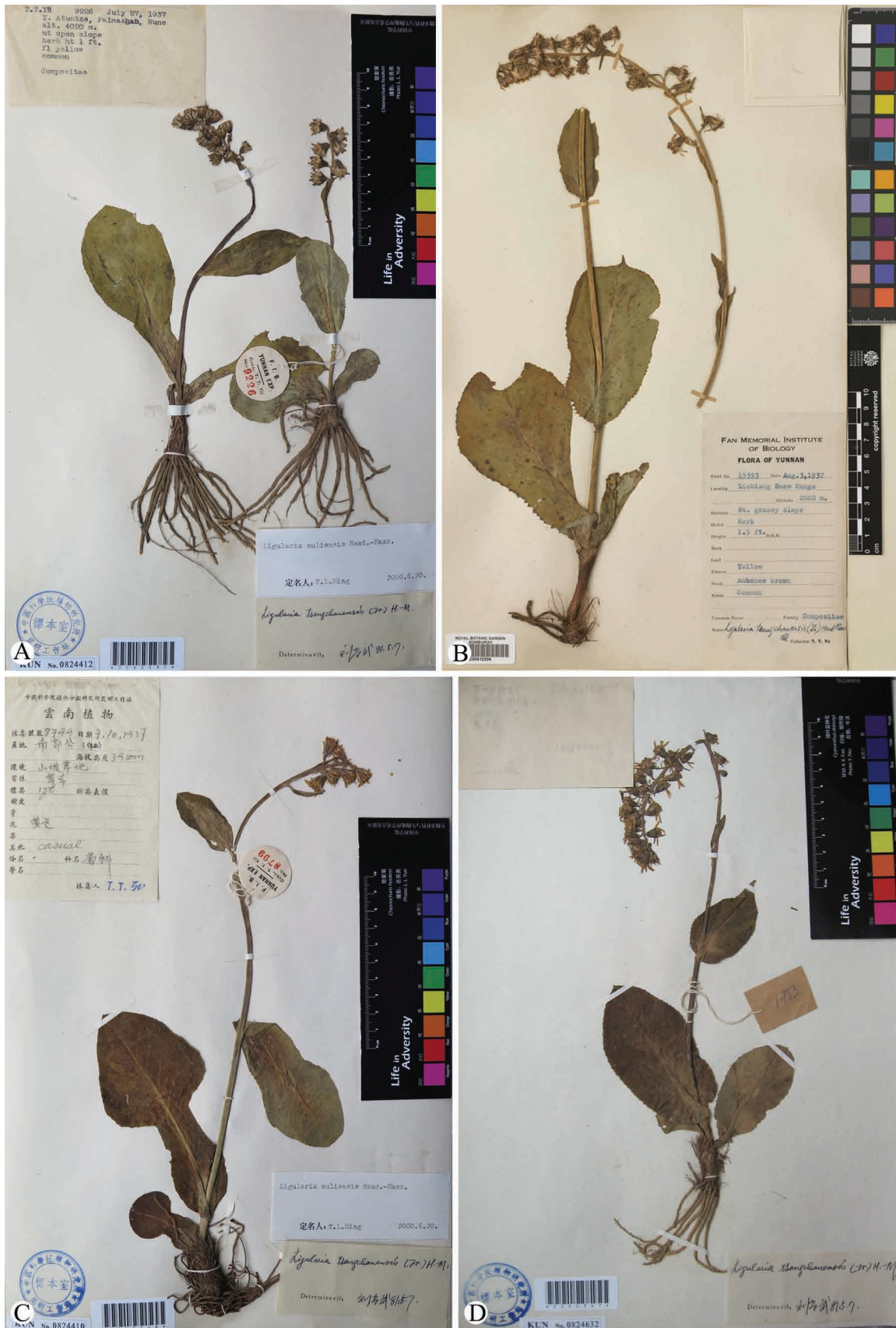


FIGURE 4. Specimens of *Ligularia tsangchanensis*. **A.** China, northwestern Yunnan, Dêqên, T.T. Yu 9226 (KUN). **B.** China, northwestern Yunnan, Lijiang, T.T. Yu 15393 (E). **C.** China, northwestern Yunnan, Weixi, T.T. Yu 8799 (KUN). **D.** China, northwestern Yunnan, Zhongdian, K.M. Feng 1753 (KUN).

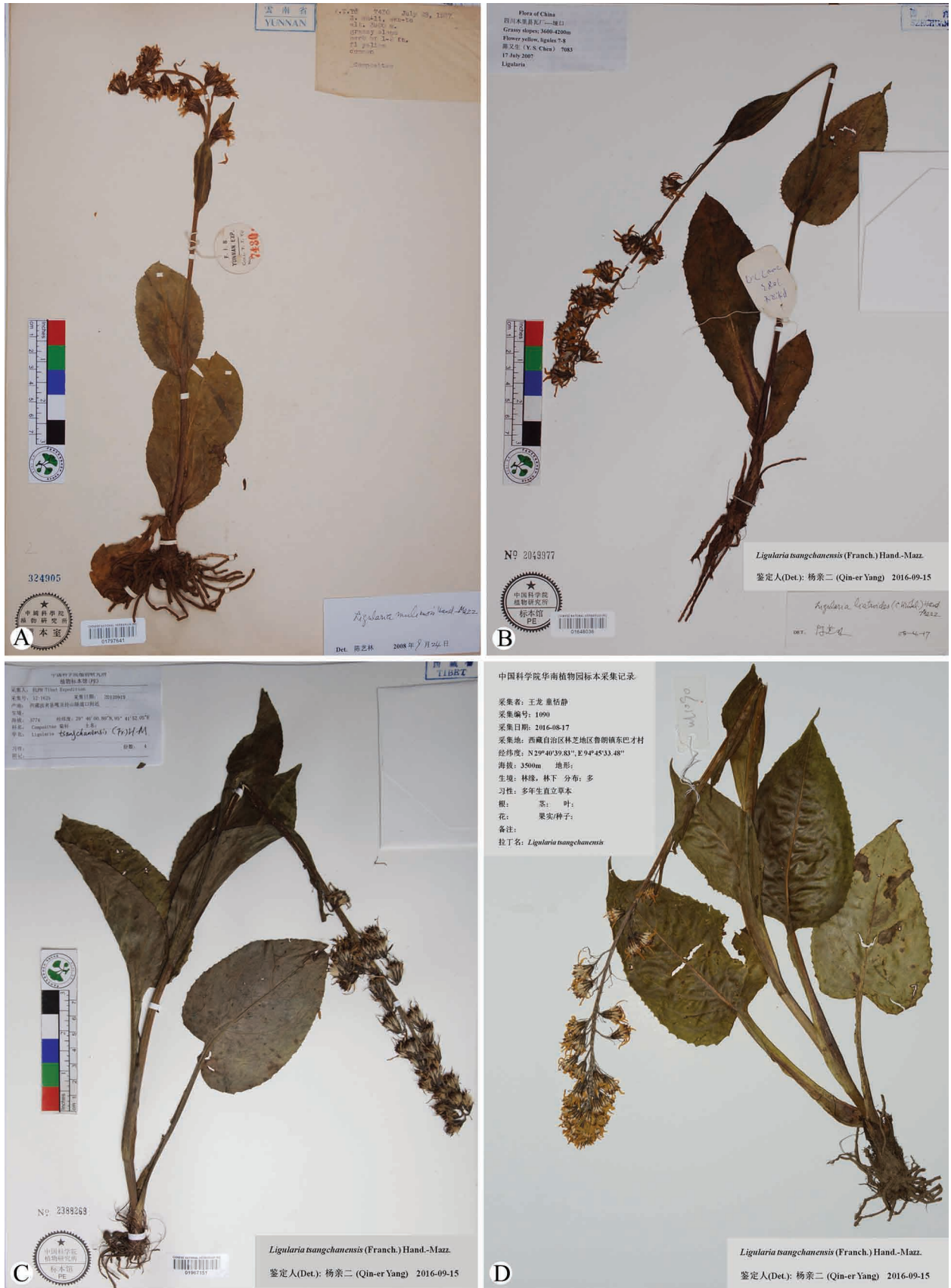


FIGURE 5. Specimens of *Ligularia tsangchanensis*. **A.** China, southwestern Sichuan, Muli, Hwa-to, T.T. Yu 7430 (KUN). **B.** China, southwestern Sichuan, Muli, Wachang to Yakou, Y.S. Chen 7083 (PE). **C.** China, southeastern Xizang, Bomi, FLPH Tibet Exped. 12-1625 (PE). **D.** China, southeastern Xizang, Nyingchi, L. Wang & T.J. Tong 1090 (IBSC).

L. muliensis. In the protologue of the former, the capitula were described to be puberulous with the phyllaries being black or violet spotted at the apex (i.e., “capitula...puberula; involucri phylla...apice nigro vel violaceo sphacelata”); in the protologue of the latter, the involucre were described to be greenish or slightly violet with the phyllaries being pilosulose (i.e., “Involucri...viriduli vel violascentis (sic) phylla...pilosula”). It is worth mentioning that in the protologue of *Senecio remipes* Smith (1913: 117), which was described from Lijiang in northwestern Yunnan, China and was placed by all later authors, including Liu (1989) and Liu & Illarionova (2011), into the synonymy of *L. tsangchanensis*, the phyllaries were described to be puberulous or subglabrous outside, pallid on margins, and blackish at the apex (i.e., “Involucri phylla...extus puberula vel subglabra, pallide marginata, apice nigrescentia”). Based on our observations on both herbarium specimens and living plants, we found that the phyllaries of *L. tsangchanensis* are generally green, sometimes marginally and apically black-brown, dorsally glabrous to yellowish-brown pilose and white puberulent.

Lectotypification of *Ligularia tsangchanensis* and of *L. muliensis*

The type material of *Ligularia tsangchanensis* consists of ten specimens of four collections from northwestern Yunnan, China. They are all syntypes (McNeill *et al.* 2012). Hu (1967) cited *J.M. Delavay 631* from Cang Shan (= Tsang-chan), which includes four sheets, as the type, but she did not specify the herbarium in which the type was conserved and also did not annotate any of the four specimens as the holotype. Hu's (1967) citation should be considered as a first-step lectotypification (McNeill *et al.* 2012: Art. 9.17 & 9.9). Here we designate the specimen P00723348 (Fig. 1A), which matches perfectly the original Latin description and also exactly conforms to the specific epithet with respect to the collection locality, as the lectotype of *L. tsangchanensis* and its basionym, *Senecio tsangchanensis*.

The type material of *Ligularia muliensis* includes at least six specimens of two collections. Two specimens of *J.F. Rock 16582* kept in B and W were designated by Handel-Mazzetti (1938) in the protologue as the type and thus those of *J.F. Rock 16683* should be regarded as the paratypes. From B we have been unable to trace the type sheet (most likely destroyed during World War II). In W there is only a paratype sheet (W1937-0000419A), with a sketch of a stem leaf (W1937-0000419B) from the type sheet in B being attached to it (Fig. 3D). One sheet of *J.F. Rock 16582* is kept in US. This specimen (US00115984; Fig. 2) perfectly matches the original Latin description of *L. muliensis*, and thus we designate it as the lectotype of this name.

Taxonomic treatment

Ligularia tsangchanensis (Franchet) Handel-Mazzetti (1936: 1140). *Senecio tsangchanensis* Franchet (1893: 299). Figs. 1–10.

Type:—CHINA. Yunnan: Tali (= Dali), Cang Shan (= Tsang-chan), pasture, 4 July 1882, *J.M. Delavay 631* (P00723348!, first-step lectotype designated by Hu 1967: 75; second-step lectotype designated here; isolectotypes P00723346!, P00723347!, P04264194!). Fig. 1A.

= *Ligularia muliensis* Handel-Mazzetti (1938: 117), **syn. nov.**

Type:—CHINA. Sichuan: Muli, Mitzuga Shan, 4150 m a.s.l., June 1928, *J.F. Rock 16582* (US00115984!, lectotype designated here). Fig. 2.

= *Senecio remipes* Smith (1913: 117).

Type:—CHINA. Yunnan: Eastern flank of the Lichiang (= Lijiang) Range, alpine pasture, 13000 feet a.s.l., lat. 27°30'N, August 1910, *G. Forrest 6493* (E00413276!, holotype; isotypes K000814887!, P00836370!, BM001125709!).

Perennial herbs, robust. Stems solitary, erect, 15–120 cm tall, 3–8 mm in diameter at base, proximally glabrous, distally and inflorescence white puberulent and shortly yellowish brown pilose. Basal leaves sessile or petiolate; petiole 2–20 cm long, base sheathed; wing margin entire or denticulate; leaf blade ovate-oblong or ovate, 3.5–18 × 3–14 cm, pinnately veined, adaxially glabrous, abaxially slightly yellowish pilose along the veins and whitish arachnoid, base truncate or broadly cuneate, margin dentate, apex acute or obtuse. Middle to distal stem leaves sessile, oblong, 7–20 × 3–9 cm, base semiamplexicaul. Distalmost stem leaves smaller, lanceolate. Synflorescence racemose, proximally sometimes branched; foliose bracts linear-lanceolate to linear, to 3 cm long; peduncles 1–1.5 cm long, yellowish brown pilose and white arachnoid. Capitula numerous; supplementary bracts linear. Involucre narrowly campanulate, 3–5(–7) mm in diameter, outside green, sometimes margin and apex black-brown, glabrous or yellowish brown pilose and



FIGURE 6. *Ligularia tsangchanensis* in the wild, showing the habitat and habit (A, D), synflorescences (B, E), and capitula and pappi (C, F). **A–C.** China, southwestern Sichuan, Muli, 912–913 Forestry Station, C. Ren *et al.* 242 (IBSC). **D–F.** China, southwestern Sichuan, Muli, Shawan, C. Ren *et al.* 309 (IBSC).

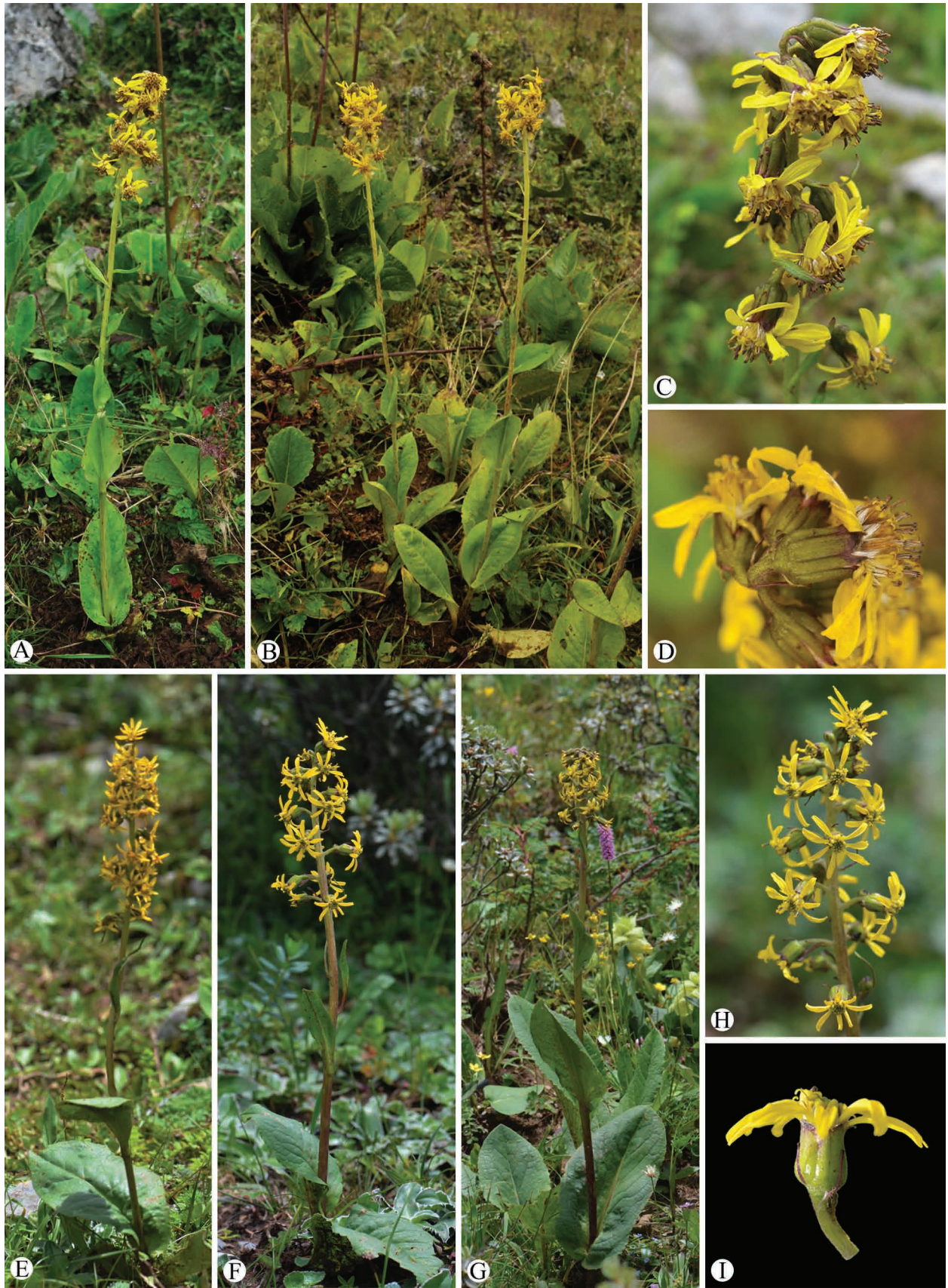


FIGURE 7. *Ligularia tsangchanensis* in the wild, showing the habit (A, B, E–G), synflorescences (C, H), and capitula and pappi (D, I). A–D. China, southwestern Sichuan, Yanyuan, Huolu Shan, 3600–3700 m a.s.l., *C. Ren et al.* 69 (IBSC). E–I. China, southwestern Sichuan, Yanyuan, Huolu Shan, 3945 m a.s.l., *L. Wang & Y.P. Zeng* 848 (IBSC).

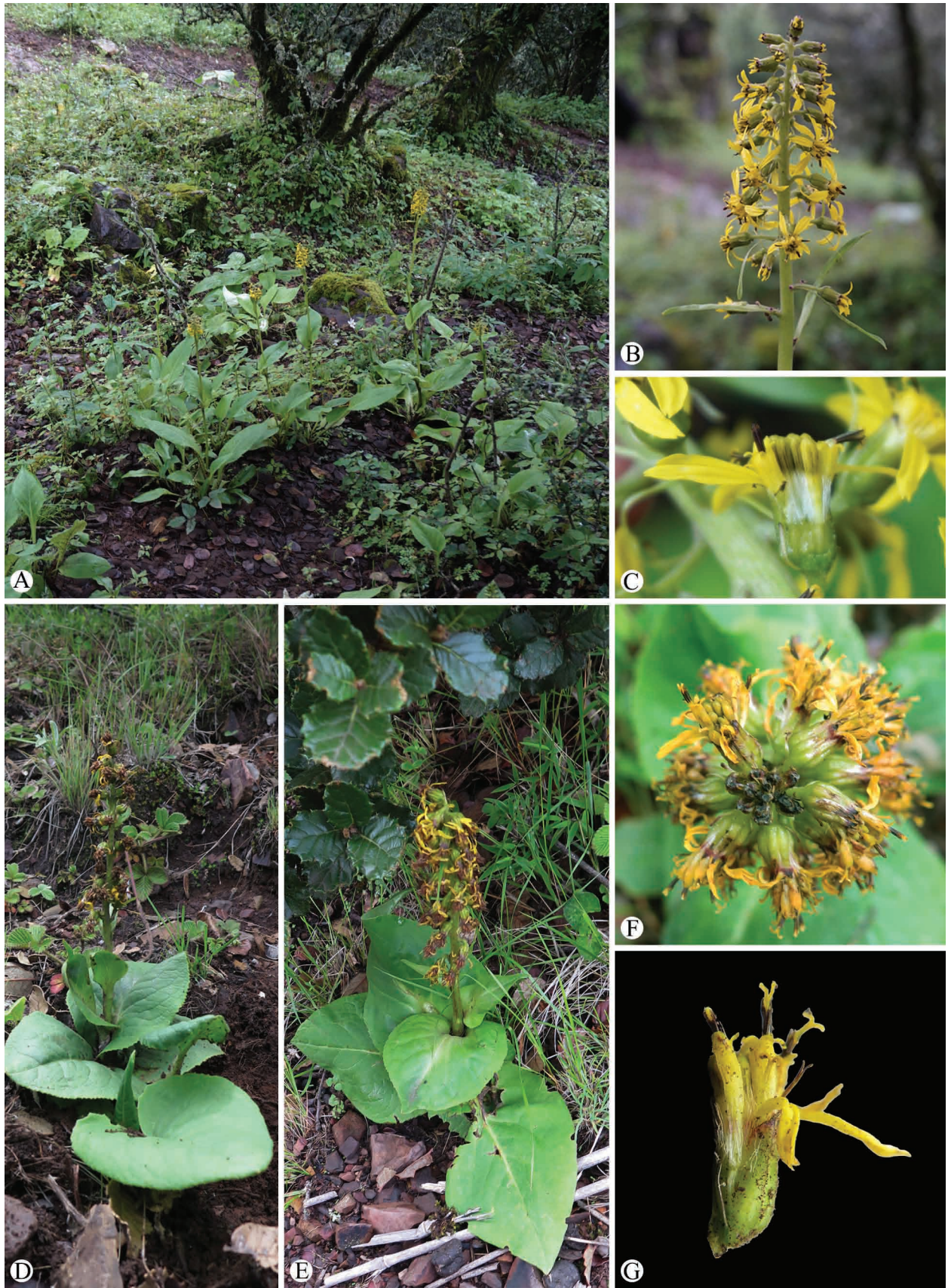


FIGURE 8. *Ligularia tsangchanensis* in the wild, showing the habitat and habit (A, D, E), synflorescences (B, F), and capitula and pappi (C, G). A–C. China, northwestern Yunnan, Heqing, Maer Shan, 3050 m a.s.l., T.J. Tong & M. Tang 393 (IBSC). D–G. China, northwestern Yunnan, Heqing, Maer Shan, 3591 m a.s.l., M. Tang et al. 974 (IBSC).

white puberulent; phyllaries 6–8(–10), (5–)6–7(–10) mm long, in 2 rows, oblong or lanceolate, margin membranous, apex dark brown, triangular or acuminate. Ray florets (1–)3–6(–9), yellow; lamina oblong, 5–12 mm long, 1–3 mm broad. Tubular florets numerous, 5–6.5 mm long, tube ca. 2 mm long. Achenes brown, cylindrical, 5–6 mm long. Pappus white or whitish, sometimes brown when dry, 3–6 mm long, shorter than corolla.

Distribution and habitat:—*Ligularia tsangchanensis* is distributed in southwestern Sichuan, southeastern Xizang, and northwestern and northeastern Yunnan (Fig. 11). It grows in alpine meadows or in alpine scrub and forest understories at elevations between 2700–4200 m above sea level.

Phenology:—Flowering June to July; fruiting late July to September.

Additional specimens examined:—CHINA. Sichuan: Muli, Y.S. Chen 7083 (PE), S. Jiang & T.S. Ying 4190 (PE), Qinghai-Xizang Exped. 14438 (KUN), C. Ren et al. 181 (IBSC), C. Ren et al. 236 (IBSC), C. Ren et al. 242 (IBSC), C. Ren et al. 309 (IBSC), C. Ren et al. 478 (IBSC), T.T. Yu 7430 (KUN, PE), T.T. Yu 14360 (E, KUN, PE); Yanyuan, C. Ren et al. 69 (IBSC), L. Wang & Y.P. Zeng 848 (IBSC), Q.L. Zhang 6162 (IBSC). Xizang: Bomi, Y.S. Chen 9335 (PE), FLPH Tibet Exped. 12-1625 (PE), R.F. Huang 752 (HNWP), B.S. Li & S.Z. Cheng 0523 (PE), Qinghai-Xizang Suppl. Exped. 5851 (KUN), C.Y. Wu 5838 (KUN); Gongbo'gyamda, Anonymous 2137 (PE), D.E. Boufford et al. 30111 (PE), F. Ludlow et al. 5357 (BM, E), F. Ludlow et al. 5471 (BM, E); Lhünzê, Y.S. Chen et al. 13-0563 (PE), L. Wang & T.J. Tong 1269 (IBSC); Mainling, FLPH Tibet Exped. 12-2011 (PE), C.C. Ni et al. 2907 (PE), Qinghai-Xizang Exped. 74-1879 (KUN), Qinghai-Xizang Suppl. Exped. 75-0876 (HNWP, KUN, PE), Xizang Med. Plant Exped. 3862 (HNWP, PE), Xizang Med. Plant Exped. 4118 (PE), Xizang Med. Plant Exped. 4192 (PE); Mêdog, Qinghai-Xizang Exped. 74-3927 (KUN, PE); Nyngchi, Y.T. Chang & K.Y. Lang 582 (KUN), Y.T. Chang & K.Y. Lang 952 (PE), Y.S. Chen 9376 (PE), F. Kingdon-Ward 12076 (BM), H. Sun et al. 2720 (IBSC), L. Wang & T.J. Tong 1090 (IBSC); Zayü, X.H. Jin et al. ST2535 (PE), X.H. Jin et al. ST2876 (PE), X.H. Jin et al. ST2892 (PE), C.C. Ni et al. 1081 (PE), C.C. Ni et al. 1118 (PE), Qinghai-Xizang Exped. 73-396 (KUN, PE), Qinghai-Xizang Exped. 73-1096 (KUN, PE), J.F. Rock 22360 (E, K), J.F. Rock 22404 (E), C.W. Wang 65555 (IBSC, KUN, NAS, PE, WUK). Yunnan: Dali, Anonymous s.n. (HITBC), G. Forrest 4040 (BM, IBSC, K), G. Forrest 28168 (E, PE), T.N. Liou 21179 (KUN), T.N. Liou 21237 (IBSC, KUN, PE), T.N. Liou 21293 (IBSC, PE), McLaren's Collectors 80 (E), McLaren's Collectors L103 (E, K), C. Ren & L.Y. Wang 406 (IBSC), H.T. Tsai 53806 (E, KUN, PE, SZ), Y. Tsiang 11445 (IBSC, NAS, PE), H.C. Wang 1192 (KUN, PE), H.C. Wang 2684 (IBSC, KUN), H.C. Wang 4513 (IBSC, KUN, PE), H.C. Wang 4521 (IBSC, KUN, PE), H.C. Wang 4820 (KUN, PE), C.Y. Wu & D.Y. Liu 11636 (KUN, PE), Z.J. Yin et al. 1537 (KUN), Yunnan Exped. YN-ET 1628 (PE), Zhongdian Exped. 63-3738 (KUN); Dayao, Woody Oil Plant Exped. 65-048 (HIB, KUN); Dêqên, G. Forrest 30455 (BM), Monbeig 74 (E), Monbeig s.n. (E, K), J.E. Soulié 1346 (P), J.E. Soulié s.n. (P, PE), M. Tang & C. Ren 723 (IBSC), C.W. Wang 69445 (KUN, NAS, PE, WUK), L. Wang et al. 943 (IBSC), T.T. Yu 9084 (KUN, PE), T.T. Yu 9226 (KUN, PE), T.T. Yu 9797 (IBSC, KUN, PE); Dongchuan, F. Ducloux 6590 (P), E.D. Liu et al. 2192 (KUN), NE Yunnan Exped. 819 (KUN), H. Peng et al. 8615 (KUN); Eryuan, R.C. Ching 23213 (KUN, PE), J.M. Delavay s.n. (P), J.M. Delavay 3113 (P), J.M. Delavay 3976 (P); Gongshan, Anonymous s.n. (PE), K.M. Feng 5304 (KUN, PE), X.H. Jin et al. ST1154 (PE), M. Tang 856 (IBSC), L. Wang & Y.P. Zeng 904 (IBSC), T.T. Yu 19826 (E, KUN, PE), T.T. Yu 22240 (E, KUN, PE), T.T. Yu 22539 (E, KUN, PE), T.T. Yu 22809 (KUN); Heqing, Y.S. Chen & Y.C. Bi 11-134 (PE), R.C. Ching 23885 (KUN, PE), M. Tang et al. 974 (IBSC), T.J. Tong & M. Tang 393 (IBSC); Huize, NE Yunnan Exped. 265 (KUN); Lanping, M. Tang & Y. Hong 284 (IBSC); Lijiang, Y.S. Chen & Y.C. Bi 11-118 (PE), R.C. Ching 20968 (KUN, PE), R.C. Ching 21449 (KUN), R.C. Ching 30427 (KUN, PE), H. Handel-Mazzetti 3655 (W, WU), KUN & E Exped. 85-603 (KUN), McLaren's Collectors 103 (BM), C. Ren & L.Y. Wang 460 (IBSC), J.F. Rock 9767 (E), J.F. Rock 16683 (E, GH, P, W), M. Tang et al. 977 (IBSC), T.T. Yu 15393 (E, KUN, PE), A.L. Zhang et al. 100906 (KUN); Luquan, H. Peng et al. 9546 (KUN), M. Tang et al. 1314 (IBSC); Ninglang, H. Handel-Mazzetti 7088 (W, WU); Qiaojia, Anonymous s.n. (HITBC, KUN), Y.S. Chen & Z.H. Wang 9061 (KUN), B.S. Sun et al. 1025 (KUN), H. Wang et al. 01-0196 (KUN); Weixi, R.C. Ching 20878 (KUN, PE), K.M. Feng 4744 (KUN, PE), K.M. Feng s.n. (PE), G. Forrest 30455 (E, PE), Y. Hong & L. Wang 502 (IBSC), McLaren's Collectors 168 (E), PE Hengduan Shan Exped. 01361 (PE), M. Tang et al. 1035 (IBSC), M. Tang et al. 1051 (IBSC), C.W. Wang 63765 (KUN, NAS, PE, WUK), C.W. Wang 63818 (KUN, NAS, PE, WUK), C.W. Wang 68563 (IBSC, KUN, NAS, PE, WUK), Q.E. Yang & H.Z. Kong 98-205 (PE), Q.E. Yang & H.Z. Kong 98-451 (PE), T.T. Yu 8799 (KUN, PE), T.T. Yu 10634 (E, KUN); Yangbi, M. Tang & L. Wang 176 (IBSC), M. Tang & L. Wang 306 (IBSC); Zhongdian, Anonymous s.n. (HITBC), D.E. Boufford et al. 35093 (PE), K.M. Feng 1562 (KUN, PE), K.M. Feng 1753 (KUN, PE), G. Forrest 10898 (BM, E, K, PE), H. Handel-Mazzetti 4544 (W, WU), M. Tang & C. Ren 723 (IBSC), M. Tang et al. 1167 (IBSC), M. Tang et al. 1220 (IBSC), Z.X. Tang et al. 508 (PE), Z.X. Tang et al. 747 (PE), Q.E. Yang & H.Z. Kong 98-538 (PE), Q.E. Yang et al. 3123 (IBSC), Q.E. Yang et al. 3240 (IBSC), T.T. Yu 11822 (KUN, PE), T.T. Yu 13530 (E, KUN, PE), T.T. Yu 13535 (E, KUN, PE), X.G. Zhao 93006 (CPU), Zhongdian Exped. 911 (KUN), Zhongdian Exped. 1191 (KUN, PE), Zhongdian Exped. 1549 (KUN, PE), Zhongdian Exped. 63-2785 (KUN), Zhongdian Exped. 3590 (KUN).

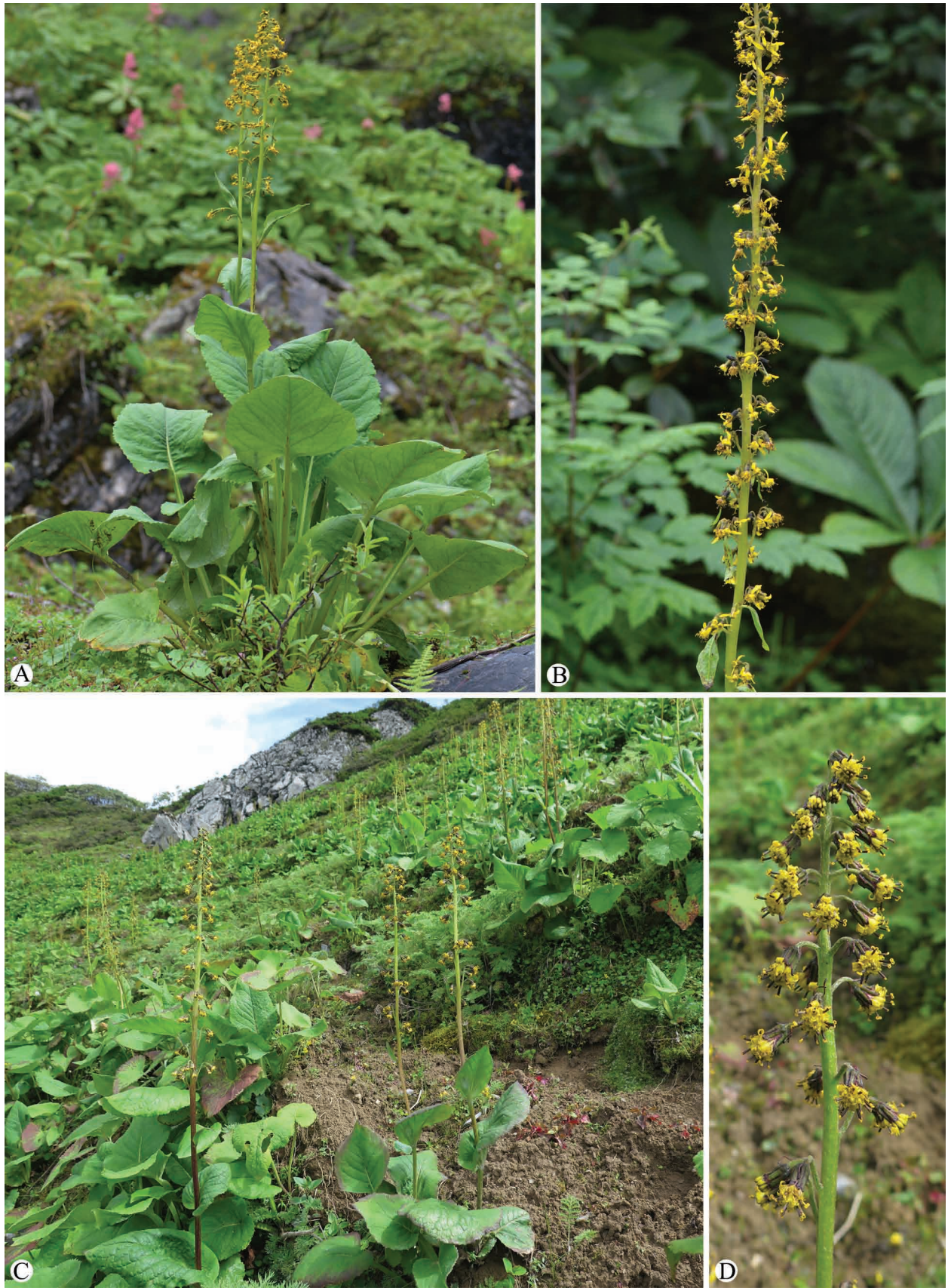


FIGURE 9. *Ligularia tsangchanensis* in the wild, showing the habitat and habit (A, C) and synflorescences (B, D). A, B. China, northwestern Yunnan, Gongshan, L. Wang & Y.P. Zeng 904 (IBSC). C, D. China, northwestern Yunnan, Weixi, M. Tang et al. 1051 (IBSC).

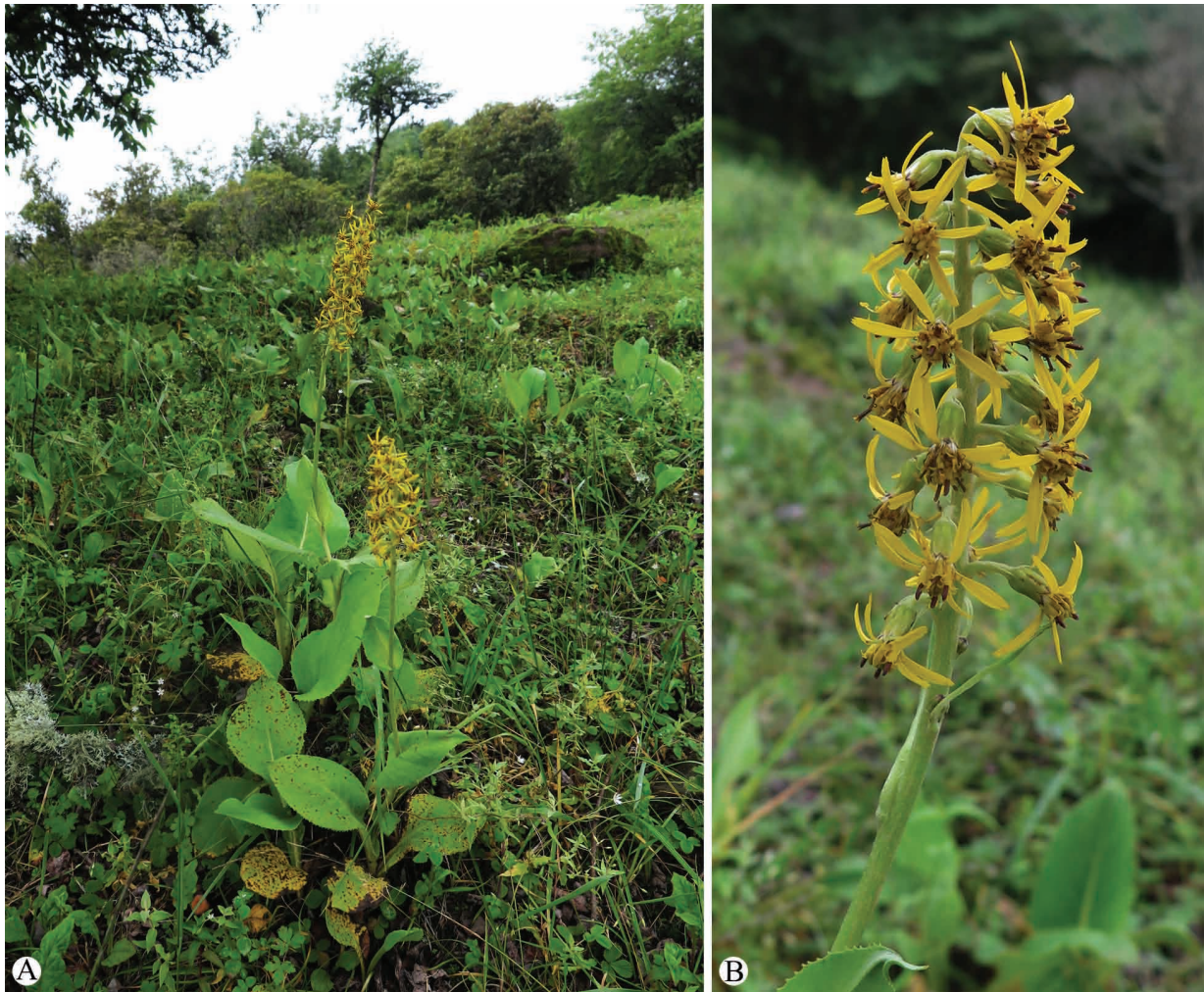


FIGURE 10. *Ligularia tsangchanensis* in the wild (China, northeastern Yunnan, Luquan). A. Habitat and habit. B. Synflorescence.

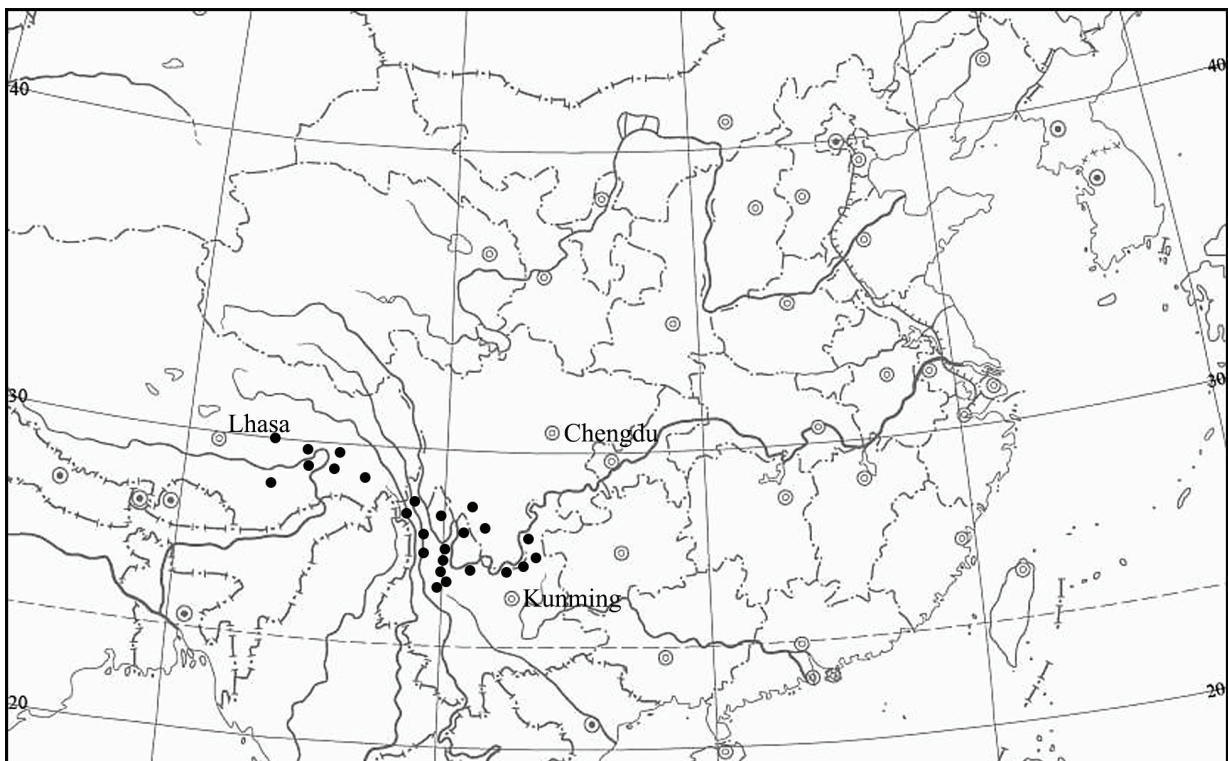


FIGURE 11. Distribution of *Ligularia tsangchanensis* (●).

Note:—In general aspect, as pointed out by Wang *et al.* (2016), *Ligularia tsangchanensis* is most closely similar to *L. shifangensis* Chen & Zhang (1997: 181), a species distributed in western Sichuan, China, but differs in the narrowly campanulate (vs. hemispheric) involucre, the peduncles shorter (1–1.5 cm vs. 1.5–10 cm long), and the pappus longer (3–6 mm vs. ca. 2 mm long). According to Liu (1985, 1989), *L. tsangchanensis* belongs to *L.* sect. *Ligularia* ser. *Racemiferae* (Pojarkova 1961: 893) Liu (1985: 66).

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