

34. BUPLEURUM Linnaeus, Sp. Pl. 1: 236. 1753.

柴胡属 chai hu shu

She Menglan (余孟兰 Sheh Meng-lan); Mark F. Watson

Herbs perennial, rarely annual, glabrous. Rootstock usually short, woody. Stem alternate or dichotomously branched, green or glaucous, base with or without fibrous remnant sheaths. Leaves entire, petioles sheathing; blade membranous, herbaceous or coriaceous, usually with parallel venation, base usually tapering into petiole. Cauline leaves often sessile, clasping, auriculate or perfoliate. Inflorescence loose, umbels compound, terminal and lateral; bracts several, conspicuous, often similar to uppermost leaves; rays few to many; bracteoles several, conspicuous. Calyx teeth obsolete. Petals yellow, greenish-yellow, tinged purple or purple, oblong to orbicular, apex narrowly inflexed. Stylopodium conic, low-conic or discoid; styles short, often reflexed. Fruit oblong to ovoid-oblong or ellipsoid, slightly laterally compressed, mericarps subpentagonal (rarely rounded) in cross section; ribs 5, filiform, prominent or obscure; vittae 1–3(–6) in each furrow, 2–6(–8) on commissure, sometimes obscure. Seed face plane. Carpophore 2-cleft to base.

About 180 species: widespread in the N temperate zone, one species (*B. mundtii* Chamisso & Schlechtendal) in S Africa; introduced in Australasia; 42 species (22 endemic) in China.

This distinctive genus is easily recognized by the simple leaves and conspicuous bracts and bracteoles. Species within *Bupleurum* are, however, notoriously difficult to identify on account of wide morphological variation within a species, often spread across wide geographic distributions. Many *Bupleurum* species are difficult to characterize, as is evident by complex classifications where all possible taxonomic ranks have been used. Several taxa are recorded only from a few collections, and it is likely that future work will reduce the number of species. The roots of several species of *Bupleurum* are famous for their use as the traditional Chinese medicine “chai hu” for treatment of coughs, fevers, and influenza. Almost all of the species are recorded in the literature as regional substitutes for “chai hu” or for other local medicinal purposes. However, caution should be applied as a very few species are toxic (e.g., *B. longiradiatum*) and can result in “toxic strike” if misused as such substitutes.

- 1a. Bracteoles large and conspicuous, mostly exceeding the umbellule.

2a. Cauline leaves broadly ovate, 10–20 × 3–5.5 cm, base dilated, rounded, perfoliate (Xinjiang) 3. *B. aureum*
 2b. Cauline leaves linear, lanceolate or narrowly ovate, 1–15 × 0.1–1 cm, base dilated or not, but never perfoliate.

3a. Plants small, 7–20(–25) cm.

4a. Bracteoles yellow or tinged purple.

5a. Plants erect; bracteoles 5–8, yellow-green; stylopodium dark yellow (NW China) 4. *B. triradiatum*
 5b. Plants decumbent; bracteoles 6–10, tinged purple; stylopodium dark purple (NW and SW China) ... 9. *B. dalhousieanum*

4b. Bracteoles green.

6a. Leaves and bracteoles abaxially glaucous, 3–5-nerved; umbellules 10–20-flowered (Qinghai, Xinjiang) 5. *B. densiflorum*
 6b. Leaves and bracteoles abaxially not glaucous, 9–15-nerved; umbellules 8–14-flowered (Sichuan, Xizang, Yunnan) 10. *B. yunnanense*

3b. Plants tall, 25–125 cm.

7a. Middle and upper leaves base dilated, cordate and clasping.

8a. Root dark brown; bracteoles usually 6–9; petals yellow-green (NC and NW China) 8. *B. smithii*
 8b. Root gray-brown; bracteoles usually 10–12; petals usually dark purple (C, NW, and SW China) 16. *B. longicaule*

7b. Middle and upper leaves base not dilated nor cordate.

9a. Inflorescence many-branched, forming a panicle (Yunnan) 11. *B. luxiense*
 9b. Inflorescence little-branched, not forming a panicle.

10a. Petals purple or dark purple (at least abaxially).

11a. Bracteoles 5(–7), green, broadly ovate, apex rounded or acute, apiculate (Jilin) 7. *B. euphorbioides*
 11b. Bracteoles 7–9, bluish-purple, elliptic, apex acuminate, long-apiculate (NW and SW China) 13. *B. commelynoidaeum*

10b. Petals yellow.

12a. Lateral umbel present at base of terminal umbel and overtopping it (Guizhou) 17. *B. kweichowense*
 12b. Terminal umbel without a lateral umbel at base.

13a. Bracts 1–2, linear-lanceolate, usually deciduous (NC and NE China) 6. *B. sibiricum*
 13b. Bracts 1–5, elliptic or ovate, persistent.

14a. Bracts elliptic, apex acuminate; rays 8–11(NW and SW China) 15. *B. petiolulatum*
 14b. Bracts ovate or suborbicular, apex rounded or obtuse; rays 4–12.

15a. Leaves thin-papery, abaxially grayish-white-green, margin not thickened, green; rays 4–8 (Sichuan, Xizang, Yunnan) 12. *B. candollei*
 15b. Leaves thick-papery, often tinged reddish-brown, abaxially green, margins thickened and reddish; rays 7–12 (Sichuan, Yunnan) 14. *B. rockii*

- 1b. Bracteoles small, narrow, usually shorter than, equaling or slightly exceeding the umbellules.
- 16a. Leaves $8\text{--}25 \times 2.5\text{--}10$ cm, base dilated, cordate and clasping.
- 17a. Petals and stylopodium usually yellow; fruit dark brown (NE and NW China) 1. *B. longiradiatum*
- 17b. Petals and stylopodium purple; fruit dark purplish-brown (Gansu, Henan, Hubei, Shaanxi, Sichuan) 2. *B. boissieuanum*
- 16b. Leaves $2\text{--}16(20) \times 0.1\text{--}1(3)$ cm, base not dilated nor cordate and clasping.
- 18a. Plants small, 2–20(–30) cm (sometimes more in *B. gracillimum*).
- 19a. Stem base densely clothed with fibrous remnant sheaths.
- 20a. Plants 15–30 cm; fruit 2.5–3 mm, ribs prominent; altitude 650–1550 m (NC and NE China) 18. *B. bicaule*
- 20b. Plants 2–10 cm; fruit 3.5–4 mm, ribs conspicuous or narrowly winged; altitude 2300–3500 m (Nei Mongol, Ningxia, Qinghai, Xinjiang) 19. *B. pusillum*
- 19b. Stem base without fibrous remnant sheaths (Qinghai, Sichuan, Xizang).
- 21a. Plants gray-green; fruit ribs broadly winged (Xizang) 20. *B. alatum*
- 21b. Plants tinged red; fruit ribs rounded or slightly prominent.
- 22a. Basal leaves very numerous, rosette-caespitose; rays 4–7, 3–6 cm; petals usually yellow or yellow-green (Qinghai) 21. *B. condensatum*
- 22b. Basal leaves few, not rosette-caespitose; rays ca. 3, 0.5–1.7 cm; petals yellow or dark purple (Sichuan) 23. *B. gracillimum*
- 18b. Plants tall, (25–)30–125 cm (or less in *B. angustissimum* and *B. hamiltonii*).
- 23a. Root surface reddish-brown.
- 24a. Stem base without fibrous remnant sheaths (Gansu, Nei Mongol, Ningxia, Shaanxi) 29. *B. yinchowense*
- 24b. Stem base clothed in fibrous remnant sheaths.
- 25a. Leaves linear, $6\text{--}16 \times 2\text{--}7$ mm (E, NC, NW, and SC China) 27. *B. scorzonerifolium*
- 25b. Leaves narrow-linear, $6\text{--}18 \times 0.8\text{--}1$ mm (NC and NW China) 28. *B. angustissimum*
- 23b. Root surface usually gray-yellow or brown, not reddish-brown.
- 26a. Fruit vittae 1 in each furrow, 2 on commissure (C, SC, and SW China) 34. *B. hamiltonii*
- 26b. Fruit vittae 1–3 in each furrow, 2–4 on commissure.
- 27a. Leaves lanceolate or oblong-elliptic, (0.5–)0.8–3 cm wide.
- 28a. Rootstock short, tuberous, with many fibrous fascicled roots (Heilongjiang, Jilin) 24. *B. komarovianum*
- 28b. Taproot little-branched or unbranched.
- 29a. Leaf margin white cartilaginous (C, NW, and SW China) 35. *B. marginatum*
- 29b. Leaf margin not white cartilaginous.
- 30a. Fruit vittae 1(rarely 2–3) in each furrow, 2 on commissure (Xinjiang) 25. *B. krylovianum*
- 30b. Fruit vittae 3–4 in each furrow, 4 on commissure.
- 31a. Stem and branches usually slender and flexuous; bracts narrowly linear, $1\text{--}5 \times 0.5\text{--}1$ mm (C, E, NC, NE, and NW China) 38. *B. chinense*
- 31b. Stem and branches rigid, not flexuous; bracts lanceolate, ovate, elliptic or obovate, $3\text{--}10 \times 1\text{--}5$ mm.
- 32a. Bracts 3–5, ovate, elliptic or obovate; fruit brown, glaucous (Chongqing) 37. *B. gracilipes*
- 32b. Bracts 2–3, lanceolate; fruit brown but not glaucous (Taiwan) 42. *B. kaoi*
- 27b. Leaves linear, $0.2\text{--}0.5(7)$ cm wide (to 1 cm in *B. microcephalum*).
- 33a. Stem solitary.
- 34a. Rays 1–3, filiform, very unequal, remote (NW Sichuan) 33. *B. wenchuanense*
- 34b. Rays (3–)4–10, not slender, moderately equal.
- 35a. Fruit oblong; ribs prominent.
- 36a. Stem little-branched (W Xinjiang) 26. *B. thianschanicum*
- 36b. Stem many-branched (Yunnan) 39. *B. polyclonum*
- 35b. Stem little-branched; fruit ovoid or ellipsoid; ribs inconspicuous.
- 37a. Pedicels 1–1.5 mm; fruit ovoid; mericarp pentagonal in cross section (Gansu, Sichuan, Xizang) 31. *B. microcephalum*
- 37b. Pedicels 5–10 mm; fruit ellipsoid; mericarp near round in cross section (Shaanxi) 32. *B. dielsianum*
- 33b. Stems numerous, often caespitose from a thickened woody caudex.
- 38a. Leaves margin white cartilaginous (Sichuan) 36. *B. chaishoui*
- 38b. Leaves margin not white cartilaginous.
- 39a. Fruit vittae 1 in each furrow, 2 on commissure (Xinjiang) 22. *B. exaltatum*
- 39b. Fruit vittae 3 in each furrow, 4 on commissure.
- 40a. Bracts 1–3, small, linear or squamose; bracteoles shorter than or equaling umbellules (Gansu, Qinghai, Sichuan, Xizang) 30. *B. malconense*
- 40b. Bracts 3–8, oblong or narrowly elliptic; bracteoles longer than the umbellules.

- 41a. Bracts 5–8, narrowly elliptic; rays 4–11, somewhat unequal, 1–2.5 cm (Yunnan) 40. *B. kunmingense*
41b. Bracts 3–4, oblong; rays 6–13, very unequal, 0.4–3.3 cm (Qinghai) 41. *B. qinghaiense*

1. *Bupleurum longiradiatum* Turczaninow, Bull. Soc. Imp. Naturalistes Moscou 17: 719. 1844.

大叶柴胡 da ye chai hu

Plants (50–)80–150 cm, perennial. Rhizome thick, little-branched. Stem usually solitary, much-branched above, base without fibrous remnant sheaths. Leaves several, basal leaves petiolate, 8–12 cm, tinged purple; blade broadly ovate-elliptic or lanceolate, 8–17 × 2.5–5(–8) cm, 9–11-nerved. Middle leaves sessile; blade ovate or narrowly ovate. Upper leaves sessile; blade broadly lanceolate, base cordate, clasping, apex acuminate. Inflorescence much-branched, remote, umbels 3–10 cm across; bracts 1–5, lanceolate, 2–10 × 1–2 mm, unequal, yellowish-green; rays 3–9, 3–35 mm, unequal, very slender; bracteoles 5–6, ovate-lanceolate, 1.5–5 × 0.5–1.2 mm, unequal; umbellules 10–15 mm across, 5–16-flowered; pedicels long, 4–8 mm, unequal, 7–15 mm in fruit. Petals yellow or purple, short-orbicular, apex notched. Stylopodium conic, dark yellow. Fruit oblong-ellipsoid, 4–7 × 2–2.5 mm, glaucous; mericarp surrounded in cross section; ribs obscure; vittae 3–4 in each furrow, 4–6 on commissure. Fl. and fr. Aug–Oct. $n = 6^*$.

Forests, woods, mountain slopes, shady river banks; 200–900 m. Gansu, Heilongjiang, Jilin, Liaoning, Nei Mongol [Japan, Korea, SE Russia].

This is one of a few toxic species in the genus that should not be used for medicinal purposes as a substitute for “chai hu.”

- 1a. Plants 80–150 cm; rays long, usually 25–40 mm; fruit not reddish-brown 1a. var. *longiradiatum*
1b. Plants 50–80 cm; rays short, 10–20 mm; fruit reddish-brown 1b. var. *breviradiatum*

1a. *Bupleurum longiradiatum* var. *longiradiatum*

大叶柴胡(原变种) da ye chai hu (yuan bian zhong)

Bupleurum leveillei H. de Boissieu; *B. longiradiatum* f. *leveillei* (H. de Boissieu) Kitagawa.

Plants 80–150 cm. Upper leaves long-ovate or broadly lanceolate, base cordate and clasping. Fruit dark brown, glaucous.

Forests, mountain slopes; 200–900 m. Gansu, Heilongjiang, Jilin, Liaoning, Nei Mongol [Japan, Korea, SE Russia].

The endemic *Bupleurum longiradiatum* f. *australe* R. H. Shan & Yin Li (Acta Phytotax. Sin. 12: 269. 1974) is recorded from wet valleys in shady woods or grasslands at 500–1400 m in Anhui, Jiangxi, Hubei, Hunan, and Zhejiang. This form is distinguished by having taller stature, upper leaves lanceolate or narrowly obovate, with base tapering and cuneate, and chromosome number $n = 6^*$.

1b. *Bupleurum longiradiatum* var. *breviradiatum* F. Schmidt ex Maximowicz, Mém. Acad. Imp. Sci. St.-Pétersbourg Divers Savans 9 [Prim. Fl. Amur.]: 125. 1859.

短伞大叶柴胡 duan san da ye chai hu

Bupleurum sachalinense F. Schmidt.

Plants short, 50–80 cm. Upper leaves short, thick. Peduncles and rays short, rays 10–20 mm. Fruit small, reddish brown.

Woods, shady river banks; 200–800 m. Heilongjiang, Liaoning [Japan, Korea, SE Russia].

2. *Bupleurum boissieuanum* H. Wolff, Repert. Spec. Nov. Regni Veg. 27: 186. 1929.

紫花阔叶柴胡 zi hua kuo ye chai hu

Bupleurum longiradiatum Turczaninow var. *porphyranthum* R. H. Shan & Yin Li.

Plants 80–120 cm, perennial. Stem rigid, erect, solid, much-branched from base, with profuse elongate and slender branches, base without fibrous remnant sheaths. Lower leaves many; blade lanceolate, slightly falcate, base tapering into petiole. Cauline leaves many; blade broadly ovate elliptic or broadly lanceolate, 8–25 × ca. 10 cm, base narrow, clasping, margins slightly incrassate. Apical leaves small and narrow, lanceolate, sessile. Inflorescence much-branched, branches remote and slender; umbels 2–9 cm across; bracts 5, narrowly lanceolate, ca. 2 × 1 mm; rays 5–8, 2–7 cm, unequal, filiform; bracteoles 5–6, lanceolate, ca. 2 × 1 mm, equal, apex acute; umbellules 5–15 mm across, 10–15-flowered; pedicels 8–10 mm in flower, 14–18 mm in fruit, very slender. Petals dark purple. Stylopodium low-conic, dark purple. Fruit oblong, dark purplish-brown, 4.5–6 × 2.8–3.3 mm; vittae 3 in each furrow, 6 on commissure. Fl. and fr. Aug–Oct.

• Woods, shady slopes, wet places; 800–1500 m. Gansu, Henan, Hubei, Shaanxi, Sichuan.

This rather poorly known taxon is recorded only from a few collections. It is similar to, and perhaps conspecific with, *Bupleurum longiradiatum*. It also has reputed medicinal value.

3. *Bupleurum aureum* Fischer ex Hoffmann, Gen. Pl. Umbell. 115. 1814.

金黄柴胡 jin huang chai hu

Plants 50–120 cm, perennial. Rhizomes thin, dark brown, creeping, little-branched. Stems 1–2(–3), little-branched, lustrous, often tinged purple, base without fibrous remnant sheaths. Lowest leaves many, petiolate; blade broadly ovate or obovate, 4–6.5 × 3–5 cm, 9–11-nerved, base tapering into petiole, apex rounded or acute. Middle leaves sessile; blade lyrate, base auriculate, clasping, apex obtuse-acute. Upper leaf blades perfoliate, 12–20 × 3–5.5 cm. Uppermost leaf ovate, small, base cordate, clasping. Terminal umbel 6–10 cm across, lateral umbels 3–5 cm; bracts 3–5, ovate to ovate-orbicular, 6–28 × 3–16 mm, unequal; rays 6–10, 1.5–6 cm, unequal; bracteoles aureate, 5–6 (–7), broadly ovate or elliptic, 4–9 × 3–8 mm, equal; umbellules 6–10 mm across, 15–20-flowered; pedicels 2–4 mm. Petals yellow, obovate, midvein dark yellow. Stylopodium low-conic or discoid, pale yellow. Fruit oblong, dark brown, 4–6 × 2.5–3 mm; ribs prominent; vittae 3 in each furrow, 4 on commissure. Fl. and fr. Jul–Sep.

Open forests, forest margins, among shrubs, mountain slopes, river

banks; 1300–1900 m. W Xinjiang (Tian Shan) [Kazakhstan, Kyrgyzstan, Mongolia, Russia].

Two varieties occur in China. Both have reputed medicinal value.

- 1a. Bracteoles broad-ovate or elliptic, 5–12 × 7–9 mm, exceeding flowers, base obtuse 3a. var. *aureum*
- 1b. Bracteoles narrowly ovate or linear-lanceolate, 2–3 × 0.7–2 mm, equaling or shorter than flowers, base tapering 3b. var. *breviinvolucratum*

3a. *Bupleurum aureum* var. *aureum*

金黄柴胡(原变种) jin huang chai hu (yuan bian zhong)

Bupleurum longifolium Linnaeus var. *aureum* (Fischer ex Hoffmann) H. Wolff.

Bracteoles broadly ovate or elliptic, 5–12 × 7–9 mm, usually exceeding flowers, base obtuse, 5–9-nerved.

Forest margins, among shrubs, mountain slopes, river banks; 1300–1900 m. W Xinjiang (Tian Shan) [Kazakhstan, Kyrgyzstan, Mongolia, Russia].

3b. *Bupleurum aureum* var. *breviinvolucratum* (Trautvetter ex H. Wolff) R. H. Shan & Yin Li, Acta Phytotax. Sin. 12: 271. 1974.

短苞金黄柴胡 duan bao jin huang chai hu

Bupleurum longifolium subvar. *breviinvolucratum* Trautvetter ex H. Wolff in Engler, Pflanzenr. 43(IV. 228): 53. 1910.

Bracteoles narrowly ovate or linear-lanceolate, 2–3 × 0.7–2 mm, shorter than flowers, base tapering, 3-nerved.

• Open forests, among shrubs, mountain slopes; 1400–1600 m. W Xinjiang (Tian Shan).

This is a variant with narrow bracteoles at the southernmost limit of this C Asian species.

4. *Bupleurum triradiatum* Adams ex Hoffmann, Gen. Pl. Umbell. 115. 1814.

三辐柴胡 san fu chai hu

Bupleurum ranunculoides Linnaeus var. *triradiatum* (Adams ex Hoffmann) Regel; *Diaphyllum triradiatum* (Adams ex Hoffmann) Hoffmann.

Plants 7–20(–25) cm, perennial. Rhizome dark brown, creeping, little-branched. Stem erect, tinged purple at base, base without fibrous remnant sheaths. Basal leaves several, linear or lanceolate, 2.5–10 × 0.3–1 cm, 3–5-nerved, base tapering, apex obtuse-acute. Cauline leaves few, 1–4, sessile; blade narrow-ovate, 1.5–6 × 0.3–0.7 cm, base obtuse, clasping. Umbels 1–3, 2–5 cm across; bracts 1–3, ovate or broad-ovate, 5–15 × 4–14 mm, unequal, shorter than rays, 7–19-nerved; rays 2–3, erect, 1–2.5 cm; bracteoles 5–8, 3–7 × 2–6 mm, yellowish, reddish-tinged or purplish-tinged, distinctly longer than flowers, base subrounded, apex obtuse or acute; umbellules 8–15 mm across; flowers 18–26, crowded; pedicels 2–3 mm. Petals yellow or abaxially purplish, apex obtuse, inflexed. Stylopodium low-conic or discoid, dark yellow. Fruit ellipsoid, brownish-red, 2.5–3 × 1.5–2 mm; ribs prominent; vittae 1–3 in each furrow, 2–4 on commissure. Fl. and fr. Jul–Sep.

Forest margins, alpine meadows, sunny slopes, rock crevices; 2300–4900 m. Qinghai, W Sichuan, Xinjiang, Xizang, NW Yunnan [?N Japan, Russia].

This species has reputed medicinal value.

5. *Bupleurum densiflorum* Ruprecht, Mém. Acad. Imp. Sci. Saint Pétersbourg, Sér. 7, 14(4): 47. 1867.

密花柴胡 mi hua chai hu

Plants 10–30 cm, perennial. Rhizome short, horizontal. Stems few or several, slender, base without fibrous remnant sheaths. Basal leaves many; blade narrow-lanceolate or linear, 6–13 × 0.3–0.7 cm, thin, abaxially glaucous, 3–5-nerved, base tapering into a long petiole. Cauline leaves 1–3, lanceolate, sessile, base clasping, apex obtuse-acute, 5–7-nerved. Umbels terminal, ca. 3 cm across; bracts 1–3, ovate-lanceolate, 5–15 × 3–5 mm, unequal, base embracing; rays 2–3(–4), slender, 1.5–5 cm, unequal; bracteoles 5–6, ovate to broadly ovate, 5–7 × 3–7 mm, exceeding flowers, 7–9-nerved; umbellules ca. 10 mm across, 10–20-flowered; pedicels ca. 2 mm. Petals yellow, mid-vein purplish, prominent. Stylopodium low-conic, discoid, dark purple. Fruit oblong, dark brown, 3–4 × 2–2.5 mm; ribs acute; vittae large, 2 in each furrow, 2 on commissure. Fl. and fr. Jul–Sep.

Alpine meadows, gravelly slopes; 2500–3100 m. Qinghai, Xinjiang [Kazakhstan, Kyrgyzstan, Tajikistan].

This species has reputed medicinal value (in Xinjiang). It is considered to be closely related to *Bupleurum triradiatum*, and in C Asia the two taxa intergrade.

6. *Bupleurum sibiricum* Vest ex Sprengel in Roemer & Schultes, Syst. Veg. 6: 368. 1820.

兴安柴胡 xing an chai hu

Plants 30–70 cm, perennial. Stems few or many, base often purplish-red, with or without fibrous remnant sheaths. Basal leaves many; blade narrowly lanceolate, 12–25 × 0.7–1.6 cm, 7–9 nerved, apex short-acuminate, apiculate, base tapering into petioles; petioles 5–10 cm. Upper leaves sessile; blades lanceolate, 2.5–6 × 0.8–1.1 cm, base rounded-cuneate, embracing, apex acuminate. Umbels 4–6 cm across; bracts 1–2, lanceolate, 5–10 × 1–3 mm, similar to upper leaves, deciduous; rays 5–14, 1.5–3(–5) cm, unequal, stout, slightly incurved; bracteoles (5) 7–12, elliptic-lanceolate, 5–7 × 2–3 mm, 5–7-nerved, exceeding flowers and fruit, base cuneate; umbellules 8–15 mm across, 10–20-flowered; pedicels 0.5–1.5 mm. Petals yellow. Stylopodium low-conic, discoid, yellow. Fruit broad-ellipsoid, dark brown, 3–4 × 2.5–3 mm, slightly glaucous; ribs prominent, narrowly winged; vittae 3 in each furrow, 4–6 on commissure. Fl. and fr. Jul–Sep. *n* = 32*.

Mountain slopes; 300–2000 m. Hebei, Heilongjiang, Liaoning, Nei Mongol [Mongolia, SE Russia].

Two varieties occur in China. Both have reputed medicinal value.

- 1a. Leaf blade narrowly lanceolate; bracteoles 7–12 6a. var. *sibiricum*
- 1b. Leaf blade broad, ovate-lanceolate; bracteoles 5 6b. var. *jeholense*

6a. *Bupleurum sibiricum* var. *sibiricum*

兴安柴胡(原变种) xing an chai hu (yuan bian zhong)

Bupleurum dahuricum Fischer & C. A. Meyer ex Turczaninow.

Leaf blade narrowly lanceolate; bracteoles 7–12, pale yellow, usually 5-nerved.

Mountain slopes; 300–800 m. Heilongjiang, Liaoning, Nei Mongol [Mongolia, SE Russia].

6b. *Bupleurum sibiricum* var. *jeholense* (Nakai) Y. C. Chu ex R. H. Shan & Y. Li, Acta Phytotax. Sin. 12: 272. 1974.

雾灵柴胡 wu ling chai hu

Bupleurum jeholense Nakai, J. Jap. Bot. 13: 482. 1937; *B. jeholense* var. *latifolium* Nakai.

Leaf blade ovate-lanceolate; bracteoles 5, yellowish-green, usually 7-nerved.

• Mountain slopes; 1500–2000 m. Hebei (Wuling Shan)

This rather poorly known taxon is recorded only from a few collections.

7. *Bupleurum euphorbioides* Nakai, Bot. Mag. (Tokyo) 27: 313. 1914.

大苞柴胡 da bao chai hu

Bupleurum tatudinense I. V. Baranov.

Plants (8–)12–60 cm, annual or biennial. Taproot slender. Stem often tinged purple, 1–2-branched above, base without fibrous remnant sheaths. Basal leaf blades linear 7–15 × 0.1–0.3 cm, base tapering into petiole, 5–7-nerved. Cauline leaves narrowly lanceolate, clasping, apical leaf ovate. Umbels 2–11 cm across; bracts 2–5, ovate, 3–30 × 2–12 mm, very unequal; rays 4–11, 0.5–10 cm, very unequal, slender; bracteoles 5(–7), broadly elliptic or obovate, green, 4–9 × 1.5–5 mm, apex acute, apiculate, exceeding flowers and fruit; umbellules 6–15 mm across, 16–24-flowered; pedicels 2–3 mm. Petals yellow, abaxially purplish. Stylopodium low-conic, discoid, purple. Fruit ovoid-oblong, purplish-brown, ca. 3 × 2 mm; ribs prominent; mericarp pentagonal in cross section; vittae 3–4(–5) in each furrow, 4 on commissure. Fl. and fr. Jul–Sep. 2n = 16*.

Forest margins, grassy places, mountain slopes; 1200–2500 m. S Jilin (Antu, Changbai Shan, Fusong) [Korea].

8. *Bupleurum smithii* H. Wolff, Acta Horti Gothob. 2: 304. 1926.

黑柴胡 hei chai hu

Plant 25–60 cm, perennial. Rhizome dark brown, usually branched, often thick. Stems several, tufted, stout, base without fibrous remnant sheaths. Basal leaves many; petioles often purplish-red, clasping; blade narrow-oblong or oblanceolate, 10–20 × 1–2 cm, thick-papery, 7–9-nerved, base tapering, margins white scarious, apex obtuse or acute, apiculate. Cauline leaves sessile. Apical leaf long-ovate, 1.5–7.5 × 1–1.7 cm, base rounded, sometimes auriculate, clasping, apex acuminate. Bracts 0 or 1–2, broadly ovate, 7–18 × 4–11 mm, unequally; rays 4–9, 0.5–4 cm,

unequal, angled; bracteoles 6–9, ovate or broad-ovate, 4.5–6 × 3–5 mm, equal, acute, apiculate, exceeding (to × 1.5) flowers; umbellules 1–2 cm across; pedicels 1.5–2.5 mm. Petals yellow, occasionally abaxially purplish-red. Stylopodium low-conic, discoid, dark yellow or purple-brown. Fruit ovoid, brown, 3.5–4 × 2–2.5 mm; ribs acute, prominent; vittae 3 in each furrow, 3–4 on commissure. Fl. and fr. Jul–Sep.

• Mountain slopes, grassy places, sunny riverside shingle; 1400–3700 m. Gansu, Hebei, Henan, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shanxi.

1a. Leaf blade 2–2.6 cm broad, upper leaf bases deep-cordate or deep-auriculate 8b. var. *auriculatum*

1b. Leaf blade 0.3–2 cm broad, upper leaf bases not deep-cordate or deep-auriculate.

2a. Leaf blade 10–20 × 1–2 cm 8a. var. *smithii*
2b. Leaf blade 6–11 × 0.3–0.7 cm 8c. var. *parvifolium*

8a. *Bupleurum smithii* var. *smithii*

黑柴胡(原变种) hei chai hu (yuan bian zhong)

Bupleurum borealisinense Nakai.

Leaf blade broadly lanceolate or oblong, 10–20 × 1–2 cm, thinly papery, base shallowly caudate, semi-embracing.

• Mountain slopes in valleys, grassy places; 1400–3400 m. Gansu, Hebei, Henan, Nei Mongol, Shaanxi, Shanxi.

8b. *Bupleurum smithii* var. *auriculatum* R. H. Shan & Yin Li, Acta Phytotax. Sin. 12: 273. 1974.

耳叶黑柴胡 er ye hei chai hu

Leaf blade broadly lanceolate or oblong, 10–20 × 2–2.6 cm, thinly papery, base deep-cordate or deep-auriculate, embracing.

• Mountain slopes, sunny riverside shingle; 2100–2400 m. N Shanxi (Ningwu).

8c. *Bupleurum smithii* var. *parvifolium* R. H. Shan & Yin Li, Acta Phytotax. Sin. 12: 273. 1974.

小叶黑柴胡 xiao ye hei chai hu

Basal leaves narrowly lanceolate, 6–11 × 0.3–0.7 cm, thickly papery, base tapered into petiole, not embracing.

• Grassy places on mountain slopes; 2700–3700 m. Gansu, Nei Mongol, Ningxia, Qinghai.

This variety is widely used in Gansu and Qinghai as a substitute for the Chinese medicine “chai hu” (see *B. chinense* and *B. scorzoniferifolium*).

9. *Bupleurum dalhousieanum* (C. B. Clarke) Koso-Poljansky, Trudy Imp. Bot. Sada Petra Velikago 30(2): 165. 1913 [“*dalhousianum*”].

匍枝柴胡 pu zhi chai hu

Bupleurum longicaule de Candolle var. *dalhousieanum* C. B. Clarke in J. D. Hooker, Fl. Brit. India 2: 677. 1879 [“*dalhousieana*”].

Plants (5–)10–20 cm, perennial. Rootstock long, woody, branched. Stems purplish-red, numerous, usually decumbent, base without fibrous remnant sheaths. Basal leaves few; blade linear, 3–8 × 0.2–0.4 cm, 5–7-nerved, tapering into petiole. Upper leaves sessile; blade lanceolate or ovate, 1.5–5 × 0.3–0.8 cm, base rounded, clasping, apex acuminate, sometimes caudate. Umbels few, 1.5–2.5 cm across, terminal; bracts 1–3, ovate, 5–18 × 4–8 mm, unequal; rays 2–4, 1–2 cm, unequal; bracteoles (4–)6–10, broadly ovate or obovate, tinged purple, 4–8 × 3.5–5.5 mm, slightly exceeding flowers, apex apiculate; umbellules 11–13 mm across, 16–24-flowered; pedicels 1–2 mm. Petals purplish. Stylopodium low-conic, dark purple. Fruit oblong-ovoid, brown, ca. 4 × 2 mm; ribs narrowly winged; vittae 3 in each furrow, 4 on commissure. Fl. and fr. Jun–Sep.

Alpine regions, mountain summits, rock crevices; 3700–4800 m. W Sichuan, S and W Xizang, NW Yunnan [Bhutan, NE India, N Myanmar, Sikkim].

This species has reputed medicinal value.

10. *Bupleurum yunnanense* Franchet, Bull. Soc. Philom. Paris, sér. 8, 6: 117. 1894.

云南柴胡 yun nan chai hu

Plants 12–35 cm, perennial. Taproot fusiform, vertical, thickened, often branched. Stems several, slender, erect, base without fibrous remnant sheaths. Lower leaves sessile; blade linear, 4–8 × 0.15–0.4 cm, base clasping. Middle leaves sessile; blade lanceolate, 5–10 × 0.3–0.7 cm, 9–15-nerved, base rounded, embracing, apex caudate. Upper leaves small, ovate-lanceolate. Umbels few, 1.5–2.7 cm across; bracts 2–4, ovate-lanceolate, 0.2–2.5 mm, unequal; rays (2–)3–5(–7), 3–25 mm, unequal; bracteoles 5, elliptic, 3–5 × 1–2 mm, equal, apex acuminate, about 1.5–2 times as long as flowers; umbellules ca. 10 mm across, 8–14-flowered; pedicels ca. 2 mm. Petals yellow or purplish. Stylopodium low-conic, discoid, yellow or purplish. Fruit oblong, gray-brown, ca. 2.5 × 1.1 mm; ribs prominent, narrowly winged; vittae 3 in each furrow, 4 on commissure. Fl. and fr. Jul–Sep.

• Mountain slopes; 2500–5000 m. Sichuan, SE Xizang (Dinggyê), Yunnan.

This species has reputed medicinal value (in Yunnan). It is very similar to the C Asian *Bupleurum falcatum* Linnaeus.

11. *Bupleurum luxiense* Yin Li & S. L. Pan, Acta Phytotax. Sin. 24: 150. 1986.

泸西柴胡 lu xi chai hu

Plants 55–125 cm, stout, perennial. Taproot dark brown, thick, woody, little-branched, densely marked with annular leaf scars. Stem usually tinged purple at base, base without fibrous remnant sheaths. Basal leaves caespitose, lanceolate, 10–20 × 1.6–3 cm, abaxially glaucous, 5–7-nerved, base tapering into long petiole, margins usually reddish-brown. Cauline leaves narrow-lanceolate, 8–18 × 1.2–2.5 cm, petiolate, clasping, 7–9-nerved. Apical leaves sessile, obovate, clasping, 9–11-nerved. Inflorescence profusely dichotomously branched forming a large panicle, branches spreading and rigid; umbels 2.5–4 cm across; bracts 5, obovate, 4–7 × 3–4 mm, unequal; rays 2–9, 1–4 cm; bracteoles 5, elliptic or obovate, ca. 3 × 2.5 mm, green,

exceeding flowers; umbellules ca. 10 mm across, 8–17-flowered; pedicels 0.5–1 mm. Petals yellow. Stylopodium low-conic, discoid, yellow. Fruit oblong, brown, 2–3.5 × 1–2 mm; ribs prominent; vittae 3 in each furrow, 4 on commissure. Fl. and fr. Jul–Oct.

• Mountain slopes; ca. 1800 m. SE Yunnan (Jianshui, Luxi).

The roots are used in traditional Chinese medicine. This rather poorly known taxon is recorded only from a few collections.

12. *Bupleurum candollei* Wallich ex de Candolle, Prodr. 4: 131. 1830 [“*candollii*”].

川滇柴胡 chuan dian chai hu

Plants 40–100 cm, perennial. Taproot stout, woody, branched. Stem erect, much-branched above, branches spreading-ascending, base without fibrous remnant sheaths. Lower leaves linear-lanceolate or long-elliptic, 12–15 × 0.5–0.8 cm, 11–15-nerved, abaxially glaucous, apex rounded-obtuse, apiculate. Upper leaves long-ovate, base cuneate. Umbels 2.5–4 cm across; bracts 3–5, ovate, 3–20 × 2–10 mm, unequal; rays 4–8, 1–3 cm, unequal, slender; bracteoles 5, broadly elliptic or suborbicular, 3–6 × 1.8–4 mm, apex rounded, apiculate, greatly exceeding flowers; umbellules 8–12 mm across, 10–15-flowered; pedicels 0.5–1.5 mm. Petals pale yellow or dark purple. Stylopodium low-conic, discoid, dark yellow or dark purple. Fruit oblong, brown, 2.7–3.5 × 1.7–1.9 mm; ribs prominent, narrowly winged; vittae 3 in each furrow, 4 on commissure. Fl. Jul–Aug, fr. Sep–Oct.

Mixed forests on shady slopes, open forests, mountain slopes, grassy places; 1800–3200 m. W Sichuan, S Xizang, Yunnan [Bhutan, N India, Kashmir, N Myanmar, Nepal, Pakistan, Sikkim].

This widespread species exhibits wide variation across its geographic range. Several infraspecific taxa have been described, but these are not always distinct. This, and the following four species are morphologically very similar and further work is needed to define the taxa clearly. At least var. *candollei* has reputed medicinal value.

- 1a. Stem, bracts and bracteoles purplish-red; leaf blade abaxially not glaucous 12b. var. *atropurpureum*
- 1b. Stem, bracts and bracteoles green; leaf blade abaxially glaucous.
 - 2a. Stem moderately branched; basal leaves not spatulate, petioles short 12a. var. *candollei*
 - 2b. Stem copiously branched, branches slender; basal leaves spatulate or oblanceolate, tapering into a long petiole 12c. var. *virgatissimum*

12a. *Bupleurum candollei* var. *candollei*

川滇柴胡(原变种) chuan dian chai hu (yuan bian zhong)

Stem, bracts and bracteoles green. Basal leaves linear-lanceolate or long-elliptic, leaf blade abaxially glaucous, thinly papery. Petals yellow. Stylopodium dark yellow.

Open forests, mountain slopes, grassy places; 1800–3200 m. W Sichuan, S Xizang, NW Yunnan [Bhutan, N India, Kashmir, N Myanmar, Nepal, Pakistan, Sikkim].

12b. *Bupleurum candollei* var. *atropurpureum* C. Y. Wu, Acta Phytotax. Sin. 12: 275. 1974.

紫红川滇柴胡 *zi hong chuan dian chai hu*

Bupleurum atropurpureum (C. Y. Wu) C. Y. Wu.

Stem, bracts and bracteoles purplish-red, thickly papery. Leaves green on both surfaces. Petals dark purple. Stylopodium dark purple.

• Grassy slopes; ca. 2900 m. W Yunnan (Zhenkang).

This poorly known taxon is recorded only from a few collections.

12c. *Bupleurum candollei* var. *virgatissimum* C. Y. Wu, Acta Phytotax. Sin. 12: 275. 1974.

多枝川滇柴胡 *duo zhi chuan dian chai hu*

Stem copiously branched, branches, peduncles and rays slender. Basal leaves spatulate or oblanceolate, tapering toward the base, forming a long petiole, 7-nerved. Petals yellow. Stylopodium dark yellow.

• Mixed forests on shady slopes; 2500–3000 m. SW Sichuan (Huidong, Miyi), Yunnan (Kunming).

13. *Bupleurum commelynoideum* H. de Boissieu, Bull. Herb. Boissier, sér. 2, 2: 805. 1902.

紫花鸭跖柴胡 *zi hua ya zhi chai hu*

Plants 15–50 cm, perennial. Rhizome slender, woody, much-branched. Stems several, base without fibrous remnant sheaths. Basal leaves sessile; blade linear-lanceolate, 8–18 × 0.3–0.5 cm, abaxially tinged purple, 5-nerved, base rounded, clasping. Middle leaves ovate-lanceolate, apex long-acuminate or caudate, 8–11 × 0.5–1 cm, margin white scarious. Apical leaf short, narrow-ovate, apex caudate. Umbels 2–6 cm across; bracts 1 or 2, or absent, ovate-lanceolate, 4–35 × 2–9 mm, unequal, deciduous; rays 3–7, 1.5–5 cm; bracteoles 7–9, broadly ovate, 7–9 × 3–5 mm, exceeding flowers; umbellules 8–18 mm across, 16–30-flowered; pedicels 1–3 mm. Petals adaxially purple or yellowish-tinged, abaxially purple. Stylopodium low-conic, discoid, dark purple. Fruit oblong, reddish-brown, 2–2.5 × ca. 1.5 mm; ribs pale brown, prominent or narrowly winged; vittae 3 in each furrow, 4 on commissure. Fl. and fr. Aug–Oct.

• Alpine meadows; 2700–4300 m. S Gansu, SE Qinghai, W Sichuan, Xizang, NW Yunnan.

At least var. *commelynoideum* has reputed medicinal value. See the taxonomic note under *Bupleurum candollei*.

1a. Bracteoles tinged purple; umbellules

12–18 mm across 13a. var. *commelynoideum*

1b. Bracteoles yellow; umbellules

8–12 mm across 13b. var. *flaviflorum*

13a. *Bupleurum commelynoideum* var. *commelynoideum*

紫花鸭跖柴胡(原变种) *zi hua ya zhi chai hu* (yuan bian zhong)

Umbellules 12–18 mm across; bracteoles purplish-blue, ovate or lanceolate, 7–9 × 3–5 mm, greatly exceeding the flowers.

• Alpine meadows; 3000–4300 m. W Sichuan, Xizang, NW Yunnan.

13b. *Bupleurum commelynoideum* var. *flaviflorum* R. H. Shan & Yin Li, Acta Phytotax. Sin. 12: 276. 1974.

黄花鸭跖柴胡 *huang hua ya zhi chai hu*

Umbellules 8–12 mm across; bracteoles yellow, 5–7 × 2–3 mm, slightly exceeding the flowers.

• Alpine meadows; 2700–4000 m. S Gansu, SE Qinghai, W Sichuan, E and S Xizang.

14. *Bupleurum rockii* H. Wolff, Repert. Spec. Nov. Regni Veg. 27: 186. 1929.

丽江柴胡 *li jiang chai hu*

Bupleurum handelii H. Wolff.

Plants 60–100 cm, perennial. Taproot branching, dark brown, woody. Stem erect, sometimes purplish-red, few-branched above, base without fibrous remnant sheaths. Basal leaves many, linear-oblong, 10–15 × 0.8–1 cm, thick-papery, often reddish brown-tinged, 11-nerved, base tapering into a long petiole, margins reddish and thickened. Cauline leaves often few, sessile; blade ovate-lanceolate, 2.5–7 × 8–12 mm, base rounded, clasping, margins purple, apex obtuse-acute. Terminal umbel 6–8 cm across; peduncles elongate and rigid; bracts 1–3, ovate-lanceolate, 7–20 × 0.5–1 cm, unequal, green or tinged red, apex obtuse-rounded; rays (3)–7–12, 1–4 cm, unequal; bracteoles 5, elliptic-obovate, 3–4 × 1.8–2.5 mm, often reddish, equaling or slightly exceeding flowers, shorter than umbellules in fruit; umbellules ca. 8 mm across, 10–12-flowered; pedicels 0.5–1.5 mm. Petals yellow. Stylopodium shape low-conic, color dark yellow. Fruit ovoid, reddish-brown when mature, 4–5 × 2.2–2.6 mm; vittae 3 in each furrow, 4 on commissure. Fl. and fr. Jul–Oct.

• Open forests, grassy places on mountain slopes; 1900–4200 m. Sichuan, NW Yunnan.

This species has reputed medicinal value. See the taxonomic note under *Bupleurum candollei*.

15. *Bupleurum petiolatum* Franchet, Bull. Soc. Philom. Paris, sér. 8, 6; 117. 1894.

有柄柴胡 *you bing chai hu*

Plants 50–70 cm, perennial. Taproot long-fusiform, dark brown. Stem usually solitary, erect, usually little-branched above, base without fibrous remnant sheaths. Basal leaves several, narrowly long-lanceolate or long-elliptic, 9–14 × 1–1.3 cm, thinly papery, 7–9-nerved, margin tinged red, base tapering into long petioles, clasping. Upper leaves short-petiolate; blade elliptic or lanceolate, 7–12 × 1–2 cm, apex obtuse-acute, apiculate. Apical leaf small, sessile. Umbels few, 4–8 cm across; bracts 1–3, elliptic, 4–9 × 2–4 mm, apiculate; rays 8–11, 0.5–4 cm, unequal, slender; bracteoles 5–7, ovate-lanceolate, 5–11 × 1.5–3 mm, unequal, membranous, apex acute, apiculate, equaling or slightly exceeding the flowers; umbellules 4–6 mm across, 8–16-flowered; pedicels 1.2–2.2 mm. Petals yellow. Stylopodium low-conic, yellow. Fruit ellipsoid, dark brown, 3.5–5 × 1.6–2.1 mm; ribs pale brown, slightly prominent; vittae

3 in each furrow, 4 on commissure. Fl. and fr. Jul–Sep.

• Mixed forests on mountain slopes, among shrubs, alpine grasslands; 2300–3900 m. Gansu, Qinghai, Sichuan, Xizang, Yunnan.

At least var. *petiolulatum* has reputed medicinal value. See the taxonomic note under *Bupleurum candollei*.

- 1a. Stem stout, branching above; bracteoles $2.8\text{--}5 \times 1.2\text{--}1.5$ mm, shorter than the flowers 15a. var. *petiolulatum*
- 1b. Stem slender, branching from base; bracteoles $4\text{--}6 \times 1.6\text{--}3.2$ mm, usually exceeding the flowers 15b. var. *tenerum*

15a. *Bupleurum petiolulatum* var. *petiolulatum*

有柄柴胡(原变种) you bing chai hu (yuan bian zhong)

Bupleurum longicaule de Candolle var. *tibeticum* H. Wolff.

Stem usually solitary, stout, branched above; bracteoles ovate-lanceolate or lanceolate, $2.8\text{--}5 \times 1.2\text{--}1.5$ mm, base cuneate, membranous, 3-nerved, usually shorter than the flowers.

• Among shrubs, alpine grasslands; 2300–3400 m. Gansu, Sichuan, Xizang, Yunnan.

15b. *Bupleurum petiolulatum* var. *tenerum* R. H. Shan & Yin Li, Acta Phytotax. Sin. 12: 277. 1974.

细茎有柄柴胡 xi jing you bing chai hu

Stems few, slender, branching from base; bracteoles broadly ovate, $4\text{--}6 \times 1.6\text{--}3.2$ mm, base broad-cuneate, 5-nerved, usually exceeding the flowers.

• Mixed forests on mountain slopes; 2800–3900 m. Qinghai, Sichuan, Xizang.

16. *Bupleurum longicaule* de Candolle, Prodr. 4: 131. 1830.

长茎柴胡 chang jing chai hu

Plants 50–70 cm, perennial. Rhizome horizontal, little-branched, gray-brown. Stems solitary or several, erect, little-branched above, branches short or elongate, base without fibrous remnant sheaths. Basal leaves narrow-linear, lanceolate or oblanceolate, $10\text{--}12 \times 0.5\text{--}2$ cm, 5–11-nerved, base tapering into a conspicuous petiole, apex acute or acuminate. Cauline leaves sessile; blade linear-lanceolate to ovate-lanceolate, smaller, base broad-cordate and clasping, apex long-acuminate or acute. Umbels 3–8 cm across; bracts 0 or 2–3, lanceolate or ovate, $4\text{--}15 \times 3\text{--}8$ mm, unequal, 9–15-nerved; rays 3–12, 2.5–6 cm, unequal, somewhat stout, ribbed; bracteoles (5–)10–12, narrow-lanceolate or suborbicular, ca. 7×5 mm, longer than the flowers; umbellules ca. 8 mm across, ca. 20-flowered; pedicels 1.5–2 mm. Petals dark purple or yellow. Stylopodium low-conic, discoid, dark purple. Fruit ovoid or ellipsoid-ovoid, gray-brown, $3.5\text{--}5 \times 1\text{--}1.5$ mm; ribs prominent, acute; vittae 3 in each furrow, 4 on commissure. Fl. and fr. Jul–Sep.

Forests, grassy places on mountain slopes; 1000–4000 m. S Gansu, W Hubei, Ningxia, Qinghai, Shaanxi, Shanxi, NE and W Sichuan, E Xizang, NW Yunnan [India, Kashmir, Nepal, Pakistan].

All four varieties have reputed medicinal value. See the taxonomic note under *Bupleurum candollei*.

1a. Stem solitary; petals usually dark purple 16a. var. *longicaule*

1b. Stems several, rarely solitary; petals yellow.

2a. Bracteoles 5–7; rays 4–6 16d. var. *giraldii*

2b. Bracteoles 5; rays 7–12.

3a. Middle leaves lanceolate-ovate, base cordate 16b. var. *amplexicaule*

3b. Middle leaves lanceolate, base narrow, not cordate 16c. var. *franchetii*

16a. *Bupleurum longicaule* var. *longicaule*

长茎柴胡(原变种) chang jing chai hu (yuan bian zhong)

Bupleurum longicaule var. *strictum* C. B. Clarke; *B. rupestre* Edgeworth.

Stem solitary. Lower leaves lanceolate, $2\text{--}12 \times 0.5\text{--}1.5$ cm, sessile, base broad, clasping. Petals dark purple.

Grassy places on mountain slopes; 2500–3600 m. W Hubei, SE Qinghai, SW Sichuan, E Xizang, NW Yunnan [India, Kashmir, Nepal, Pakistan].

16b. *Bupleurum longicaule* var. *amplexicaule* C. Y. Wu ex R. H. Shan & Yin Li, Acta Phytotax. Sin. 12: 277. 1974.

抱茎柴胡 bao jing chai hu

Stems several, unbranched or few-branched above. Lower leaves linear, $9\text{--}18 \times 0.6\text{--}1.2$ cm, sessile, clasping. Middle leaves long-lanceolate, sessile, base rounded or cordate. Upper leaves narrow-ovate, base deep cordate. Rays (4–)7–9. Petals yellow.

• Forests on mountain slopes; 2500–2700 m. NW Yunnan.

16c. *Bupleurum longicaule* var. *franchetii* H. de Boissieu, Bull. Soc. Bot. France 53: 425. 1906.

空心柴胡 kong xin chai hu

Bupleurum candollei Franchet (1894), not Wallich ex de Candolle (1830).

Stems usually several, rarely solitary, younger parts often purplish-tinged. Basal leaves narrowly oblong-lanceolate, $10\text{--}19 \times 0.7\text{--}1.5$ cm. Middle leaves lanceolate, base slightly narrow and clasping. Bracts 1–2, deciduous, umbellules 8–15-flowered. Petals yellow.

• Forests, grassy places on mountain slopes; 1000–4000 m. S Gansu, W Hubei, Ningxia, S Shaanxi, NE and W Sichuan, NW Yunnan.

16d. *Bupleurum longicaule* var. *giraldii* H. Wolff in Engler, Pflanzenr. 43(IV. 228): 123. 1910.

秦岭柴胡 qin ling chai hu

Bupleurum giraldii (H. Wolff) Koso-Poljansky.

Stems tufted, sometimes solitary, few-branched. Basal leaves oblanceolate, $6\text{--}10 \times 1\text{--}1.7$ cm, 5–7-nerved, base tapering into petioles. Cauline leaves sessile, ovate-orbicular to broad-ovate, base subcordate, clasping. Rays 4–6; bracts 2–3,

bracteoles 5–7, broad-ovate, slightly exceeding the flowers. Petals yellow.

• Grassy places on mountain slopes; 2600–3300 m. Ningxia, Qinghai, Shaanxi, Shanxi.

17. *Bupleurum kweichowense* R. H. Shan, Sinensis 11: 172. 1940.

贵州柴胡 *gui zhou chai hu*

Plants 20–40 cm, perennial. Rhizome slender. Stem solitary, erect, tinged purple, especially upper parts and around nodes, base without fibrous remnant sheaths. Basal leaves numerous; blades narrowly spatulate to lanceolate, base tapering into a long petiole. Middle leaves usually in two rows, sessile; blades obovate-lanceolate, 7–12 × 1–1.5 cm, nerves 7–9, base narrow and clasping, apex obtuse-acute, often tinged purple. Upper leaves long-elliptic, 1–4 × 0.5–1 cm. Umbels 2.5–4 cm across, terminal and axillary, base of terminal umbel often bearing a lateral umbel which overtops the terminal; bracts 1, broad-obovate, 5–12 × 2–6 mm, deciduous; rays 5–6, 1.5–2.5 cm, unequal; bracteoles 5, broad-obovate, 4–5 × 2.2–3 mm, apex rounded, mucronate, tinged purple, equaling or slightly shorter than umbellules in fruit; umbellules ca. 8 mm across, 10–14-flowered; pedicels ca. 2 mm. Fruit ovoid or ellipsoid, brown, 3.5–4.5 × 2.5–2.7 mm; ribs thick, pale brown; vittae (3–)4–5 in each furrow, 4–6 on commissure. Fl. and fr. Aug–Oct.

• Gravelly slopes in sunny places; ca. 2100 m. NE Guizhou (Fanjing Shan).

This poorly known taxon is recorded only from a few collections.

18. *Bupleurum bicaule* Helm, Mém. Soc. Imp. Naturalistes Moscou 2: 108. 1809.

锥叶柴胡 *zhu ye chai hu*

Plants 15–30 cm, perennial. Rootstock, branched, thickened and woody at apex. Stems many, slender, few-branched above, base densely clothed with remnant fibrous sheaths. Leaves all linear, 7–16 × 0.1–0.3 cm, 3–5-nerved, base slightly tapering into a short petiole, apex mucronate. Cauline leaves sessile, slightly clasping. Umbels 1–2 cm across; bracts 1–3, or absent, 1–3 × ca. 1 mm; rays 4–7, 4–15 mm; bracteoles 5, lanceolate, 1–3 × 0.5–0.7 mm, shorter than flowers; umbellules 3–6 mm across, 7–13-flowered; pedicels 0.7–1.3 mm. Petals bright yellow, tip shallowly 2-lobed. Stylopodium low-conic, dark yellow. Fruit broadly ovoid, bluish-brown, 2.5–3 × ca. 2 mm; ribs prominent; vittae 3 in each furrow, 2–4 on commissure, very small, obscure when mature. Fl. and fr. Jul–Sep.

Forest margins, gravelly or sunny mountain slopes, dry stony grasslands; 600–1600 m. Hebei, N Heilongjiang, Nei Mongol, N Shaanxi, N Shanxi [Afghanistan, Japan, Korea, Mongolia, Russia].

The roots of at least var. *bicaule* are used in traditional Chinese medicine.

- 1a. Stems several to many, leaves linear, 0.1–0.3 cm broad 18a. var. *bicaule*
- 1b. Stems very numerous, usually ca. 20, caespitose, leaves linear-lanceolate,

ca. 4 mm broad 18b. var. *latifolium*

18a. *Bupleurum bicaule* var. *bicaule*

锥叶柴胡(原变种) *zhu ye chai hu* (*yuan bian zhong*)

Bupleurum falcatum Linnaeus var. *bicaule* (Helm) H. Wolff.

Stems several to many. Leaves all linear, 0.1–0.3 cm broad.

Sunny mountain slopes, dry stony grasslands; 600–1600 m. Hebei, Nei Mongol, N Shaanxi, N Shanxi [Afghanistan, Japan, Korea, Mongolia, Russia].

18b. *Bupleurum bicaule* var. *latifolium* Y. C. Chu, Fl. Pl. Herb. Chin. Bor.-Orient. 6: 293. 1977.

呼玛柴胡 *hu ma chai hu*

Bupleurum bicaule f. *latifolium* (Y. C. Chu) Y. C. Chu.

Stems very numerous, usually ca. 20 cm, caespitose. Leaves linear-lanceolate, ca. 4 mm broad.

• Forest margins, gravelly mountain slopes; ca. 600 m. N Heilongjiang (Da Hinggan Ling).

This poorly known taxon is recorded only from a few collections.

19. *Bupleurum pusillum* Krylov, Trudy Imp. S.-Peterburgsk. Bot. Sada 21: 18. 1903.

短茎柴胡 *duan jing chai hu*

Plants 2–10 cm, bluish gray-green, perennial. Root thickened at apex into woody caudex. Stem decumbent or ascending, branches flexuose, base densely clothed with remnant sheaths. Basal leaves numerous; petiole tinged purple; blade linear or narrowly oblanceolate, 2–5 × 0.1–0.4 cm, 3–5-nerved, thickly papery, apex acute. Cauline leaves sessile, clasping; blades shorter, slightly broader. Umbels 1–2.5 cm across; bracts 1–4, ovate-lanceolate, 4–9 × 1–2.5 mm, unequal; rays 3–6, 1.5–4 mm, unequal; bracteoles 5(–7), ovate, 4.5–5 × 1.2–2 mm, equaling or slightly exceeding umbellules, 3-nerved, apex apiculate, abaxially glaucous; umbellules 4–6 mm across, 10–15-flowered; pedicels ca. 1 mm. Petals yellow. Stylopodium low-conic, dark yellow. Fruit ovoid-ellipsoid, brown, 3.5–4 × 1.8–2.5 mm; ribs prominent; vittae 3(–4) in each furrow, 4 on commissure. Fl. Jun–Jul, fr. Aug–Sep.

Scrub or grassland on sunny mountain slopes; 2300–3500 m. Nei Mongol, Ningxia, Qinghai, Xinjiang [Mongolia, Russia].

20. *Bupleurum alatum* R. H. Shan & M. L. Sheh, Fl. Reipubl. Popularis Sin. 55(1): 300. 1979.

翅果柴胡 *chi guo chai hu*

Plants ca. 20 cm, perennial. Root slender, pale brown, little-branched. Stems several, slender, erect, base without fibrous remnant sheath. Lower leaves sessile, clasping, blade oblong-lanceolate, ca. 20 × 2.5 mm, nerves 11–13, apex acuminate. Middle leaves elliptic-lanceolate, apex obtuse-acute. Umbels 2–5 cm across, lax; bracts 2–3, elliptic, 7–10 × 1.8–3 mm, 5–7-nerved, apex acute or acuminate; rays of terminal umbel 3, 2–5 cm, unequal, rays of lateral and lower umbels 1–2, ca. 2 cm; bracteoles 3–5, linear-lanceolate, 4–5 × 1.2–1.5 mm, shorter than umbellules in fruit; umbellules 3–8 mm across, (4–)8–10–

flowered; pedicels 1–2.5 mm. Petals yellow. Stylopodium low-conic, dark yellow. Fruit oblong, ca. 5×2 mm; ribs all broadly winged, equal; vittae 1 in each furrow, 2 on commissure. Fl. and fr. Aug–Sep.

- Mountain slopes; ca. 3900 m. S Xizang (Nyalam).

This rather poorly known species is recorded only from a few localities. It is similar to *Bupleurum stewartianum* Nasir, from Pakistan, but differs in having fewer and longer rays, and fruit with broader wings.

21. *Bupleurum condensatum* R. H. Shan & Yin Li, Acta Phytotax. Sin. 12: 279. 1974.

簇生柴胡 cu sheng chai hu

Plants 8–20 cm, perennial, tinged pink throughout. Taproot stout, fusiform, apex woody, forming a thick caudex. Stems very numerous, slender, base without fibrous remnant sheaths. Basal leaves numerous, rosette-caespitose, sessile and clasping; blade narrowly lanceolate, $2–5.5 \times 0.2–0.5$ cm, 5–11-nerved, acuminate. Cauline leaves reduced upwards. Terminal umbels 4–6 cm across, lax; bracts 5–6, linear, $1.2–3 \times 0.5–2$ mm; rays 4–7, 3–6 cm, very unequal, slender; bracteoles (5–)6–8, lanceolate or ovate-elliptic, $3–5 \times 1–1.7$ mm, apiculate; umbellules 4–7 mm across, 14–20-flowered; pedicels 1.2–1.8 mm. Petals yellow, yellow-green, or tinged purple, obovate-elliptic, midvein dark. Stylopodium low-conic, yellow or purplish. Fruit ovoid-oblong, reddish-brown, $1.8–3.2 \times 1.8–2$ mm; ribs slightly prominent; vittae 1 in each furrow, 2 on commissure. Fl. and fr. Jul–Sep.

- Sunny mountain slopes, open gravels, sandy soils, riversides; 3000–3700 m. E Qinghai (Gonghe, Xinghai).

22. *Bupleurum exaltatum* Marschall von Bieberstein, Tabl. Prov. Mer. Casp. 113. 1798.

新疆柴胡 xin jiang chai hu

Bupleurum falcatum Linnaeus var. *euxaltatum* H. Wolff; *B. falcatum* var. *linearifolium* H. Wolff, p.p.

Plants 40–90 cm, perennial. Taproot stout, woody, thickened into a several-branched caudex. Stems numerous, branching above, base without fibrous remnant sheaths. Basal leaves many, caespitose, sessile; blade linear to linear-lanceolate, $8–12 \times 0.2–0.4$ cm, 3-nerved, base slightly narrow, clasping. Middle leaves linear-subulate. Upper leaves subulate, ca. 5×1 mm, 1–3-nerved. Inflorescence copiously branched, umbels 1.5–3 cm across; bracts 2–3, linear or lanceolate, 0.5–2 mm; rays 3–5 (–7), 5–22 mm, unequal; bracteoles 5, elliptic or lanceolate, $1–1.5 \times$ ca. 0.5 mm, thick, shorter than or equaling pedicels; umbellules 4–7 mm across, 5–10-flowered; pedicels 2–3 mm, exceeding the bracteoles in fruit. Petals yellow. Stylopodium low-conic, dark yellow. Fruit oblong, $3.5–4.5 \times 1.5–2$ mm; ribs narrowly winged; vittae large, 1 in each furrow, 2 on commissure. Fl. Jun–Jul, fr. Aug–Sep.

Mountain slopes; ca. 1500 m. Xinjiang (Urumqi) [Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan].

This species has reputed medicinal value (in Xinjiang).

23. *Bupleurum gracillimum* Klotzsch in Klotzsch & Garcke, Bot. Ergebni. Reise Waldemar, 148. 1862.

纤细柴胡 xian xi chai hu

Bupleurum falcatum Linnaeus var. *gracillimum* (Klotzsch) H. Wolff.

Plants 6–30(–40) cm, perennial. Taproot slender. Stems numerous, caespitose, decumbent, slender, branching at base, yellow or tinged pink, base without fibrous remnant sheaths. Leaves sessile; blades linear, $1–6 \times 0.2–0.6$ cm, 7–11-nerved, gray-green, base slightly dilated, almost clasping, apex acuminate. Middle leaves shorter and broader, lanceolate, thinly 15–19-nerved. Umbels 1–3 cm across; bracts 3–4, ovate or elliptic, $4–9 \times 2–4$ mm, unequal; rays 3, 0.5–2 cm, rather thick, unequal; bracteoles (1–)3–5, ovate or lanceolate, $1.5–5 \times 0.7–2.5$ mm, very unequal; umbellules ca. 5 mm across, 3–6(–9)-flowered, only 2–3 flowers develop into fruit; pedicels ca. 1 mm. Petals yellow or dark purple. Stylopodium low-conic, dark yellow or purplish. Fruit ellipsoid or long-ovoid, brown, $3.5–4.5 \times 2–2.3$ mm, apex slightly narrow; ribs pale yellow, rounded; vittae 4–5 in each furrow, 4 on commissure. Fl. and Fr. Jul–Sep.

Alpine meadows, streamsides; 3200–4500 m. Sichuan [Bhutan, Kashmir, N Myanmar, Nepal, Pakistan].

24. *Bupleurum komarovianum* O. A. Linczevski in Schischkin & Bobrov, Fl. URSS 16: 319. 1950.

长白柴胡 chang bai chai hu

Bupleurum chinense de Candolle var. *komarovianum* (O. A. Linczevski) S. L. Liou & Y. Huei Huang; *B. falcatum* Linnaeus subsp. *komarovianum* (O. A. Linczevski) Vorskilov.

Plants 70–100 cm, perennial. Rootstock short, woody, tuberous, dark brown, with many fibrous fascicled roots. Stems several, erect, branching from base, upper parts flexuous and branched, base without fibrous remnant sheaths. Basal and lower leaves lanceolate or narrowly elliptic, $15–20 \times 1.6–2.5$ cm, nerves 7–9, base tapering into flat, broad petioles, clasping, prominent abaxially, apex acuminate, rigidly apiculate. Middle leaves oblong-elliptic, $8–14 \times 1.5–3.5$ cm. Apical leaves small, elliptic. Umbels numerous, terminal umbels 1.5–5 cm across; bracts 1–3, or absent, linear, 1–7 mm; rays 4–13, 0.6–4 cm, unequal; bracteoles 5, linear, $2–3(–5) \times 0.5–1$ mm, slightly shorter than or equaling umbellules; umbellules 5–10 mm across, 6–14-flowered; pedicels ca. 2 mm. Petals bright yellow. Stylopodium low-conic, pale yellow. Fruit ellipsoid, brown, $2.8–3.2 \times 2–2.2$ mm, apex rounded; vittae (4–)5 in each furrow, 6–8 on commissure, distinct when young, obscure when mature. Fl. and fr. Jul–Sep. $2n = 8^*$.

Forest margins, among shrubs, mountain slopes, stony sandy areas; 200–300 m. Heilongjiang, Jilin [Japan, Korea, SE Russia].

This species has reputed medicinal value.

25. *Bupleurum krylovianum* Schischkin ex Krylov, Fl. Sibir. Occid. 8: 2010. 1935.

阿尔泰柴胡 a er tai chai hu

Plants 40–80 cm, perennial. Rootstock woody, tawny, thickened and branched at apex forming caudex. Stems numerous, branched above, base without fibrous remnant sheaths.

Basal leaves lanceolate, 10–20 × 1–2 cm including petioles, 5–7-nerved, thinly coriaceous, adaxially yellow-green, abaxially greenish-white, base tapering into long petioles, apex acute to rounded, rigidly apiculate. Middle leaves short-petiolate or sessile; blade lanceolate, sometimes slightly falcate, 4–17 × 0.7–1.5 cm. Apical leaves small, elliptic, rigid. Umbels 3–7 cm across; bracts 4–6(–8), 4–11 × 0.5–3 mm, unequal; rays of terminal umbels 10–20, lateral umbels 6–8-rayed, 5–35 mm, unequal; bracteoles 5, ovate-lanceolate, 4–7 × 1–2 mm, equaling or slightly shorter than umbellules, yellowish-green, rigid, often reflexed; umbellules 3–5 mm across, 18–22-flowered; pedicels 1–2.5 mm. Petals yellow, tips 2-lobed. Stylopodium low-conic, dark yellow. Fruit terete-oblong, dark brown, 3–4 × 1.5–2 mm; ribs prominent; vittae 1(rarely 2–3) in each furrow, 2 on commissure. Fl. and fr. Jul–Sep.

Under shrubs, dry stony mountain slopes; 1200–2000 m. Xinjiang [Kazakhstan, Kyrgyzstan, Russia].

This species has reputed medicinal value.

26. *Bupleurum thianschanicum* Freyn, Mém. Herb. Boissier 13: 23. 1900.

天山柴胡 tian shan chai hu

Plants 50–80 cm, perennial. Root fibrous or somewhat fleshy. Stems several, sometimes tinged purple, short-branched above, base without remnant sheaths. Basal leaves linear to narrowly lanceolate, 9–18 × 0.2–0.4 cm, 5–7-nerved, thick-papery, margin narrowly membranous, base tapering into petiole and clasping, apex acuminate. Cauline leaves linear-lanceolate, 6–10 × 0.4–0.6 cm, almost clasping. Apical leaves small. Umbels 2–4 cm across; bracts 2–3, lanceolate, 5–15 × 3–4 mm, unequal, deciduous; rays (3)–5–7(–15), 2–4 cm, unequal; bracteoles 7–9, ovate-lanceolate, 4–7 × 1.5–2 mm, equal, slightly exceeding umbellules in flower, equaling or slightly shorter than umbellules in fruit; umbellules 8–13 mm across, 15–30-flowered, capitate in fruit; pedicels 1.5–2.5 mm. Petals yellow or brownish-yellow. Stylopodium low-conic, brownish-yellow. Fruit oblong, dark brown, 3–4 × ca. 2 mm; ribs pale brown, prominent; vittae 1 in each furrow, 2 on commissure. Fl. and fr. Jul–Sep.

Grassy slopes, stony places; 1700–2000 m. W Xinjiang (Tian Shan) [Kazakhstan, Kyrgyzstan].

This species has reputed medicinal value (in Xinjiang).

27. *Bupleurum scorzonerifolium* Willdenow, Enum. Pl. Suppl. 30. 1814 [“*scorzonerifolium*”].

红柴胡 hong chai hu

Bupleurum falcatum Linnaeus subsp. *scorzonerifolium* (Willdenow) Koso-Poljansky; *B. falcatum* var. *scorzonerifolium* (Willdenow) Ledebour; *B. sinensium* Gandoer.

Plants 30–60 cm, perennial. Taproot stout, dark reddish-brown, branched. Stems 1–3, flexuose, greatly dichotomously branched, base clothed with fibrous remnant sheaths. Basal leaves linear, 6–16 × 0.2–0.7 cm, thick-papery, rigid, nerves 3–5, prominent abaxially, margin white cartilaginous, base slightly narrowed and clasping. Upper leaves small. Umbels numerous, 1.2–4 cm across; bracts 1–3, subulate, 0.5–4 × 0.2–0.6

mm, unequal, deciduous; rays (3)–4–6(–8), 1–2 cm, very slender, spreading; bracteoles 5, lanceolate, 2.5–4 × 0.5–1 mm, equaling or slightly exceeding umbellules; umbellules 2–5 mm across, (6)–9–11(–15)-flowered; pedicels 0.2–1 mm. Petals yellow. Stylopodium low-conic, dark yellow. Fruit ellipsoid, dark brown, 2.5–3 × 1.5–2 mm; ribs pale, prominent; vittae 5–6 in each furrow, 4–6 on commissure. Fl. and fr. Jul–Sep. n = 6*.

Shrub forest margins, sunny mountain slopes, dry grasslands; 100–2300 m. Anhui, Gansu, Guangxi, Hebei, Heilongjiang, Jiangsu, Jilin, Liaoning, Nei Mongol, Shaanxi, Shandong, Shanxi [Japan, Korea, Mongolia, Russia].

This *Bupleurum* is one of two primary species the roots of which are used for the major traditional Chinese medicine “chai hu” (see also *B. chinense*).

Two forms are endemic in China: f. *longiradiatum* R. H. Shan & Yin Li (Acta Phytotax. Sin. 12: 282. 1974), distinguished by having rays longer, 11–35 mm, and bracts larger, 4–7 mm (Hebei, Liaoning, Qinghai); and f. *pauciflorum* R. H. Shan & Yin Li (loc. cit.), distinguished by having rays usually fewer, 2–3(–5), and shorter, 3–12 mm, and umbellules only 4–6(–8)-flowered (Jiangsu, n = 6*).

28. *Bupleurum angustissimum* (Franchet) Kitagawa, J. Jap. Bot. 21: 97. 1947.

线叶柴胡 xian ye chai hu

Bupleurum falcatum Linnaeus var. *angustissimum* Franchet, Pl. David. 1: 138. 1883; *B. falcatum* f. *angustissimum* (Franchet) C. Pei & R. H. Shan; *B. falcatum* subf. *angustissimum* (Franchet) H. Wolff; *B. scorzonerifolium* Willdenow subsp. *angustissimum* (Franchet) Kitagawa; *B. scorzonerifolium* var. *angustissimum* (Franchet) Y. Huei Huang.

Plants 15–80 cm, perennial. Taproot long, slender, woody, reddish-brown. Stem slender, dichotomous-branched throughout, base clothed with fibrous remnant sheaths. Lower leaves sessile, linear, 6–18 × 0.8–1 cm, thick, rigid, 3–5-nerved, margins narrowly reflexed, apex and base tapering. Apical leaves short. Umbels numerous, 1.5–2 cm across, bracts 1 or absent, subulate, 0.5–2 × 0.2–0.5 mm, unequal; rays 5–7, 1.5–3 cm, unequal; bracteoles 5, linear-lanceolate, 1.2–2.5 × 0.5–0.7 mm, longer than pedicels in fruit; umbellules ca. 5 mm across, 12–16-flowered; pedicels ca. 0.8 mm. Petals yellow, midvein dark. Stylopodium low-conic, dark yellow. Fruit ellipsoid, ca. 2 × 1 mm; ribs prominent; vittae not recorded. Fl. Jun–Jul, fr. Aug–Sep.

Dry grasslands; 1600–2000 m. Gansu, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi [Mongolia].

This species is widely used as a substitute for the Chinese medicine “chai hu.”

29. *Bupleurum yinchowense* R. H. Shan & Yin Li, Acta Phytotax. Sin. 12: 283. 1974.

银州柴胡 yin zhou chai hu

Plants 25–50 cm, perennial. Taproot long, stout, woody, pale reddish-brown, digitate-branched, thickened at apex. Stems numerous, slender, tinged purple at base, branching above, base without fibrous remnant sheaths. Basal leaves oblanceolate, 5–8 × 0.2–0.5 cm, 3–5-nerved, deciduous, base tapering into long petioles, apex acute, apiculate. Middle leaves short-petiolate.

Umbels numerous, 10–18 mm across; bracts 1 or 2, or absent, subulate, ca. 2 mm; rays (3–)4–6(–9), slender, 4–11 mm; bracteoles 5, linear, 1–2 × ca. 0.2 mm, shorter than pedicels in fruit; umbellules 2.5–4 mm across, 6–9-flowered; pedicels ca. 2 mm. Petals yellow, midvein brown. Stylopodium low-conic, pale yellow. Fruit broadly ovoid, dark brown, 2.8–3.2 × 2–2.2 mm; ribs prominent; vittae 3 in each furrow, 4 on commissure. Fl. Aug, fr. Sep.

- Dry mountain slopes; 500–1900 m. Gansu, Nei Mongol, Ningxia, Shaanxi.

This species is widely used as a substitute for the Chinese medicine “chai hu.” It resembles both *Bupleurum angustissimum* and *B. bicaulis* but differs in the following characters: root horizontal, smooth; leaves oblanceolate, thinly papery; caudine leaves tapering at base, petioles conspicuous; bracteoles shorter than pedicels in fruit.

30. *Bupleurum malconense* R. H. Shan & Yin Li, Acta Phytotax. Sin. 12: 284. 1974.

马尔康柴胡 ma er kang chai hu

Bupleurum sichuanense S. L. Pan & P. S. Hsu.

Plants 30–65 cm, perennial. Taproot stout, woody, purplish-brown, digitate-branched. Stems numerous, usually erect, base purplish, without fibrous remnant sheaths. Basal leaves numerous, linear, 10–15 × 0.25–0.5 cm, thick and rigid, 5–7-nerved, base clasping. Middle and upper leaves linear-lanceolate, 3–5-nerved. Umbels numerous, small, 1–2 cm across; peduncles usually purplish-tinged; bracts 2–3, linear or squamose, 1–5 × 0.5–1 mm, unequal; rays 3–5, 1–2 cm; bracteoles 5, lanceolate, 2–2.5 × 0.6–0.8 mm, slightly shorter than or equaling umbellules; umbellules very small, 4–6 mm across, 7–11-flowered; pedicels 0.5–1 mm. Petals yellow. Stylopodium low-conic, yellow. Fruit ellipsoid, brown, 2.5–3 × 1.5–1.8 mm; vittae 3 in each furrow, 4 on commissure. Fl. Jul–Sep, fr. Sep–Oct. n = 6*.

- Shrub forest margins, mountain slopes, riversides, ruderal areas, 2000–3700 m. S Gansu, SE Qinghai, W Sichuan, SE Xizang.

This species is used as a regional substitute for the Chinese medicine “chai hu.”

31. *Bupleurum microcephalum* Diels, Bot. Jahrb. Syst. 29: 494. 1900.

马尾柴胡 ma wei chai hu

Plants 50–100 cm, biennial. Taproot yellowish-brown, elongate-terete, unbranched. Stem solitary, several-branched above, slender, base purplish-tinged, without fibrous remnant sheaths. Basal leaves numerous, narrowly linear, 16–30 × 0.25–1 cm, thin-papery, abaxially slightly glaucous, 5-nerved, base tapering into petiole, margin white scarious. Cauline leaves shorter, sessile, somewhat clasping. Umbels numerous, 1.2–3 cm across; peduncles and rays very slender; bracts 3–5, very small, 0.2–2 × 0.1–0.4 mm, lanceolate or squamose; rays (3–)4–6(–9), 7–50 mm, unequal; bracteoles 5, elliptic or spatulate, 1.5–2.5 × 0.5–1 mm, mostly shorter than umbellules in fruit; umbellules 2.5–5 mm across, 6–12-flowered; pedicels 1–1.5 mm. Petals yellow, midvein dark. Stylopodium low-conic, yellow. Fruit ovoid, brown, 2.6–3 × 2–2.2 mm, glaucous, base rounded; ribs inconspicuous; mericarps pentagonal in cross section; vittae 3 in each furrow, 4 on commissure. Fl. Jul–Aug.

fr. Aug–Oct.

- Among shrubs, open slopes, roadsides; 1400–3200 m. S Gansu, W Sichuan, SE Xizang.

This species is used as a regional substitute for the Chinese Medicine “chai hu.” It is similar to *Bupleurum malconense* but differs in the unbranched rootstock and the narrow, longer leaf blades.

32. *Bupleurum dielsianum* H. Wolff in Engler, Pflanzenr. 43 (IV. 228): 147. 1910.

太白柴胡 tai bai chai hu

Plant 50–75 cm, perennial. Taproot long-terete, unbranched. Stem solitary, erect, slender, branched above, base tinged purple, without fibrous remnant sheaths. Basal leaves linear, 5–7 × 0.3–0.5 cm including petioles, 5–7-nerved, thinly papery, abaxially greenish-white. Cauline leaves similar to basal, shortly petiolate. Apical leaves small, sessile. Umbels 3–4 cm across; bracts 1–2, lanceolate, 1–4 × 0.5–1.5 mm, unequal; rays (4–)6–10, 1–3 cm, unequal, very slender, spreading; bracteoles 5–6, elliptic, 1–2 × 0.5–1 mm, membranous; umbellules 4–5 mm across, 10–14-flowered; pedicels very slender, 5–7 mm in flower, up to 10 mm in fruit, greatly exceeding the bracteoles. Petals yellow. Stylopodium low-conic, discoid, yellow. Fruit ellipsoid, brown, ca. 4 × 2 mm, slightly glaucous; ribs inconspicuous; mericarps near round in cross section; vittae 3 in each furrow, 4 on commissure. Fl. and fr. Aug–Sep.

- Mountain slopes; ca. 2000 m. SW Shaanxi (Taibai Shan).

This species is used as a regional substitute for the Chinese medicine “chai hu.” It is a rather poorly known taxon, recorded only from a few collections.

33. *Bupleurum wenchuanense* R. H. Shan & Yin Li, Acta Phytotax. Sin. 12: 288. 1974.

汶川柴胡 wen chuan chai hu

Plant 40–90 cm, perennial. Taproot long, thickened, yellowish-brown, fusiform, little-branched. Stem solitary, much-branched throughout, branches long, slender, remote, base clothed with fibrous remnant sheaths. Basal leaves numerous, rosette-caespitose; blades oblanceolate, 5–12 × 0.2–0.4 cm, 3–5-nerved, tapering into petiole, base dilated, clasping. Lower leaves linear. Middle and upper leaves 1–8, subulate to squamose, 0.5–1 mm. Umbels numerous, remote, very small, ca. 4 mm across; bracts 2–3, subulate or squamose, 0.3–1.5 × 0.1–0.3 mm, unequal, rigid; rays (1–)2–3, 2–35 mm, filiform, very unequal; bracteoles 5–6(–7), obovate or elliptic, 0.6–1 × 0.3–0.5 mm, thick, shorter than flowers; umbellules 2–3 mm across, 1–4-flowered; pedicels 3–6 mm in flower, elongating in fruit. Petals yellow, midvein dark yellow. Stylopodium low-conic, yellow. Fruit ovoid, brown, ca. 2 × 1.5 mm; ribs prominent; vittae 2–3 in each furrow, 3–4 on commissure. Fl. and fr. Aug–Oct.

- Mountain slopes, grasslands; 1400–1800 m. NW Sichuan (upward from Min Jiang drainage basin).

This species is used as a regional substitute for the Chinese medicine “chai hu.”

34. *Bupleurum hamiltonii* N. P. Balakrishnan, J. Bombay Nat. Hist. Soc. 63: 328. 1967.

小柴胡 xiao chai hu

Herbs 10–100 cm, annual, or short-lived perennial. Root grayish-yellow, thin, woody, branched. Stem tinged purple, much branched throughout, branches slender, ascending, base without fibrous remnant sheaths. Leaves sessile, oblong-lanceolate or linear, 3–8 × 0.4–0.8 cm, 7–9-nerved, base slightly narrow, sometimes punctate with oil glands along veins and margin. Inflorescence profusely branched, umbels numerous, small, 1–2 cm across, lax; bracts 2–4, lanceolate or elliptic, 3–6 × 1–2 mm, unequal, 5–7-nerved; rays 2–5(–7), 0.5–2 cm, unequal, very slender; bracteoles 5, lanceolate or elliptic, 3–4 × 1–1.5 mm, equal, 3-nerved, apex apiculate, equaling or slightly longer than flowers; umbellules 1–1.3 mm across, 5–11-flowered; pedicels 0.5–1.5 mm. Petals yellow-green, suborbicular, midvein dark. Stylopodium low-conic, dark yellow. Fruit broad-ovoid or ellipsoid, brown, 2–2.5 × ca. 1.5 mm; ribs pale yellow, prominent; vittae 1 in each furrow, 2 on commissure. Fl. and fr. Sep–Oct.

Forest margins, mountain slopes, grasslands, sunny slopes, shady wet places, dry stony areas; 600–2900 m. Hubei, Guangxi, Guizhou, Sichuan, S Xizang, NW Yunnan [Bhutan, N India, Kashmir, Malaysia, Myanmar, Nepal, Pakistan, Sikkim, Thailand, Vietnam].

All three varieties have reputed medicinal value.

- 1a. Plants annual, 10–25 cm, usually reddish throughout 34b. var. *humile*
- 1b. Plants biennial or perennial, usually 50–100 cm high, green.
 - 2a. Plants ca. 100 cm; bracts 2–3, equal; bracteoles usually 3, exceeding the flowers 34c. var. *poucefulcrans*
 - 2b. Plants 50–80 cm; bracts usually 4; bracteoles 5, equaling or slightly exceeding the flowers 34a. var. *hamiltonii*

34a. *Bupleurum hamiltonii* var. *hamiltonii*

小柴胡(原变种) xiao chai hu (yuan bian zhong)

Bupleurum tenuie Buchanan-Hamilton ex D. Don, Prodr. Fl. Nepal. 182. 1825, not Salisbury (1796).

Plants 50–80 cm, biennial; bracts usually 4; bracteoles 5, equaling or slightly exceeding the flowers.

Grasslands, sunny slopes, dry stony areas; 600–2900 m. Hubei, Guangxi, Guizhou, Sichuan, S Xizang, NW Yunnan [Bhutan, N India, Kashmir, Malaysia, Myanmar, Nepal, Pakistan, Sikkim, Thailand, Vietnam].

34b. *Bupleurum hamiltonii* var. *humile* (Franchet) R. H. Shan & M. L. Sheh, Vasc. Pl. Hengduan Mts. 1: 1306. 1993.

矮小柴胡 ai xiao chai hu

Bupleurum tenuie Buchanan-Hamilton ex D. Don var. *humile* Franchet, Bull. Soc. Philom. Paris, sér. 8, 6: 118. 1894.

Plants 10–25 cm, annual, usually reddish throughout. Branches numerous, short. Leaves small, thick-papery, 1–3 × 0.15–0.3 cm.

• Forest margins, mountain slopes, grasslands; 1100–2300 m. SW Sichuan, NW Yunnan [?Vietnam].

Records of this variety from Vietnam require confirmation.

34c. *Bupleurum hamiltonii* var. *poucefulcrans* C. Y. Wu ex R. H. Shan & Yin Li, Acta Phytotax. Sin. 12: 291. 1974.

三苞柴胡 san bao chai hu

Plants ca. 1 m, perennial. Stem stout. Leaves large, 6–8 × ca. 0.8 cm. Bracts 2–3; bracteoles usually 3, unequal, exceeding the flowers.

• Mountain slopes, shady wet places; ca. 1300 m. W Guizhou (Bijie).

35. *Bupleurum marginatum* Wallich ex de Candolle, Prodr. 4: 132. 1830.

竹叶柴胡 zhu ye chai hu

Plants 25–120 cm high, perennial. Taproot stout, woody, branched. Stem rigid, base woody, usually tinged purple, without fibrous remnant sheaths. Leaves long-lanceolate to linear, 10–16 × 0.6–1.4 cm, thinly coriaceous, nerves 9–13, base tapering and clasping, margin conspicuously white-cartilaginous, apex acute or acuminate, apiculate. Upper leaves small. Inflorescence much-branched, umbels numerous, 1.5–4 cm across, lateral umbels often overtopping the terminal; bracts 2–5, lanceolate or squamose, 1–4 × 0.2–1 mm, unequal; rays 3–4(–7), 1–3 cm, unequal; bracteoles 5, lanceolate, 1.5–2.5 × 0.5–1 mm, shorter than pedicels, apex apiculate, margin white-scarious; umbellules 4–9 mm across, (6–)8–10(–12)-flowered. Petals pale yellow. Stylopodium low-conic, dark yellow. Fruit oblong, brown, 3.5–4.5 × 1.8–2.2 mm; ribs prominent; vittae 3 in each furrow, 4 on commissure. Fl. Jun–Sep, fr. Sep–Nov. n = 12*.

Forests, alpine forests, mountain slopes, grasslands, river banks, roadsides; 700–4000 m. S Gansu, Guizhou, Hubei, Qinghai, Sichuan, Xizang, Yunnan [Bhutan, NE India, Kashmir, Myanmar, Nepal, Pakistan, Sikkim].

The root is widely used as a substitute for the Chinese medicine “chai hu.”

- 1a. Plants 50–120 cm; leaves broad, 10–16 × 0.6–1.4 cm, cartilaginous margin broad 35a. var. *marginatum*
- 1b. Plants 25–60 cm; leaves narrow, 3–10 × 0.3–0.6 cm, cartilaginous margin narrow 35b. var. *stenophyllum*

35a. *Bupleurum marginatum* var. *marginatum*

竹叶柴胡(原变种) zhu ye chai hu (yuan bian zhong)

Bupleurum falcatum Linnaeus subsp. *marginatum* (Wallich ex de Candolle) H. Wolff; *B. falcatum* var. *marginatum* (Wallich ex de Candolle) C. B. Clarke.

Plants 50–120 cm. Leaves broad, 10–16 × 0.6–1.4 cm, cartilaginous margin broad. Bracteoles shorter than pedicels. Fl. Jun–Sep, fr. Sep–Nov. n = 12*.

Forests, mountain slopes, grasslands; 700–3100 m. S Gansu, Guizhou, Hubei, Sichuan, E and S Xizang, Yunnan [Bhutan, NE India, Kashmir, Myanmar, Nepal, Pakistan, Sikkim].

35b. *Bupleurum marginatum* var. *stenophyllum* (H. Wolff) R. H. Shan & Yin Li, Acta Phytotax. Sin. 12: 292. 1974.

窄竹叶柴胡 zhai zhu ye chai hu

Bupleurum falcatum var. *stenophyllum* H. Wolff in Handel-Mazzetti, Symb. Sin. 7: 713. 1933; *B. falcatum* f. *stenophyllum* (H. Wolff) P. K. Mukherjee & B. D. Naithani; *B. marginatum* f. *stenophyllum* (H. Wolff) H. J. Chowdherry & Wadhwa.

Plants 25–60 cm. Leaves narrow, 3–10 × 0.3–0.6 cm, cartilaginous margin narrow. Bracteoles longer than the pedicels. Fl. Aug–Sep, fr. Sep–Oct. $n = 7^*$.

• Alpine forests, river banks, roadsides; 2300–4000 m. Qinghai, Sichuan, Xizang, Yunnan [?Bhutan, ?E Nepal].

The taxonomic status of var. *stenophyllum* requires further study. Some authors treat it as conspecific with *Bupleurum marginatum* without any infraspecific designation, but the difference in chromosome numbers favors treating it as a separate taxon, perhaps as a separate species.

36. *Bupleurum chaishoui* R. H. Shan & M. L. Sheh, Fl. Reipubl. Popularis Sin. 55(1): 299. 1979.

柴首 chai shou

Plants 0.5–1 m, perennial. Taproot gray-brown, stout, digitate-branched, capitate, woody when old forming a thickened caudex. Stems many, tufted, base without fibrous remnant sheaths. Basal leaves numerous, subsessile or shortly petiolate; blade oblanceolate, 4–6 × ca. 0.5 cm, dark gray-green, glabrous, nerves 7, margin white cartilaginous, apex obtuse. Cauline leaves lanceolate to elliptic, very unequal at the same node, 1.2–9 × 0.3–1.2 cm, 5-nerved, usually reflexed. Umbels numerous, small, terminal umbels 1–2(–4) cm across, lateral umbels less than 1 cm; bracts 2–4, linear, 0.6–7 × 0.3–1 mm, unequal; rays 3–5, 0.2–3 cm, slender when young, thickening with age; bracteoles 5, obovate or obovate-elliptic, 1.2–2.8 × 0.5–0.8 mm, equaling or exceeding the umbellules, nerves 3; umbellules ca. 5 mm across, 4–10-flowered; pedicels ca. 1 mm. Petals yellow. Stylopodium low-conic, yellow. Fruit ovoid-ellipsoid, brown, 3–3.5 × ca. 2 mm; ribs prominent; vittae 3 in each furrow, 4 on commissure. Fl. and fr. Aug–Oct.

• Among shrubs, sunny slopes; 2100–2700 m. NW Sichuan.

The multi-branched and thickened rootstock is used as the traditional Chinese medicine “chai shou” (柴首). The crude drug looks like a large head, hence the name “shou” (head).

37. *Bupleurum gracilipes* Diels, Bot. Jahrb. Syst. 29: 493. 1900.

细柄柴胡 xi bing chai hu

Plants 50–90 cm, perennial. Root long, thickened, branched. Stem usually solitary, erect, branched at base, base without fibrous remnant sheaths. Basal leaves oblanceolate, 8–18 × 1–1.4 cm including petioles, base narrow, clasping, apex acute. Cauline leaves subsessile, oblanceolate or narrowly long-elliptic, 5–9 × 0.7–1 cm, abaxially grayish-green, 5–7-nerved, apex obtuse, apiculate. Upper leaves sessile, small, lanceolate. Umbels 1.5–4 cm across; bracts 3–5, elliptic or ovate, 3–7 × 1–3 mm, unequal; rays 2–3(–5), thin and rigid, 1–3 cm, unequal; bracteoles 4–5, green, 3–4 × 2–2.5 mm, margin membranous, exceeding umbellules in flower, but shorter in fruit; umbellules ca. 5 mm across, 5–10-flowered; pedicels ca. 1 mm. Petals pale

yellow, midvein dark. Stylopodium low-conic, yellow. Fruit oblong-ellipsoid, brown, ca. 4 × 1.5 mm, glaucous; ribs prominent; vittae 3 in each furrow, 2–4 on commissure. Fl. and fr. Jun–Aug.

• Forests, shady valleys; 1400–1700 m. Chongqing (Nanchuan).

This poorly known taxon is recorded only from a few collections.

38. *Bupleurum chinense* de Candolle, Prodr. 4: 128. 1830.

北柴胡 bei chai hu

Bupleurum chinense Franchet (1883), not de Candolle (1830); *B. chinense* de Candolle f. *vanheurckii* (Müller Argoviensis) R. H. Shan & Yin Li; *B. falcatum* Linnaeus f. *ensifolium* H. Wolff; *B. togasii* Kitagawa; *B. vanheurckii* Müller Argoviensis.

Plants 50–85 cm, perennial. Root stout, elongate, brown, woody, usually branched. Stem solitary or several, dichotomously much-branched above, base without fibrous remnant sheaths. Basal leaves oblanceolate or narrow-elliptic, 4–7 × 0.6–0.8 cm, base tapering into petioles, apex acuminate. Middle leaves broadly linear-lanceolate, 4–12 × 0.6–1.8(–3) cm, 7–9-nerved, abaxially glaucous, apex apiculate. Apical leaves small. Umbels numerous, 2–6 cm across; peduncles slender, greatly spreading forming a large loose panicle; bracts 0 or 2–3, linear, 1–5 × 0.5–1 mm, 3-nerved; rays 3–8, very slender, 1–3 cm, unequal; bracteoles 5, lanceolate, 3–3.5 × 0.6–1 mm, shorter than flowers; umbellules 4–6 mm across, 5–10-flowered. Petal bright yellow. Stylopodium low-conic, discoid, dark yellow. Fruit oblong, brown, ca. 3 × 2 mm; ribs prominent, narrowly winged, wings pale brown; vittae 3(–4) in each furrow, 4 on commissure. Fl. and fr. Sep–Oct. $n = 6^*$.

• Grasslands, stream banks, sunny slopes, roadsides; 100–2700 m. Anhui, Gansu, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, Nei Mongol, Shaanxi, Shandong, Shanxi, Zhejiang.

This *Bupleurum* is one of two primary species the roots of which are used for the major traditional Chinese medicine “chai hu” (see also *B. scorzonerifolium*). It is a very widespread species, within which three forms are currently recognized: f. *pekinense* (Franchet ex Hemsley) R. H. Shan & Yin Li (Acta Phytotax. Sin. 12: 293. 1974; *B. pekinense* Franchet ex Hemsley, J. Linn. Soc., Bot. 23: 327. 1887), distinguished by having leaves rigid, papery, both surfaces gray-green; f. *chilosciadium* (H. Wolff) R. H. Shan & Yin Li (loc. cit.; *B. falcatum* Linnaeus var. *chilosciadium* H. Wolff, Acta Horti Gothob. 2: 303. 1926), distinguished by having peduncles much-branched and umbellules numerous, small; and f. *octoradiatum* (Bunge) R. H. Shan & M. L. Sheh (Fl. Reipubl. Popularis Sin. 55(1): 293. 1979; *B. octoradiatum* Bunge, Mém. Acad. Imp. Sci. St.-Pétersbourg Divers Savans 2: 106. 1835), distinguished by having branches non-flexuous, bracteoles elliptic-lanceolate, usually exceeding umbellules in flower and longer than pedicels in fruit, and chromosome number $n = 6 + 1 - 2B^*$.

39. *Bupleurum polyclonum* Yin Li & S. L. Pan, Acta Phytotax. Sin. 22: 131. 1984.

多枝柴胡 duo zhi chai hu

Plants 15–40 cm, perennial. Taproot slender, woody, annular leaf scars dense. Stem much branched throughout, base without fibrous remnant sheaths. Basal leaves caespitose, linear,

10–20 × 0.2–0.3 cm. Cauline leaves remote, linear, 13–15 × 0.15–0.3 cm. Apical leaves subulate, 3–5-nerved. Inflorescence much dichotomously branched, forming a large panicle; umbels numerous, 1.5–3 cm across; bracts 4–5, elliptic or obovate, 2–8 × 1–3 mm, unequal, 5–7-nerved; rays 3–6, 1–3 cm, unequal, very slender; bracteoles ca. 5, obovate, 3–4 × 2–3 mm, exceeding the flowers; umbellules 1.5–4 mm across, 7–15-flowered; pedicels ca. 1.5 mm. Petals yellow. Stylopodium low-conic, yellow. Fruit oblong, brown, 2–3 × 1.2–1.5 mm; ribs prominent; vittae 3 in each furrow, 4 on commissure. Fl. and fr. Jul–Sep.

- Mountain slopes; ca. 2200 m. NE Yunnan (Huize).

The roots are used in traditional Chinese medicine. This poorly known taxon is recorded only from a few collections.

40. *Bupleurum kunmingense* Yin Li & S. L. Pan, Acta Phytotax. Sin. 22: 131. 1984.

韭叶柴胡 jiu ye chai hu

Plant 60–100 cm, perennial. Taproot slender, woody, rarely branched. Stem green, erect, base densely marked with annular leaf scars, without fibrous remnant sheaths. Basal leaves numerous, linear, 10–15 × 0.3–0.5 cm, abaxially glaucous, 3–7-nerved, thinly papery, base tapering, apex acuminate. Cauline leaves remote; blade narrowly lanceolate. Apical leaves small, 8–10 × 1.5–5 mm, 3–5-nerved, clasping. Umbels 1.5–4.5 cm across; bracts 5–8, narrow-elliptic, 1.5–5 × 1–2 mm, unequal; rays 4–11, 1–2.5 cm, unequal, slender; bracteoles 5, obovate or broad-elliptic, 2.5–3.5 × 1–2 mm, 3–5-nerved, greenish, exceeding the flowers; umbellules 4–6 mm across, 8–14-flowered; pedicels 1–1.5 mm, slender. Petals yellow. Stylopodium low-conic, yellow. Fruit oblong, brown, 2–3 × 1–2 mm; ribs prominent; vittae 3 in each furrow, 4 on commissure. Fl. Jul–Sep, fr. Aug–Oct.

- Upland slopes; ca. 2000 m. E Yunnan (Kunming, Luxi).

The roots are used in traditional Chinese medicine. This rather poorly known taxon is recorded only from a few collections.

41. *Bupleurum qinghaiense* Yin Li & J. X. Guo, J. Chin. Pharm. Sci. 2: 39. 1993.

青海柴胡 qing hai chai hu

Plants 30–80 cm, perennial. Root yellowish-brown, woody, slender. Stem erect, green, base without fibrous remnant sheaths. Basal leaves linear, 10–14 × 0.3–0.5 cm, 5-nerved, papery, base tapering into petiole. Cauline leaves linear, 8–10 × 0.4–0.5 cm, 5-nerved, petiolate, clasping. Apical leaves short-linear. Umbels 2–3.5 cm across; bracts 3–4, oblong, 2–7 × 1–2 mm, 5-nerved; rays 6–13, 4–33 mm, unequal; bracteoles 5–7, obovate, 3–4 × 1–2 mm, green, 3-nerved, thickly papery, exceeding the flowers; umbellules 5–8 mm across, 5–26-flowered; pedicels 1–2 mm, very slender. Petals yellow. Stylopodium low-conic, yellow. Fruit oblong, brown, 2–3 × ca. 1.5 mm; ribs prominent; vittae 3 in each furrow, 4 on commissure. Fl. and fr. Jun–Aug.

- Sunny slopes, grassy places; 3200–3700 m. Qinghai (Wanglin).

This rather poorly known taxon is recorded only from a few collections.

42. *Bupleurum kaoi* T. S. Liu et al., Quart. J. Taiwan Mus. 14: 22. 1961.

台湾柴胡 tai wan chai hu

Plants 30–70 cm, perennial. Rootstock slender, branched. Stems several, erect, much-branched from base, base without fibrous remnant sheaths. Basal and lower leaves petiolate; blade oblong-lanceolate or spatulate, 5–10 × 0.5–1 cm, apex acute. Upper leaves numerous, sessile, oblanceolate to oblong-spatulate, 1–3 × 0.3–0.7 cm, almost embracing, 5–7-nerved. Umbels 3–5 cm across; bracts 2–3, lanceolate, 5–10 × 3–5 mm; rays 5–6, 1–3 cm, unequal; bracteoles 4–5, linear-lanceolate, 1–5 mm; umbellules ca. 1 cm across, ca. 5-flowered; pedicels 1–3 mm. Petals yellow. Stylopodium low-conic, yellow. Fruit oblong, brown, 2–3 × 1–1.5 mm; vittae large, usually 2–3 in each furrow, 4 on commissure. Fl. and fr. Jun–Aug. n = 12*.

- Mountain slopes; ca. 100 m. C and N Taiwan.

This species has reputed medicinal value. It is the only species of *Bupleurum* reported from Taiwan, but is rather poorly known and is recorded only from a few collections.

