

9. Tribe ANTHEMIDEAE

春黄菊族 chun huang ju zu

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Shrubs, subshrubs, or annual or perennial herbs, aromatic; indumentum of short biseriate glandular hairs (glands) and uniseriate simple, T-shaped or stellate hairs. Leaves alternate, rarely opposite, fasciculate or in basal rosettes, pinnatisect, pinnatifid, lobed, serrulate, serrate, or dentate, rarely entire, rarely succulent, base sometimes with stipulelike auricles (“pseudostipules”). Synflorescences mostly terminal, sometimes axillary, cymose or racemose, often paniculate, often flat-topped. Capitula heterogamous, with marginal female florets and central bisexual or male disk florets, or homogamous with only bisexual tubular florets. Phyllaries in 2–7 rows, overlapping, usually with scarious margin and apices. Receptacle paleate or epaleate, rarely pilose or hirsute. Marginal female florets radiate, or corollas tubular to filiform, often 2-toothed, or absent, and capitula disciform, fertile or sterile; corolla yellow or white, less often purplish, pink, orange, or red. Disk florets bisexual or male, tubular or funnel-shaped, usually yellow, rarely whitish, purplish, or red, usually 4- or 5-lobed. Anthers mostly rounded, rarely shortly tailed at base, apical appendage ovate or triangular to subulate. Pollen with or without spines. Style base slender or bulbous; style branches usually free (rarely fused in functionally male florets), usually linear, rarely wider, with apex truncate, penicillate. Achenes often obovoid, obconical, or cylindrical, sometimes dorsiventrally flattened, apex rounded or truncate, true pappus absent, sometimes with a pappuslike corona of rather few scarious or bristlelike scales, or with an auricle, usually adaxial.

About 110 genera and ca. 1,750 species: worldwide, mainly concentrated in C Asia, the Mediterranean region, and S Africa; 29 genera (two endemic, four introduced) and 364 species (138 endemic, ten introduced) in China.

This tribe includes well-known vegetables (*Glebionis carinata*, *G. coronaria*, and *G. segetum*) and famous ornamental plants (most notably “*Chrysanthemum grandiflorum*”; see note under *Chrysanthemum*). Insecticides are extracted from some species (e.g., *Tanacetum* (*Pyrethrum*) *cinerariifolium*). Other species are very important medicinally (e.g., *Artemisia annua*, the source of the important anti-malarial drug artemisinin) while some are significant forage plants in dry regions.

The generic sequence follows Oberprieler et al. (in Kadereit & C. Jeffrey, *Fam. Gen. Vasc. Pl.* 8: 342–373. 2007).

Records of *Anthemis tinctoria* Linnaeus (Sp. Pl. 2: 896. 1753; *Cota tinctoria* (Linnaeus) J. Gay ex Gussone, *Fl. Sicul.* Sin. 2: 867. 1844–1845; 春黄菊 chun huang ju), *Argyranthemum frutescens* (Linnaeus) Schultz Bipontinus (in Webb & Berthelot, *Hist. Nat. Iles Canaries* 2: 264. 1844; *Chrysanthemum frutescens* Linnaeus, Sp. Pl. 2: 887. 1753; *Pyrethrum frutescens* (Linnaeus) Willdenow; 木蒿 mu tong hao), *Chamaemelum nobile* (Linnaeus) Allioni (*Fl. Pedem.* 1: 185. 1785; *Anthemis nobilis* Linnaeus, Sp. Pl. 2: 894. 1753; 果香菊 guo xiang ju), and *Coleostephus myconis* (Linnaeus) Cassini (*Dict. Sci. Nat.* 41: 43. 1826; *Chrysanthemum myconis* Linnaeus, Sp. Pl., ed. 2, 1254. 1763; *Myconia chrysanthemum* Schultz Bipontinus; 鞘冠菊 qiao guan ju) in FRPS (76(1): 7, 9, 20, 74. 1983) were based on cultivated ornamental plants.

- 1a. Capitula radiate; ray florets often conspicuous, but sometimes not so.
 - 2a. Receptacle scales present at least near margins of receptacle.
 - 3a. Capitula in ± flat-topped panicles; involucre 2–7(–9) mm in diam.; mostly wild plants, only occasionally cultivated as medicinal plants 167. *Achillea*
 - 3b. Capitula solitary, long pedunculate; involucre 7–15 mm in diam.; mostly grown as ornamentals and only occasionally found as an escape 168. *Anthemis*
 - 2b. Receptacle scales absent, but receptacle sometimes hairy.
 - 4a. Achene winged: marginal achenes 2- or 3-winged, disk achenes 1- or 2-winged; ray florets mostly bright yellow; plants often grown as vegetables or ornamentals 172. *Glebionis*
 - 4b. Achene not winged; ray florets mostly white or pink, less often yellow (*Brachanthemum*, some species of *Chrysanthemum*).
 - 5a. Pappus or corona absent, but achenes sometimes with an obtuse rim or with ribs apically projected.
 - 6a. Achene with ribs projected at apex.
 - 7a. Marsh plants; ray florets sterile 163. *Leucanthemella*
 - 7b. Grassland plants, often grown as ornamentals and only occasionally found as an escape; ray florets fertile 173. *Leucanthemum*
 - 6b. Achene with ribs not projected at apex.
 - 8a. Dwarf shrubs or subshrubs; involucre campanulate, hemispheric, or obconical; ray florets yellow, lamina ovate, to 3 mm 149. *Brachanthemum*
 - 8b. Herbs, annual or perennial; involucre shallowly cup-shaped; ray florets white, red, or violet, less often yellow (some species of *Chrysanthemum*), lamina oblong, often more than 5 mm.
 - 9a. Perennial herbs or subshrubs; achenes terete, ribs 5–8, uniformly spaced, rather obscure 150. *Chrysanthemum*

- 9b. Annual herbs; achenes dorsiventrally compressed, ribs 3–5, mainly adaxial, slender but distinct 171. *Matricaria*
- 5b. Pappuslike corona present.
- 10a. Corona of separate scales or bristles.
- 11a. Corona scales obovate, brown tipped 158. *Richteria*
- 11b. Corona scales bristlelike or subulate.
- 12a. Corona scales many, bristlelike, with flat and palmate bases 156. *Allardia*
- 12b. Corona scales 4–6, subulate, unequal, mainly abaxial 165. *Opisthopappus*
- 10b. Corona cupular, shallowly or deeply divided or divided to base.
- 13a. Achene with multicellular hairs between ribs 164. *Microcephala*
- 13b. Achene glabrous.
- 14a. Achene with 5–10 equal ribs, without resin sacs 169. *Tanacetum*
- 14b. Achene with both thick and thin ribs, abaxially and apically with distinct resin sacs 170. *Tripleurospermum*
- 1b. Capitula discoid with all florets bisexual, tubular, or capitula disciform with marginal florets inconspicuous, corollas narrowly tubular to filiform or absent.
- 15a. Capitula heterogamous, disciform: marginal florets female or neuter, corolla tubular or narrowly tubular or absent, disk florets male or bisexual, tubular.
- 16a. Marginal female florets in many rows.
- 17a. Capitula pedunculate, terminal; achenes without persistent style 145. *Cotula*
- 17b. Capitula sessile, axillary; achenes with persistent style 146. *Soliva*
- 16b. Marginal female florets in 1 row.
- 18a. Capitula in spikes or racemes, often secund, often grouped into panicles.
- 19a. Pappuslike corona present 153. *Crossostephium*
- 19b. Corona absent.
- 20a. Marginal florets female, disk florets bisexual, fertile; achenes all over receptacle; leaf blade very variable but never pectinate-pinnatisect 151. *Artemisia*
- 20b. Marginal florets partly female, disk florets bisexual, fertile and sterile; achenes in a row around base of receptacle; leaf blade pinnatisect with ± pectinately arranged lateral lobes 155. *Neopallasia*
- 18b. Capitula in terminal, rounded to flat-topped panicles, clusters, or solitary.
- 21a. Corolla exterior stellate hairy or apically densely pilose with erect straight hairs.
- 22a. Annual herbs; corolla exterior apically densely pilose with erect straight hairs 148. *Ajaniopsis*
- 22b. Subshrubs; corolla exterior with stellate hairs 162. *Kaschgaria*
- 21b. Corolla exterior glabrous or with lower part only sparsely pilose.
- 23a. Achene 5–10-ribbed, corona present, 0.1–0.4 mm 169. *Tanacetum*
- 23b. Achene 2–6-striate, corona absent.
- 24a. Florets all fertile; achenes 4 or 5(or 6)-striate/ribbed 147. *Ajania*
- 24b. Central disk florets sterile; achenes 2-striate 154. *Filifolium*
- 15b. Capitula homogamous: all florets bisexual, tubular.
- 25a. Receptacle scales present at least near margins of receptacle; stems 1 to few, thick with wide pith.
- 26a. Stem densely dirty white lanate in lower part, glabrescent in upper part; synflorescence corymbose; involucre ca. 5 mm in diam. 159. *Handelia*
- 26b. Stem densely arachnoid hairy; synflorescence long pedunculate, umbel-like; involucre 6–9 mm in diam. 160. *Pseudohandelia*
- 25b. Receptacle scales absent; stems rarely solitary, not conspicuously thickened with wide pith.
- 27a. Corona absent.
- 28a. Capitula many, in elongated spikes or racemes, often grouped into panicles 152. *Seriphidium*
- 28b. Capitula many or few, in glomerules or flat-topped panicles.
- 29a. Subshrubs, 40–80 cm tall, branches divaricate, sometimes ± spine-tipped; capitula solitary 149. *Brachanthemum*
- 29b. Herbs or subshrubs, branches not divaricate nor spine-tipped; capitula in corymbs or umbels of 3 or more.
- 30a. Annual herbs; corolla bowl-shaped 166. *Stilpnolepis*
- 30b. Biennial or perennial herbs or subshrubs; corolla not bowl-shaped.
- 31a. Herbs, stem often solitary, robust, 20–100 cm tall, unbranched below synflorescence, dying after flowering; synflorescence long pedunculate, umbel-like 160. *Pseudohandelia*

- 31b. Herbs perennial or stemless, small subshrubs, or cushion plants, rarely more than 40 cm tall; synflorescence dense or lax \pm flat-topped panicles 161. *Hippolytia*
- 27b. Corona present, cupular or with distinct scales.
- 32a. Achene with distinct resin sacs 170. *Tripleurospermum*
- 32b. Achene without resin sacs.
- 33a. Perennial herbs or subshrubs; achene with 5–12 equally arranged ribs.
- 34a. Capitula usually solitary at apex of stem; florets yellow 157. *Cancrinia*
- 34b. Capitula many or several, in flat-topped panicle, rarely solitary and then florets orange-red 169. *Tanacetum*
- 33b. Annual herbs; achene with 3–5 adaxial ribs.
- 35a. Capitula usually solitary at apex of stem; florets constricted in middle 164. *Microcephala*
- 35b. Capitula many or several, in lax corymb or solitary at apex of lateral branches; florets not constricted 171. *Matricaria*

145. COTULA Linnaeus, Sp. Pl. 2: 891. 1753.

山芫绶属 shan yuan sui shu

Shi Zhu (石铸 Shih Chu); Christopher J. Humphries, Michael G. Gilbert

Lancisia Fabricius; *Machlis* Candolle.

Herbs, annual or perennial; indumentum absent or of basifixed hairs. Leaves alternate or sometimes opposite or rosulate, pinnatisect, lobed, or occasionally entire. Capitula solitary, pedunculate, heterogamous, radiate, rarely homogamous and discoid. Involucres hemispheric; phyllaries in 2 or 3 rows, unequal, scarious margin narrow. Receptacle flat to conical, epaleate. Marginal florets in 1 to several rows, female, fertile, generally pedicellate, corolla tube short or absent, lamina generally absent, white if present; disk florets yellow, bisexual, fertile, apex 4- or 5-lobed. Anther bases obtuse; apical appendage lanceolate. Style branches truncate or obtuse at apex or style undivided. Achenes dorsiventrally flattened, often laterally winged, wings aristately lengthened at apex of achene. Corona absent.

Fifty-five species: mostly in S Hemisphere, particularly S Africa and the Pacific islands (New Zealand), also in Australia and South America, a few species extending to E Africa and New Guinea; two species in China.

- 1a. Achenes of marginal female florets obovoid; lateral wings broad and thick; ultimate segments of leaves shortly triangular or lanceolate 1. *C. anthemoides*
- 1b. Achenes of marginal female florets narrowly oblong; lateral wings very narrow; ultimate segments of leaves linear or linear-lanceolate 2. *C. hemisphaerica*

1. *Cotula anthemoides* Linnaeus, Sp. Pl. 2: 891. 1753.

山芫绶 shan yuan sui

芫绶菊 yuan sui ju

Artemisia hemisphaerica Roxburgh, Fl. Ind., ed. 1832, 3: 423. 1832; *Cotula chinensis* Kitamura; *Machlis hemisphaerica* (Roxburgh) Candolle.

Herbs, annual, small. Stems with diffuse branches, \pm villos with pale brown hairs. Basal leaves petiolate; leaf blade oblanceolate-oblong, 3–5 \times 1–2 cm, both surfaces sparsely villos or subglabrous, 2-pinnatisect; primary lateral segments 5-paired; ultimate segments shortly triangular or lanceolate, apex shortly acute. Middle stem leaves similar, base semiamplexicaul. Capitula solitary at apex of branches, axillary or opposite with leaves, ca. 5 mm in diam. Involucres cup-shaped; phyllaries in 2 rows, oblong, with 1 red midvein, margin scarious, outer ones small, inner ones large. Marginal female florets many, without corolla; disk florets few, corolla yellow, 4-lobed. Achenes obovoid, ca. 1.2 mm, dorsiventrally flattened, lateral wings broad and thick, with sessile glands. Pappus absent. Fl. and fr. Sep–Mar of next year. $2n = 20$.

Herbs, annual, small. Stems with diffuse branches, \pm villos with brownish hairs. Basal leaves shortly petiolate; leaf blade oblanceolate, 3–5 \times 1–2 cm, both surfaces subglabrous, 2-pinnatisect; primary lateral segments 5-paired; ultimate segments linear or linear-lanceolate. Middle stem leaves similar, oblong, base amplexicaul; distal stem leaves small. Capitula solitary at apex of branches, ca. 5 mm in diam. Involucres cup-shaped; phyllaries in 2 rows, oblong, margin scarious, apex obtuse or acute, with brown midvein. Marginal female florets many, without corolla or corolla 2-toothed; disk florets few, corolla yellow, 4-lobed. Achenes narrowly oblong, ca. 1 mm, slightly dorsiventrally flattened, lateral wings narrow, with sessile glands. Pappus absent. Fl. and fr. Jan–May.

Wet places by rivers, paddies; 1000–1100 m. Fujian, Guangdong, Hubei, Sichuan, Taiwan, Yunnan [Cambodia, India, Indonesia, Laos, Myanmar, Nepal, Pakistan, Thailand, Vietnam; Africa].

Sandy and stony places by rivers, by paddies; ca. 100 m. Hubei, Sichuan, Taiwan [Bhutan, India, Nepal, Pakistan].

2. *Cotula hemisphaerica* (Roxburgh) Wallich ex Bentham in Bentham & J. D. Hooker, Gen. Pl. 2: 429. 1873.

The record of *Cotula chinensis* in Fl. Taiwan (4: 840. 1978) is referable to *Soliva anthemifolia*.

146. SOLIVA Ruiz & Pavon, Fl. Peruv. Prodr. 113. 1794.裸柱菊属 *luo zhu ju shu*

Shi Zhu (石铸 Shih Chu); Christopher J. Humphries, Michael G. Gilbert

Solivaea Cassini, nom. illeg. superfl.

Herbs, annual, small. Leaves alternate, pinnatisect. Capitulum solitary at leaf axils, disciform. Involucres hemispheric; phyllaries in 2 rows, equal, margin scariosus. Receptacle convex or conical, epaleate. Marginal florets female, without corolla; disk florets sterile, corolla tubular, 3- or 4-lobed. Anther obtuse at base. Style branches fused. Achenes dorsiventrally flattened, laterally winged; wings sometimes projected, teeth apex with persistent and spinescent style, sometimes transversely wrinkled to sulcate. Pappus absent.

Eight species: mostly in Australia, North and South America; two species (both introduced) in China.

- 1a. Leaves 5–15 cm; capitula often restricted to base of plant; disk florets 3-merous; achenes longer than broad, prominently villous at apex, with thick corky margins 1. *S. anthemifolia*
 1b. Leaves 1.5–5 cm; capitula scattered along stem; disk florets 4-merous; achenes broader than long, glabrous, with thin papery wings indented below middle 2. *S. pterosperma*

1. Soliva anthemifolia (Jussieu) R. Brown, Trans. Linn. Soc. London 12: 102. 1818.

裸柱菊 *luo zhu ju*

Gymnostyles anthemifolia Jussieu, Ann. Mus. Natl. Hist. Nat. 4: 262. 1804.

Stems very short, prostrate, rooting adventitiously. Leaves alternate, in basal rosettes, spatulate in outline, 5–15 × 1–3 cm overall; petiole 2–3 cm; leaf blade 2- or 3-pinnatifid; ultimate lobes linear, sparsely villous or subglabrous. Capitula at base of stem, sessile, 6–12 mm in diam. Involucres hemispheric, 5–8 × 6–10 mm; phyllaries in 2 or 3 rows, oblong or lanceolate, margin scariosus, apex acuminate, outer ones 3–3.5 × 1–1.2 mm, inner ones 3–4 × 0.3–0.6 mm. Marginal female florets in several rows, corolla absent, styles persistent; disk florets 8–12, corolla yellow, tubular, ca. 1.2 mm, apex 3-lobed; style apex capitate. Achenes oblanceolate, 2–2.5 × 0.1–1 mm, dorsiventrally flattened, with thick corky lateral wings, apex long villous, rounded; style persistent, spinescent. Pappus absent. Fl. and fr. year-round. $2n = 18$.

Naturalized in waste ground and cultivated areas. Fujian, Guangdong, Hainan, Jiangxi, Taiwan, Zhejiang [native to South America].

2. Soliva pterosperma (Jussieu) Lessing, Syn. Gen. Compos. 268. 1832.

翼子裸柱菊 *yi zi luo zhu ju*

Gymnostyles pterosperma Jussieu, Ann. Mus. Natl. Hist. Nat. 4: 262. 1804.

Stems decumbent, not rooting adventitiously, branches ascending, pilose. Leaves in basal rosettes, alternate, spatulate in outline, 1.5–5 cm overall; petiole widened below synflorescences; leaf blade tripinnatifid to tripinnate, both surfaces pilose. Capitula axillary, scattered along stem, sessile, to 5 mm in diam. Involucres hemispheric, ca. 3 × 5 mm; phyllaries in ca. 2 rows, subequal, oblong to lanceolate, 4–4.5 × 1.5–2 mm, herbaceous, abaxially pilose. Marginal female florets 13–15, in several rows, corolla absent, styles forked, persistent; disk florets 5 or 6, corolla greenish, tubular, 1.6–1.8 mm, apex 4-lobed; style capitate. Achenes obovate, ca. 2 × 3 mm, dorsiventrally flattened, glabrous, with thin, flat lateral wings indented below middle into a small basal lobe and larger upper one, apex with persistent, spinelike style, often with additional incurved spines on shoulders of upper lobes.

Naturalized in parks and gardens. N Taiwan [native to South America].

Soliva pterosperma can be a noxious weed of lawns, readily distributed by the spiny infructescences. Webb (New Zealand J. Bot. 24: 665–669. 1986) suggested that it might not be separable from *S. sessilis* Ruiz & Pavon.

147. AJANIA Poljakov, Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk S.S.S.R. 17: 419. 1955.亚菊属 *ya ju shu*

Shi Zhu (石铸 Shih Chu); Christopher J. Humphries, Michael G. Gilbert

Phaeostigma Muldashev.

Herbs, perennial, or small shrubs. Leaves alternate, pinnately or palmate-pinnately divided, serrate, rarely entire. Synflorescences cymose, flat-topped or rarely capitula solitary. Capitula heterogamous, disciform. Involucres campanulate or cylindrical; phyllaries in 4 or 5 rows, herbaceous, scariosus margin white or brown. Receptacle convex to conical, epaleate. Florets yellow, rarely purple. Marginal florets in 1 row, female, corolla usually narrowly tubular, rarely wider, apex 2- or 3(–5)-denticulate; disk florets bisexual, corolla tubular, 5-lobed. Anthers obtuse at base, apical appendage lanceolate. Style branches linear, apex truncate. Achenes obovoid, 4–6-ribbed/striate. Corona absent.

Thirty-four species: temperate Asia; 35 species (23 endemic) in China.

- 1a. Involucres straw-colored, glossy, 2–4 mm in diam.; phyllaries with colorless scarious margin.
- 2a. Capitula 5–14, often regularly fascicled-corymbose at apices of branches; involucre cylindrical or narrowly campanulate; phyllaries rigidly herbaceous, apex acute.
- 3a. Leaf blade adaxially green, 2-pinnatisect 23. *A. parviflora*
- 3b. Leaf blade gray-green, 3-parted or -lobed 24. *A. trifida*
- 2b. Capitula many, corymbose or compound-corymbose at apices of stem and branches; involucre campanulate; phyllaries herbaceous, apex obtuse or rounded.
- 4a. Perennial herbs.
- 5a. Involucres 6–7 mm in diam.; outer phyllaries narrowly elliptic, apices with rounded waxy appendage 33. *A. pallasiana*
- 5b. Involucres 2.5–4 mm in diam.; outer phyllaries ovate or lanceolate, apices without rounded waxy appendage.
- 6a. Stem weakly branched at base, often solitary, almost herbaceous; middle and lower stem leaf blades usually bipinnate with 5–7 lobes 34. *A. fastigiata*
- 6b. Stem strongly branched at base, woody for much of length; middle and lower stem leaf blades usually twice ternately divided 35. *A. gracilis*
- 4b. Small shrubs or subshrubs.
- 7a. Young stems glabrous; leaf blade abaxially green or pale green, glabrous or nearly so 32. *A. nematoloba*
- 7b. Young stems hairy; leaf blade abaxially gray-white, appressed pubescent.
- 8a. Leaf blade shallowly toothed to subentire, only occasionally lobed.
- 9a. Leaf blade adaxially green or gray-green, glabrous or very sparsely pubescent; disk florets ca. 2.5 mm 25. *A. potaninii*
- 9b. Leaf blade adaxially densely gray-white tomentose; disk florets ca. 4 mm 26. *A. amphisericea*
- 8b. Leaf blade pinnatisect, pinnatipartite, 2-pinnatisect, palmate-pinnately 3–5-divided, or twice ternately divided.
- 10a. Leaf blade pinnatisect or pinnatipartite.
- 11a. Leaf blade pinnatisect, adaxially gray-white, densely pubescent 27. *A. truncata*
- 11b. Leaf blade pinnatipartite, adaxially green, glabrous 28. *A. hypoleuca*
- 10b. Leaf blade 2-pinnatisect, palmate-pinnately 3–5-divided, bipalmatisect, or twice ternately divided.
- 12a. Leaf blade 2-pinnatisect 29. *A. achilleoides*
- 12b. Leaf blade bipalmatisect, palmately-pinnately 3–5-divided, or twice ternately divided.
- 13a. Leaf blade twice ternately divided 35. *A. gracilis*
- 13b. Leaf blade bipalmately 3–5-sect or bipalmate, pinnately 3–5-sect.
- 14a. Leaves with divided pseudostipules 30. *A. nitida*
- 14b. Leaves with entire pseudostipules 31. *A. fruticososa*
- 1b. Involucres not straw-colored, not glossy, 4–10 mm in diam.; phyllaries with dark brown or purple scarious margin.
- 15a. Leaf blade undivided, 3-lobed, or simply pinnatisect, or pinnatipartite.
- 16a. Leaf blade undivided, margin entire, serrate, or incised-serrate.
- 17a. Leaf blade linear, margin entire 1. *A. salicifolia*
- 17b. Leaf blade narrowly elliptic, lanceolate, or obovate-oblong, or broadly oblanceolate, rarely linear, margin serrate or incised-serrate.
- 18a. Subshrubs; leaves 5–10 × 0.3–4 cm, without pseudostipules, abaxially densely and thickly tomentose 2. *A. quercifolia*
- 18b. Perennial herbs; leaves 3–4.5 × 1–2 cm, with divided pseudostipules, abaxially densely pubescent 3. *A. latifolia*
- 16b. Leaf blade 3-lobed or pinnately divided.
- 19a. Leaf blade 3-lobed 6. *A. alabasca*
- 19b. Leaf blade pinnately divided.
- 20a. Leaf blade with 1 or 2 pairs of lateral lobes; lobes linear 4. *A. variifolia*
- 20b. Leaf blade with 3 or 4 pairs of lateral lobes; lobes narrowly elliptic, lanceolate, falcate, or obliquely triangular 5. *A. ramosa*
- 15b. Leaf blade more complexly divided: 2-pinnatisect, bipalmatisect, palmate-pinnately 3–7-divided, tripinnatisect, or tripinnate, pinnately divided.
- 21a. Small subshrubs with thick, woody rootstocks; stems 4–25 cm.
- 22a. Capitula solitary; involucre 7–10 mm in diam. 10. *A. scharnhorstii*

- 22b. Capitula in panicles; involucre 4–7(–8) mm in diam.
 23a. Phyllary margin dark purple; corolla apex purple-red 8. *A. purpurea*
 23b. Phyllary margin deep brown; florets uniformly yellow.
 24a. Leaf blade elliptic or obliquely elliptic in outline, 1–2 cm, both surfaces densely tomentose; involucre 4–6 mm in diam. 7. *A. tibetica*
 24b. Leaf blade suborbicular in outline, 0.3–0.5 cm, both surfaces densely pubescent; involucre 5–7 mm in diam. 9. *A. trilobata*
- 21b. Erect or diffuse perennial herbs, with slender fibrous roots; stems often more than 25 cm.
 25a. Leaf blade tripinnatisect, subtripinnatisect, or palmate, tripinnately divided.
 26a. Whole plant densely and thickly tomentose; phyllaries inconspicuous 19. *A. sericea*
 26b. Whole plant pubescent or densely so; phyllaries conspicuous.
 27a. Leaf blade 3–3.5 × 2–3 cm, adaxially green or pale green, glabrous or nearly so, ultimate segments lanceolate or elliptic 20. *A. tripinnatisecta*
 27b. Leaf blade 1–2 × 1–1.5 cm, adaxially gray-white, densely pubescent, ultimate segments linear.
 28a. Stems thinly silvery gray tomentose; leaf blade ca. 2 × 1.5 cm 21. *A. elegantula*
 28b. Stems densely pubescent; leaf blade ca. 1 × 1 cm 22. *A. nubigena*
- 25b. Leaf blade 2-pinnatisect, bipalmatisect, or subpalmately 3–5-divided.
 29a. Leaf blade bipalmatisect or palmately 3–5-divided.
 30a. Leaf blade adaxially green, subglabrous; involucre 4–5 mm in diam. 17. *A. breviloba*
 30b. Leaf blade adaxially densely gray-white or white pubescent; involucre 6–10 mm in diam. 18. *A. khartensis*
- 29b. Leaf blade 2-pinnatisect.
 31a. Phyllary margin ± distinctly 2-colored: dark brown with a narrow but distinct colorless margin 16. *A. tenuifolia*
 31b. Phyllary margin uniformly brown or dark brown scarious.
 32a. Primary lateral segments of leaf blade pinnatifid, pinnatifid, or pinnatipartite.
 33a. Primary lateral segments of leaf blade 1- or 2-paired, if 2-paired then ca. 1 cm apart; ultimate lobes narrowly elliptic or falcate 14. *A. remotipinna*
 33b. Primary lateral segments of leaf blade 2–4-paired, ca. 5 mm at intervals; ultimate lobes elliptic, lanceolate, or obliquely triangular 15. *A. myriantha*
- 32b. Primary lateral segments of leaf blade or leaf blade pinnatisect.
 34a. Leaf blade adaxially gray-white, densely villous or pubescent; involucre 5–6 mm in diam.; corolla of marginal female florets with truncate apex 11. *A. brachyantha*
 34b. Leaf blade adaxially green, subglabrous; involucre 2.5–5 mm in diam.; corolla of marginal female florets with toothed apex.
 35a. Ultimate segments of leaf blade linear-lanceolate or narrowly elliptic; involucre ca. 2.5 mm in diam. 12. *A. przewalskii*
 35b. Ultimate segments of leaf blade linear; involucre 4–5 mm in diam. 13. *A. adenantha*

1. *Ajania salicifolia* (Mattfeld ex Rehder & Kobuski) Poljakov, Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk S.S.S.R. 17: 424. 1955.

柳叶亚菊 liu ye ya ju

Tanacetum salicifolium Mattfeld ex Rehder & Kobuski, J. Arnold Arbor. 13: 207. 1932; *Chrysanthemum linearifolium* C. C. Chang; *C. salicifolium* (Mattfeld ex Rehder & Kobuski) Handel-Mazzetti; *Phaeostigma salicifolium* (Mattfeld ex Rehder & Kobuski) Muldashev.

Subshrubs, 30–60 cm tall. Flowering branches purple-red, sericeous, especially in upper part and on synflorescence branches. Lower and middle stem leaves sessile; leaf blade linear to lanceolate, 5–10 × 0.3–1 cm, abaxially white, densely and thickly sericeous, adaxially green, glabrous, margin entire.

Upper stem leaves progressively smaller. Synflorescence a dense terminal flat-topped panicle. Capitula many. Involucre campanulate, 4–6 mm in diam.; phyllaries in 4 rows, scarious margin broad, brown, outer ones ovate, ca. 2 mm, abaxially sparsely sericeous, middle and inner ones ovate or ovate-elliptic to linear-lanceolate, 3–4 mm. Florets yellow; marginal female florets 6, corolla narrowly tubular, ca. 2 mm, apex 3-denticulate; disk florets many, corolla tubular, ca. 3.5 mm. Achenes ca. 1.8 mm. Corona absent. Fl. and fr. Jun–Sep.

• Mountain slopes; 2600–4600 m. Gansu, Qinghai, Shaanxi, Sichuan.

2. *Ajania quercifolia* (W. W. Smith) Y. Ling & C. Shih, Bull. Bot. Lab. N. E. Forest. Inst., Harbin 6: 12. 1980.

栎叶亚菊 li ye ya ju

Tanacetum quercifolium W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 8: 119. 1913; *Chrysanthemum quercifolium* (W. W. Smith) Handel-Mazzetti; *Dendranthema quercifolium* (W. W. Smith) Kitamura; *Phaeostigma quercifolium* (W. W. Smith) Muldashev.

Subshrubs, 60–150 cm tall. Old branches gray-black; flowering branches robust, white, powdery-sericeous especially in upper part and on peduncles. Middle leaves of flowering branches shortly petiolate; leaf blade narrowly elliptic, lanceolate, or obovate-oblong, rarely linear, 5–10 × 2–4 cm, rigid, abaxially white or gray-white, densely and thickly sericeous, adaxially green, glabrous, margin coarsely dentate, incised-lobed, or -fid, teeth or lobes 3- or 4-paired, obliquely triangular or lanceolate, sometimes middle and distal leaves of flowering branches linear-lanceolate or broadly linear, to 10 cm, margin entire. Upper leaves progressively smaller. Synflorescence a dense flat-topped panicle, 4–9 cm in diam.; peduncle robust. Capitula many. Involucres campanulate, 5–6 mm in diam.; phyllaries in 4 rows, scarious margin yellow-brown, outer ones ovate-lanceolate, ca. 2 mm, abaxially sparsely sericeous, middle and inner ones narrowly elliptic to lanceolate, 3–4 mm, abaxially glabrous. Florets yellow, with sessile glands; marginal female florets 11, corolla narrowly tubular, apex minutely 4-denticulate; disk florets many, corolla tubular, apex 5-lobed. Achenes ca. 1.5 mm. Pappus absent. Fl. and fr. Aug–Oct.

- Forest understories, thickets; 3200–3900 m. Sichuan, Yunnan.

3. *Ajanía latifolia* C. Shih, Bull. Bot. Lab. N. E. Forest. Inst., Harbin 6: 12. 1980.

宽叶亚菊 kuan ye ya ju

Chrysanthemum shihchuanum H. Ohashi & Yonekura.

Herbs, perennial, 20–35 cm tall, rhizomes long or short, procumbent. Flowering and sterile stems many, sometimes densely clustered, erect, shortly corymbosely branched on upper part, pubescent, especially on synflorescence branches and peduncles, densely leafy throughout. Lower leaves withered by anthesis. Middle and upper leaves sessile or subsessile, with divided pseudostipules; leaf blade broadly oblanceolate, obovate, or elliptic, 3–4.5 × 1–2 cm, abaxially gray-white, densely and thickly appressed pubescent, adaxially green, glabrous, pinnatifid above middle, base cuneate; lobes 2- or 3-paired, lanceolate or obliquely triangular. Synflorescence a compound flat-topped panicle, 3–5 cm in diam. Capitula many. Involucres campanulate, 5–6 mm in diam.; phyllaries in 4 rows, scarious margin broadly yellow-brown, outer ones ovate or ovate-lanceolate, 2–2.5 mm, abaxially sparsely pubescent, middle and inner ones ovate-lanceolate to long ovate, middle ones sparsely pubescent abaxially, inner ones glabrous abaxially. Florets yellow; marginal female florets 6, corolla narrowly tubular, ca. 2.5 mm; disk florets many, corolla tubular, ca. 3 mm, apex 5-lobed. Fl. and fr. Oct.

- Mountain slopes; ca. 3100 m. Sichuan.

4. *Ajanía variifolia* (C. C. Chang) Tzvelev in Schischkin & Bobrov, Fl. URSS 26: 401. 1961.

异叶亚菊 yi ye ya ju

Chrysanthemum variifolium C. C. Chang, Sinensia 5: 161. 1934; *Ajanía manchurica* Poljakov; *Dendranthema variifolium* (C. C. Chang) Voroschilov; *Phaeostigma variifolium* (C. C. Chang) Muldashev.

Subshrubs, ca. 30 cm tall, old branches with densely leafy tips. Flowering branches sparsely sericeous or subglabrous. Middle leaves of flowering branches with petiole 1–2 cm; leaf blade ovate, 2–3 × 1.5–2.5 cm, abaxially gray-white, densely sericeous, adaxially green, glabrous, 3–5-pinnatisect; segments linear or narrowly linear. Lower and upper leaves smaller, blades 3-sect. Synflorescence a terminal compound flat-topped panicle. Capitula many. Involucres campanulate, 4–5 mm in diam.; phyllaries in 4 rows, scarious margin yellow-brown, outer ones ovate or long ovate, ca. 2 mm, abaxially sparsely sericeous at base, apex acute, middle and inner ones narrowly obovate or elliptic, 3–4 mm, apex rounded. Florets yellow, exterior with sessile glands; marginal female florets 6, corolla narrowly tubular, ca. 2.5 mm, apex 2- or 3-denticulate; disk florets many, corolla tubular, ca. 3 mm. Achenes ca. 2 mm. Fl. and fr. Aug–Sep.

Rocky slopes; 1200–3500 m. Heilongjiang, Hubei, Shaanxi [Korea, Russia].

The whole plant is used medicinally for relieving spasms.

5. *Ajanía ramosa* (C. C. Chang) C. Shih in C. Shih & G. X. Fu, Acta Phytotax. Sin. 17(2): 114. 1979.

分枝亚菊 fen zhi ya ju

Chrysanthemum variifolium C. C. Chang var. *ramosum* C. C. Chang, Sinensia 5: 163. 1934; *C. ramosum* (C. C. Chang) H. Ohashi & Yonekura; *Phaeostigma variifolium* (C. C. Chang) Muldashev var. *ramosum* (C. C. Chang) Muldashev.

Shrubs, 80–150 cm tall. Old branches brownish; flowering branches of current year sericeous, especially above and on synflorescence branches. Middle leaves of flowering branches petiolate; leaf blade elliptic, oblanceolate, or long ovate, 4–5 × 2–2.5 cm, abaxially white or gray-white, densely and thickly sericeous, adaxially green, glabrous, pinnatifid; lobes 3- or 4-paired, narrowly elliptic, lanceolate, or falcate. Proximal and distal leaves progressively smaller. Capitula compound-corymbose at apices of branches. Involucres campanulate, 5–6 mm in diam.; phyllaries in 4 rows, outer ones triangular-ovate, 1.5–2 mm, abaxially sparsely sericeous, scarious margin yellow-brown, apex rounded; middle and inner ones ovate-oblong or oblanceolate, 4–4.5 mm. Florets many, corolla yellow, exterior with sessile glands; marginal female florets 7, corolla narrowly tubular, ca. 2 mm, apex 4-denticulate; disk florets many, corolla tubular, ca. 3 mm. Achenes ca. 1.3 mm. Fl. and fr. Aug–Sep. *2n* = 18*.

• Mountain slopes, river valleys; 2900–4600 m. Hubei, Shaanxi, Sichuan, Xizang.

6. *Ajanía alabásica* H. C. Fu in Ma, Fl. Intramongol. 6: 325. 1982.

内蒙亚菊 nei meng ya ju

Chrysanthemum alabasicum (H. C. Fu) H. Ohashi & Yonekura.

Subshrubs, 15–30 cm tall. Old branches brown or gray-brown, with many short sterile branches and long flowering branches. Sterile and flowering branches densely sericeous, glabrescent. Lower and middle stem leaves with petiole 2–4 mm; leaf blade spatulate or flabelliform, 0.5–1.5 × 0.2–1.5 cm, both surfaces gray-white, densely sericeous, tripartite or trisect, sometimes bipalmate pinnatisect; primary lateral lobes 1-paired; all lobes linear, oblong-linear, lanceolate, or long ovate, margin entire, apex acute or obtuse. Upper stem leaves 3-partite or entire. Capitulum solitary at branch tips. Involucre campanulate, 5–7 mm in diam.; phyllaries in 4 or 5 rows, margin broadly brown scarious, outer ones rhomboid-ovate, ca. 2 mm, abaxially densely or sparsely sericeous, middle and inner ones broadly elliptic, 4–5 mm, middle ones densely or sparsely sericeous. Florets yellow, exterior with sessile glands; marginal female florets 5, corolla narrowly tubular, ca. 2.5 mm, apex 4-denticulate; disk florets many, corolla tubular, ca. 3 mm. Achenes ca. 1 mm. Fl. and fr. Jun–Aug.

- Rocky slopes. S Nei Mongol (Otog Qi).

7. *Ajania tibetica* (J. D. Hooker & Thomson ex C. B. Clarke) Tzvelev in Schischkin & Bobrov, Fl. URSS 26: 410. 1961.

西藏亚菊 xi zang ya ju

Tanacetum tibeticum J. D. Hooker & Thomson ex C. B. Clarke, Compos. Ind. 154. 1876; *Chrysanthemum tibeticum* (J. D. Hooker & Thomson ex C. B. Clarke) S. Y. Hu.

Subshrubs, 4–20 cm tall. Old branches dark brown; young branches densely sericeous. Leaves petiolate; leaf blade elliptic or oblanceolate, 1–2 × 0.7–1.5 cm, both surfaces gray-white, densely tomentose, 2-pinnatisect; primary lateral segments 2-paired; ultimate segments narrowly elliptic; leaves below synflorescence pinnatifid. Synflorescence a terminal flat-topped panicle, 1–2 cm in diam. Involucre campanulate, 4–6 mm in diam.; phyllaries in 4 rows, apex obtuse, outer ones triangular-ovate or lanceolate, ca. 3 mm, abaxially sparsely sericeous, middle and inner ones elliptic or lanceolate-elliptic, 4–5 mm, middle ones sparsely sericeous, inner ones glabrous abaxially. Florets yellow; marginal female florets: corolla narrowly tubular, ca. 2.5 mm, apex 2–4-denticulate; disk florets many, corolla tubular. Achenes ca. 2.2 mm. Fl. and fr. Aug–Sep. $2n = 18$.

Mountain slopes; 3900–4700 m. Sichuan, Xizang [India, Kazakhstan, Pakistan].

8. *Ajania purpurea* C. Shih, Acta Phytotax. Sin. 17(2): 115. 1979.

紫花亚菊 zi hua ya ju

Chrysanthemum purpureiflorum H. Ohashi & Yonekura.

Subshrubs, 4–25 cm tall, with thick woody rootstock. Old branches pale brown; young branches densely tomentose. Leaves petiolate; leaf blade elliptic or obliquely elliptic, 1–2 × 0.8–1.5 cm, both surfaces gray-white, densely and thickly tomentose, palmately 3–5-fid or lobed, or palmate-pinnately 3–5-fid or -lobed; lobes elliptic or narrowly elliptic. Synflorescence a terminal flat-topped cyme, 1.5–2 cm in diam. Capitula 5–10. Involucre campanulate, ca. 5 mm in diam.; phyllaries in 4 rows, abaxially tomentose, especially outer and middle ones,

scarious margin dark purple, outer ones narrowly ovate or elliptic-ovate, ca. 3.5 mm, middle and inner ones narrowly elliptic to lanceolate, ca. 5 mm. Florets purple above middle; marginal female florets 6, corolla narrowly subulate, ca. 2 mm, apex 3- or 4-denticulate; disk florets many, corolla tubular. Achenes ca. 2.5 mm. Pappus absent.

- Alpine meadows, thickets, gravel mounds; 4800–5300 m. Xizang.

9. *Ajania trilobata* Poljakov in Schischkin & Bobrov, Fl. URSS 26: 880. 1961.

矮亚菊 ai ya ju

Chrysanthemum trilobatum (Poljakov) H. Ohashi & Yonekura.

Subshrubs, 5–15 cm tall; roots woody, ca. 1.5 cm in diam. Flowering and sterile branches gray-white, densely pubescent. Petiole ca. 1 cm; leaf blade suborbicular or flabelliform, 3–5 × 4–5 mm, both surfaces gray-white, densely pubescent, 2-palmatisect; primary lateral segments 3–6; ultimate segments ovate or elliptic, apex obtuse or rounded. Synflorescence a terminal flat-topped cyme. Capitula (1–)3–8(–10). Involucre campanulate, (4.5–)5–7(–8) mm in diam.; phyllaries in 3 rows, scarious margin brown, outer ones ovate, ca. 2 mm, abaxially sparsely pubescent, inner ones broadly elliptic to lanceolate, 2–4 mm, abaxially glabrous. Florets yellow; marginal female florets 5, corolla narrowly tubular, ca. 2 mm, apex 3-denticulate; disk florets many, corolla tubular, 2.2–3 mm. Achenes ca. 2 mm. Pappus absent. Fl. and fr. Jul–Aug.

- Fissures of rocks by rivers; ca. 3200 m. Xinjiang (C Tian Shan).

10. *Ajania scharnhorstii* (Regel & Schmalhausen) Tzvelev in Schischkin & Bobrov, Fl. URSS 26: 409. 1961.

单头亚菊 dan tou ya ju

Tanacetum scharnhorstii Regel & Schmalhausen, Trudy Imp. S.-Peterburgsk. Bot. Sada 5: 620. 1878; *Chrysanthemum scharnhorstii* (Regel & Schmalhausen) B. Fedtschenko; *Hipolytia scharnhorstii* (Regel & Schmalhausen) Poljakov.

Subshrubs, 4–10 cm tall, with thick woody rootstock ca. 2 cm in diam. Flowering and sterile branches gray-white, densely and thickly pubescent. Petiole 1–2 mm; leaf blade suborbicular or flabelliform, 3–5 × 5–6 mm, both surfaces gray-white, densely pubescent, bipalmatisect; primary lateral segments 3–7; ultimate segments ovate or elliptic, apex obtuse or rounded. Synflorescence a solitary terminal capitulum. Involucre campanulate, 7–10 mm in diam.; phyllaries in 4 rows, scarious margin brown, outer ones ovate, ca. 3 mm, abaxially sparsely pubescent, middle and inner ones broadly elliptic to oblanceolate, 3–5 mm, middle ones sparsely pubescent abaxially, inner ones glabrous abaxially. Florets yellow; marginal female florets 5, corolla narrowly tubular, ca. 2.5 mm, apex 3- or 4-denticulate; disk florets many, corolla tubular, ca. 3.5 mm. Achenes ca. 2 mm. Fl. and fr. Jul–Aug.

- Fissures of rocks on mountain slopes, calcareous talus slopes, thickets; 3900–5100 m. Gansu, Qinghai, Xinjiang (C Tian Shan), Xizang.

11. *Ajania brachyantha* C. Shih, Acta Phytotax. Sin. 17(2): 114. 1979.

短冠亚菊 duan guan ya ju

Chrysanthemum brachyanthum (C. Shih) H. Ohashi & Yonekura.

Herbs, perennial, 30–40 cm tall, with slender fibrous roots. Stems much branched above middle. Lower branches long, spreading; upper branches ascending; stem and branches gray-white, pubescent, especially in upper part. Basal and lower leaves pinkish at anthesis. Middle stem leaves sessile; leaf blade broadly obovate-elliptic or elliptic, 1.5–2 × ca. 1 cm, both surfaces gray-white, densely appressed pubescent or villous, 2-pinnatisect; primary lateral segments 2- or 3-paired; ultimate segments narrowly elliptic, oblanceolate, or falcate, apex acute. Upper leaves and leaves below synflorescence small, pinnatifid or palmatifid. Synflorescence a terminal compound flat-topped panicle. Capitula many. Involucres broadly campanulate, 5–6 mm in diam.; phyllaries in 3 rows, scarious margin broad, dark brown, outer ones narrowly elliptic, ca. 2 mm, abaxially sparsely villous, middle and inner ones elliptic or oblanceolate, ca. 4 mm, middle ones sparsely villous abaxially, inner ones glabrous abaxially. Florets yellow; marginal female florets 6, corolla narrowly tubular, ca. 1.2 mm, apex truncate or obliquely truncate; disk florets many, corolla tubular. Fl. Aug.

- Mountain slopes; 3500–3600 m. Xizang (Nyêmo).

12. *Ajania przewalskii* Poljakov, Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk S.S.S.R. 17: 422. 1955.

细裂亚菊 xi lie ya ju

Chrysanthemum przewalskii (Poljakov) H. Ohashi & Yonekura.

Herbs, perennial, 35–80 cm tall; rhizomes short, procumbent, with slender fibrous roots; cataphylls brown, ovate. Stems erect, shortly branched at apex, red-purple, pubescent, especially in upper part. Petiole ca. 1 cm; leaf blade broadly ovate or ovate, 2–5 × 1.5–4 cm, abaxially gray-white, densely pubescent, adaxially green, glabrous or sparsely pubescent, 2-pinnatisect; primary lateral segments 2–4-paired, dense, 3–5 mm apart; ultimate segments linear-lanceolate or narrowly elliptic. Leaves below synflorescence small. Synflorescence a large, terminal, compound flat-topped panicle. Capitula many. Involucres campanulate, 2.5–3 mm in diam.; phyllaries in 4 rows, scarious margin brown, outer ones ovate or lanceolate, ca. 1.5 mm, abaxially puberulent, middle and inner ones elliptic to oblanceolate or lanceolate, ca. 2.5 mm, abaxially glabrous. Florets yellow, exterior with sessile glands; marginal female florets 4–7, corolla narrowly tubular, apex 3-denticulate; disk florets many, corolla tubular. Achenes ca. 0.8 mm. Fl. and fr. Jul–Sep. $2n = 36^*$.

- Grasslands, forest margins, on rocks; 2800–4500 m. Gansu, Nei Mongol, Ningxia, Qinghai, Sichuan.

13. *Ajania adenantha* (Diels) Y. Ling & C. Shih, Bull. Bot. Lab. N. E. Forest. Inst., Harbin 6: 13. 1980.

丽江亚菊 li jiang ya ju

Tanacetum adenanthum Diels, Notes Roy. Bot. Gard. Edinburgh 5: 187. 1912; *Chrysanthemum adenanthum* (Diels) Handel-Mazzetti.

Herbs, perennial, 20–30 cm tall; rhizomes short, with slender fibrous roots; cataphylls brown, ovate or ovate-lanceolate; indumentum of medifixed hairs. Stems erect, long branched, pubescent, especially in upper part and on peduncles. Middle stem leaves: petiole 3–5 mm; leaf blade ovate, broadly ovate, or broadly cuneate, 1.5–2 × 0.5–2 cm, abaxially gray-white, densely appressed pubescent, adaxially pale green, sparsely pubescent, 2-pinnatisect; primary lateral segments 1- or 2-paired; ultimate segments linear; lower and upper leaves 3–5-pinnatisect. Synflorescence a terminal flat-topped panicle. Capitula many. Involucres campanulate, 4–5 mm in diam.; phyllaries in 4 or 5 rows, scarious margin brown, apex rounded or obtuse, outer ones ovate-lanceolate or ovate, ca. 1.5 mm, abaxially pubescent, middle and inner ones elliptic or ovate-elliptic, 3–3.5 mm, middle ones pubescent abaxially. Florets yellow or orange, lower parts with sessile glands; marginal female florets ca. 7, corolla narrowly tubular, apex acutely 3- or 4-denticulate; disk florets many, corolla tubular.

- Mountain slopes, stony alpine meadows; 3000–3700 m. Hebei, NW Yunnan (Lijiang).

14. *Ajania remotipinna* (Handel-Mazzetti) Y. Ling & C. Shih, Bull. Bot. Lab. N. E. Forest. Inst., Harbin 6: 13. 1980.

疏齿亚菊 shu chi ya ju

Chrysanthemum remotipinnum Handel-Mazzetti, Acta Horti Gothob. 12: 265. 1938.

Herbs, perennial, 30–70 cm tall, with slender fibrous roots. Stems erect, much branched, densely or sparsely pubescent. Middle stem leaves: petiole 1–2 cm; leaf blade elliptic, ovate, or obovate, 3.5–5 × 2–3.5(–4) cm, abaxially gray-white, densely and thickly appressed villous, adaxially green, sparsely appressed pubescent, 2-pinnatisect; primary lateral segments 1- or 2-paired, remote, at ca. 1 cm intervals; ultimate segments narrowly elliptic or falcate. Lower and upper stem leaves gradually smaller. Synflorescence a terminal, rather large, compound flat-topped panicle, 3–5 cm in diam. Involucres campanulate, 2.5–3.5 mm in diam.; phyllaries in 4 rows, scarious margin yellow-brown or deep brown, apex obtuse or rounded, outer ones triangular-lanceolate, ca. 3 mm, abaxially sparsely pubescent, middle and inner ones elliptic, ca. 4 mm, abaxially glabrous. Florets yellow, exterior with sessile glands; marginal female florets 8, corolla narrowly tubular, ca. 1.8 mm, apex 2- or 3-denticulate; disk florets many, corolla tubular, ca. 2.5 mm. Achenes ca. 1 mm. Fl. and fr. Aug–Oct.

- Mountain slopes; 200–3800 m. Gansu, Shaanxi, Shanxi, Sichuan, Xizang.

15. *Ajania myriantha* (Franchet) Y. Ling ex C. Shih in C. Shih & G. X. Fu, Acta Phytotax. Sin. 17(2): 114. 1979.

多花亚菊 duo hua ya ju

Tanacetum myrianthum Franchet, Bull. Annuel Soc. Philom. Paris, sér. 8, 3: 144. 1891; *Chrysanthemum mairei* (H. Léveillé) Handel-Mazzetti; *C. myrianthum* (Franchet) Y. Ling;

C. myrianthum var. *sericocephalum* Handel-Mazzetti; *C. myrianthum* var. *wardii* (C. Marquand & Airy Shaw) Handel-Mazzetti; *C. oresbium* (W. W. Smith) Handel-Mazzetti; *Dendranthema myrianthum* (Franchet) Kitamura; *T. mairei* H. Léveillé; *T. myrianthum* var. *wardii* C. Marquand & Airy Shaw; *T. oresbium* W. W. Smith.

Herbs, perennial, 25–100 cm tall, with slender fibrous roots. Stems erect; upper parts pubescent. Middle stem leaves: petiole 0.3–1 cm; leaf blade ovate or oblong, 1.5–3 × 1–2.5 cm, abaxially white or gray-white, densely and thickly appressed pubescent, adaxially green, glabrous or sparsely pubescent, 2-pinnatisect; primary lateral segments 2–4-paired, at ca. 5 mm intervals; ultimate segments elliptic, lanceolate, or obliquely triangular. Upper stem leaves gradually smaller; leaves below synflorescence pinnatisect. Synflorescence a terminal flat-topped panicle, 3–5 cm in diam., rarely a compound corymb to 25 cm in diam. Capitula many. Involucres campanulate, 2.5–3 mm in diam.; phyllaries in 4 rows, scarious margin brown, apex rounded or obtuse, outer ones ovate, ca. 1 mm, abaxially glabrous or sparsely pubescent, middle and inner ones elliptic or lanceolate, 2–2.5 mm, middle ones abaxially glabrous or sparsely pubescent. Florets yellow, exterior with sessile glands; marginal female florets 3–6, corolla narrowly tubular, ca. 1.5 mm, apex (2–)4- or 5-denticulate; disk florets many, corolla tubular, ca. 2 mm. Achenes ca. 1 mm. Fl. and fr. Jul–Oct.

Mountain slopes, river valleys; 2200–3600 m. Gansu, Hubei, Qinghai, Sichuan, Xizang, Yunnan [Bhutan].

16. *Ajania tenuifolia* (Jacquemont ex Candolle) Tzvelev in Schischkin & Bobrov, Fl. URSS 26: 411. 1961.

细叶亚菊 xi ye ya ju

Tanacetum tenuifolium Jacquemont ex Candolle, Prodr. 6: 129. 1838; *Ajania roborowskii* Muldashev; ?*A. roborowskii* var. *tsinghaica* Muldashev; *Chrysanthemum roborowskii* (Muldashev) H. Ohashi & Yonekura; ?*C. roborowskii* var. *tsinghaicum* (Muldashev) H. Ohashi & Yonekura; *C. stenolobum* Handel-Mazzetti.

Herbs, perennial, 9–25 cm tall; rhizomes slender, with slender fibrous roots. Stems many, procumbent and erect; procumbent stems with many brown ovate cataphylls; erect stems branched from base, upper parts and peduncles appressed pubescent, hairs medifixed. Middle stem leaves: petiole 0.4–0.8 cm; leaf blade suborbicular, triangular-ovate, or flabelliform, 1–2 × 1–2 cm, abaxially white or gray-white, densely appressed villous, adaxially pale green, sparsely villous, 2-pinnatisect; primary lateral segments 2- or 3-paired; ultimate segments narrowly elliptic or oblanceolate. Proximal and distal stem leaves gradually smaller. Synflorescence a terminal flat-topped cyme, 2–3 cm in diam. Capitula few. Involucres campanulate, ca. 4 mm in diam.; phyllaries in 4 rows, apex obtuse, scarious margin distinctly divided into dark brown inner zones and narrow colorless outer zone, outer ones lanceolate, ca. 2.5 mm, abaxially sparsely pubescent, middle and inner ones elliptic to oblanceolate, 3–4 mm, abaxially glabrous. Florets dark or orange yellow, exterior with sessile glands; marginal female florets 7–13, corolla narrowly tubular, ca. 2 mm, apex 2- or 3-denticulate;

disk florets 30–60, corolla 3–4 mm. Achenes ca. 1 mm. Fl. and fr. Aug–Oct. $2n = 36^*$.

• Grasslands on mountain slopes; 2200–4600 m. Gansu, Jiangsu, Qinghai, Sichuan, Xizang, Yunnan.

Ajania roborowskii var. *tsinghaica* is known to us only from the protologue. It appears to be a depauperate form with less divided leaves.

17. *Ajania breviloba* (Franchet ex Handel-Mazzetti) Y. Ling & C. Shih, Bull. Bot. Lab. N. E. Forest. Inst., Harbin 6: 13. 1980.

短裂亚菊 duan lie ya ju

Chrysanthemum pallasianum (Fischer ex Besser) Komarov var. *brevilobum* Franchet ex Handel-Mazzetti, Symb. Sin. 7: 1112. 1936; *C. brevilobum* (Franchet ex Handel-Mazzetti) Handel-Mazzetti; *Dendranthema brevilobum* (Franchet ex Handel-Mazzetti) Kitamura.

Herbs, perennial, 8–50 cm tall; rhizomes slender, with slender fibrous roots; cataphylls brown, triangular-ovate. Stems erect, usually not branched, sometimes branched from base, purple-red, pubescent, especially upper part and below synflorescence. Middle stem leaves: petiole 0.5–1 cm; leaf blade ovate, suborbicular, or flabelliform, 1.5–3 × 1.5–2 cm, abaxially gray-white, densely and thickly appressed pubescent, adaxially green or pale green, sparsely pubescent or subglabrous, 2-pinnatisect or irregularly 3–5-bipalmate-pinnatisect; primary lateral segments 3- or 4-paired; ultimate segments elliptic or lanceolate-elliptic; proximal and distal stem leaves trisect, 5-palmatisect or biternatisect. Synflorescence a flat-topped panicle, or compound panicle, 2–7 cm in diam. Capitula many or few. Involucres campanulate, 4–5 mm in diam.; phyllaries in 4 rows, abaxially sparsely pubescent, scarious margin brown, outer ones lanceolate-elliptic, ca. 4 mm, middle and inner ones elliptic to long obovate, 3–5 mm. Florets yellow, exterior with sessile glands; marginal female florets 4, corolla narrowly tubular, ca. 2.8 mm, apex minutely 3-denticulate; disk florets many, corolla narrowly tubular, ca. 3 mm. Achenes ca. 2 mm. Fl. and fr. Sep–Oct.

• Open places in forests, gravelly places on mountain slopes; 2800–4100 m. Hubei, Jilin, Shaanxi, Yunnan.

The usual basionym given for this species, *Tanacetum pallasianum* (Fischer ex Besser) Trautvetter & C. A. Meyer “var. *brevilobum* Franchet” (Diels, Notes Roy. Bot. Gard. Edinburgh 7: 26. 1912), is a nomen nudum and was therefore not validly published (*Vienna Code*, Art. 32.1(d)).

18. *Ajania khartensis* (Dunn) C. Shih in C. Shih & G. X. Fu, Acta Phytotax. Sin. 17(2): 115. 1979.

铺散亚菊 pu san ya ju

Tanacetum khartense Dunn, Bull. Misc. Inform. Kew 1922: 150. 1922; *Ajania mutellina* (Handel-Mazzetti) Y. Ling; *Chrysanthemum khartense* (Dunn) H. Ohashi & Yonekura; *C. mutellinum* (Handel-Mazzetti) Handel-Mazzetti; *Dendranthema mutellinum* (Handel-Mazzetti) Kitamura; *T. mutellinum* Handel-Mazzetti.

Herbs, perennial, 10–20 cm tall, with slender fibrous roots. Flowering and sterile stems many, diffuse, densely or sparsely

villous or pubescent. Middle stem leaves: petiole ca. 5 mm; leaf blade orbicular, suborbicular, flabelliform, or broadly cuneate, 0.8–1.5 × 1–1.8 cm, both surfaces gray-white, densely or thickly appressed pubescent, bipalmatisect or 3–5-palmatisect; primary lateral segments 1 (or 2)-paired; ultimate segments elliptic. Lower and uppermost stem leaves trisect. Synflorescence a terminal flat-topped cyme, 2–4 cm in diam. Capitula few, (1–)3–5 or many (to 15). Involucres campanulate, 6–10 mm in diam.; phyllaries in 4 rows, abaxially densely or sparsely pubescent, scarious margin dark brown or gray-brown, apex obtuse or slightly rounded, outer ones lanceolate or linear-lanceolate, 3–4 mm, middle and inner ones broadly lanceolate, narrowly elliptic, or oblanceolate, 4–5 mm. Florets yellow; marginal female florets 6–8, corolla narrowly tubular, 3- or 4-denticulate; disk florets many, corolla tubular. Achenes ca. 1.2 mm. Fl. and fr. Jul–Sep.

Mountain slopes; 2500–5300 m. Gansu, Nei Mongol, Ningxia, Qinghai, Sichuan, Xizang, Yunnan [N India].

19. *Ajania sericea* C. Shih, Bull. Bot. Lab. N. E. Forest. Inst., Harbin 6: 14. 1980.

密绒亚菊 mi rong ya ju

Chrysanthemum delavayanum H. Ohashi & Yonekura.

Herbs, perennial, ca. 35 cm tall, with 1 flowering stem and 1 or 2 sterile stems; rhizomes short, with slender fibrous roots. Flowering stem erect, most parts densely and thickly sericeous-tomentose. Middle stem leaves: petiole 2–4 mm; leaf blade suborbicular or flabelliform, ca. 0.8 × 1.5 cm, both surfaces gray-white, densely and thickly tomentose, 3-pinnatisect or subtripalmate-pinnatisect; primary lateral segments 2-paired; ultimate segments lanceolate or narrowly elliptic. Lower and upper stem leaves smaller. Synflorescence a terminal flat-topped panicle, 2–4 cm in diam. Capitula few or moderate in number. Involucres campanulate, 3–4 mm in diam.; phyllaries in 4 rows, scarious margin pale brown, outer ones linear or lanceolate, ca. 2.5 mm, abaxially densely and thickly tomentose, middle and inner ones oblanceolate or narrowly elliptic, ca. 3 mm, middle ones densely and thickly tomentose abaxially, inner ones glabrous abaxially. Florets yellow; marginal female florets: corolla tubular, ca. 1.5 mm, apex 4- or 5-denticulate; disk florets many, corolla tubular, ca. 2 mm. Fl. May.

• Yunnan (Eryuan).

20. *Ajania tripinnatisecta* Y. Ling & C. Shih, Bull. Bot. Lab. N. E. Forest. Inst., Harbin 6: 14. 1980.

多裂亚菊 duo lie ya ju

Chrysanthemum tripinnatisectum (Y. Ling & C. Shih) H. Ohashi & Yonekura.

Herbs, perennial, ca. 65 cm tall, with slender fibrous roots. Stems solitary, erect; synflorescence branches short; upper parts and peduncles appressed pubescent. Middle stem leaves sessile; leaf blade ovate or elliptic, 3–3.5 × 2–3 cm, abaxially gray-white, densely appressed pubescent, adaxially green, sparsely pubescent, 3-pinnatisect; primary lateral segments 3-paired; ultimate segments lanceolate or elliptic. Upper stem leaves progressively smaller. Synflorescence a terminal compound flat-

topped panicle. Capitula many. Involucres campanulate, 3–4 mm in diam.; phyllaries in 4 rows, scarious margin yellow-brown, outer ones elliptic, ca. 2.5 mm, abaxially pubescent, middle and inner ones elliptic or oblanceolate, 3–4 mm, abaxially glabrous. Florets yellow, exterior with sessile glands; marginal female florets 7, corolla narrowly tubular, ca. 2 mm, acutely 3-denticulate; disk florets many, corolla tubular, ca. 3 mm. Achenes ca. 1 mm. Fl. and fr. Oct.

• Mountain slopes; 3200–3300 m. Sichuan (Hongyuan).

21. *Ajania elegantula* (W. W. Smith) C. Shih, Bull. Bot. Lab. N. E. Forest. Inst., Harbin 6: 15. 1980.

云南亚菊 yun nan ya ju

Tanacetum elegantulum W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 10: 201. 1918; *Chrysanthemum elegantulum* (W. W. Smith) S. Y. Hu.

Herbs, perennial, 25–50 cm tall, with small woody rootstock. Stems many, slender, unbranched, erect or ascending, thinly silvery gray tomentose. Stem leaves ca. 2 × 1.5 cm, both surfaces gray tomentulose, 3-pinnatisect; ultimate segments linear, 2–3 × 0.5–0.6 mm. Distal leaves less dissected, those subtending synflorescence linear, ca. 1 cm. Synflorescence a terminal flat-topped panicle; peduncles to 1.4 cm, grayish white. Immature capitula 3–4 mm in diam. Outer phyllaries linear or lanceolate, 2–3 mm, grayish white tomentulose; middle and inner ones lanceolate or elliptic, abaxially ± tomentulose, adaxially straw-colored scarious.

• Yunnan.

Ajania elegantula seems to be known only from the original immature collections and was regarded as insufficiently known in the FRPS account of *Ajania*. However, the elegant, finely dissected leaves are very distinctive, and it seems justifiable to accept it as a good species.

22. *Ajania nubigena* (Wallich ex Candolle) C. Shih in C. Shih & G. X. Fu, Acta Phytotax. Sin. 17(2): 116. 1979.

黄花亚菊 huang hua ya ju

Tanacetum nubigenum Wallich ex Candolle, Prodr. 6: 130. 1838; *Chrysanthemum nubigenum* (Wallich ex Candolle) Handel-Mazzetti; *Dendranthema nubigenum* (Wallich ex Candolle) Kitamura.

Herbs, perennial, ca. 30 cm tall, with slender fibrous roots. Stems unbranched or branched from base or lower part, densely pubescent. Middle stem leaves: petiole 3–5 cm; leaf blade orbicular or broadly ovate, ca. 1 × 1 cm, both surfaces gray-white, densely pubescent, tripinnatisect or inconspicuously tripinnatisect; primary lateral segments 2-paired; ultimate segments linear. Distal stem leaves progressively smaller. Synflorescence a terminal compound flat-topped panicle, ca. 3 cm in diam.; synflorescence branches and peduncles white, densely pubescent. Capitula many. Involucres campanulate, ca. 5 mm in diam.; phyllaries in 4 rows, abaxially sparsely pubescent, scarious margin dark brown, apex obtuse or rounded, outer ones linear-lanceolate, ca. 2.5 mm, middle and inner ones narrowly elliptic or oblanceolate, 3–4 mm. Florets yellow, exterior with

sessile glands; marginal female florets 8, corolla narrowly tubular, ca. 2 mm, apex obtusely 3-denticulate; disk florets: corolla tubular, ca. 3 mm. Fl. Aug.

Mountain slopes; 3900–4100 m. Gansu, Sichuan, Xizang (Gyirong), Yunnan [Bhutan, India, Nepal].

"*Artemisia nubigena*" (Wallich, Numer. List, no. 3233. 1831) belongs here but is a nomen nudum and was therefore not validly published (*Vienna Code*, Art. 32.1(d)).

23. *Ajania parviflora* (Grüning) Y. Ling, Bull. Bot. Lab. N. E. Forest. Inst., Harbin 6: 15. 1980.

小花亚菊 xiao hua ya ju

Chrysanthemum parviflorum Grüning, Repert. Spec. Nov. Regni Veg. 12: 312. 1913; *Tanacetum davidii* Krascheninnikov; *T. parviflorum* (Grüning) H. W. Kung.

Subshrubs, 7–25 cm tall. Old branches short, with flowering and sterile stems. Flowering stems unbranched or shortly fascicular inflorescence-branched at apices of branches, sparsely puberulent. Middle leaves petiolate; leaf blade ovate, ca. 2.5 × 2 cm, abaxially pale gray-white, densely pubescent, adaxially green, sparsely pubescent, 2-pinnatisect; primary lateral segments 1- or 2-paired; ultimate segments linear; proximal and distal leaves 3–5-pinnatisect. Synflorescence a terminal clustered flat-topped cyme. Capitula 5–10. Involucres cylindrical, 2.5–3 mm in diam.; phyllaries in 4 rows, rigidly herbaceous, scarious margin hyaline, straw-colored, glossy, apex acute, outer ones lanceolate, ca. 1.5 mm, abaxially puberulent, middle and inner ones narrowly elliptic, ca. 3.5 mm, abaxially glabrous. Florets yellow; marginal female florets 4, corolla tubular, ca. 3.5 mm, apex 5-lobed; disk florets many, corolla tubular. Achenes ca. 1.5 mm.

Low mountains, hills; ca. 1400 m. Hebei, Nei Mongol, Shanxi [Mongolia].

24. *Ajania trifida* (Turczaninow) Muldashev, Bot. Zhurn. (Moscow & Leningrad) 68: 213. 1983.

女蒿 nü hao

Artemisia trifida Turczaninow, Bull. Soc. Imp. Naturalistes Moscou 5: 196. 1832; *Chrysanthemum trifidum* (Turczaninow) Krascheninnikov; *Hippolytia trifida* (Turczaninow) Poljakov; *Tanacetum trifidum* (Turczaninow) Candolle.

Subshrubs, small, to 20 cm tall. Flowering stems slender, long, gray-white, appressed pubescent. Basal leaves in rosette, leaves petiolate; leaf blade spatulate or cuneate, including cuneate-attenuate petiole, 0.5–3.5 × 0.5–0.8 cm, both surfaces gray-green, appressed white pubescent, 3-parted or -lobed; lobes short, linear or oblong-linear, apex obtuse or rounded. Middle and upper leaves usually simple. Synflorescence a terminal clustered flat-topped panicle; peduncle 0.2–1.5 cm, appressed pubescent. Capitula 3–14. Involucres narrowly campanulate, 3–4 mm in diam.; phyllaries in 5 rows, glossy, yellowish, rigidly herbaceous, scarious margin narrow, white, outer ones ovate or elliptic, 2–2.5 mm, middle and inner ones oblong to oblanceolate, 4–4.5 mm. Corolla yellow, 3–4 mm. Achenes subterete, 1.5–3 mm. Fl. and fr. Jun–Aug.

Stony desert steppes, stony mountain slopes; 900–1400 m. Nei Mongol [Mongolia].

Tzvelev (Fl. URSS 26: 412. 1961) placed this species within *Ajania* rather than *Hippolytia* on the basis of the heterogamous capitula and densely leafy woody stems without condensed vegetative shoots.

25. *Ajania potaninii* (Krascheninnikov) Poljakov, Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk S.S.S.R. 17: 424. 1955.

川甘亚菊 chuan gan ya ju

Tanacetum potaninii Krascheninnikov, Repert. Spec. Nov. Regni Veg. 26: 28. 1929; *Ajania dentata* X. D. Cui; *Chrysanthemum potaninii* (Krascheninnikov) Handel-Mazzetti; *T. potaninii* var. *nanum* Krascheninnikov; *T. potaninii* var. *suffruticosum* Krascheninnikov; *T. rockii* Mattfeld ex Rehder & Kobuski.

Subshrubs, ca. 70 cm tall. Old branches dark gray; flowering branches sparsely appressed pubescent. Lower and middle stem leaves: petiole ca. 0.5 cm; leaf blade broadly ovate, ovate, orbicular, or broadly elliptic, 1.5–2.5 × 1–2 cm, abaxially white or gray-white, densely and thickly appressed pubescent, adaxially green or gray-green, glabrous or very sparsely pubescent, margin serrate or occasionally inconspicuously 3–5-lobed, apex truncate or acute. Uppermost stem leaves spatulate, orbicular, or narrowly elliptic, small. Synflorescence a terminal compound flat-topped panicle, 2–8 cm in diam. Capitula many. Involucres campanulate, 2.5–3 mm in diam.; phyllaries in 4 rows, straw-colored, glossy, scarious margin hyaline, outer ones ovate or triangular-lanceolate, ca. 1.5 mm, abaxially sparsely pubescent, apex obtuse or rounded, middle and inner ones elliptic or lanceolate, 2–2.5 mm, middle ones abaxially sparsely pubescent, inner ones abaxially glabrous. Marginal female florets 6, corolla narrowly tubular, ca. 2 mm, apex 2–4-denticulate; disk florets: corolla tubular, ca. 2.5 mm. Achenes ca. 1.2 mm. Fl. and fr. Aug–Nov.

• Mountain slopes, forests, river valleys, hills; 2000–2300 m. Gansu, Shaanxi, Sichuan.

26. *Ajania amphisericea* (Handel-Mazzetti) C. Shih, Acta Phytotax. Sin. 32: 366. 1994 ["*amphisericea*"].

灰叶亚菊 hui ye ya ju

Chrysanthemum potaninii (Krascheninnikov) Handel-Mazzetti var. *amphisericeum* Handel-Mazzetti, Acta Horti Gothob. 12: 271. 1938.

Subshrubs, 18–35 cm tall. Old branches gray-brown; flowering branches sparsely appressed pubescent. Middle stem leaves: petiole ca. 3 mm; leaf blade orbicular or broadly elliptic, 0.7–2 × 0.5–1.5 cm, both surfaces gray-white, densely tomentose, margin undivided, serrate. Uppermost leaves orbicular or narrowly elliptic, small. Synflorescence a terminal flat-topped panicle, 1–4 cm in diam. Capitula many. Involucres campanulate, ca. 3 mm in diam.; phyllaries in 4 rows, straw-colored, scarious margin hyaline, apex obtuse or rounded, outer ones ovate or triangular-lanceolate, ca. 2.5 mm, abaxially pubescent, middle and inner ones elliptic or lanceolate, ca. 3 mm, middle ones pubescent abaxially, inner ones glabrous abaxially. Florets yellow; marginal female florets ca. 13, corolla narrowly tubular,

ca. 3 mm, apex 4-denticulate; disk florets many, corolla tubular, ca. 4 mm. Achenes ca. 2 mm. Fl. and fr. Sep–Nov.

- Mountain slopes; 1700–2300 m. Sichuan (Kangding, Tianquan).

27. *Ajania truncata* (Handel-Mazzetti) Y. Ling ex C. Shih, Acta Phytotax. Sin. 32: 366. 1994.

深裂亚菊 shen lie ya ju

Chrysanthemum truncatum Handel-Mazzetti, Acta Horti Gothob. 12: 270. 1938.

Subshrubs, 15–35 cm tall. Old branches gray-brown; flowering branches sparsely appressed tomentose. Middle stem leaves: petiole 0.2–0.6 cm; leaf blade ovate or broadly ovate, ca. 1.2 × 1.2 cm, both surfaces gray-white, adaxially densely tomentose, pinnatisect; lateral segments 1- or 2-paired. Distal leaves and leaves below synflorescence smaller, undivided. Synflorescence a terminal compound flat-topped panicle, 1–2.5 cm in diam. Capitula many. Involucres campanulate, 2.4–3 mm in diam.; phyllaries in 4 rows, straw-colored, abaxially glabrous, scarious margin hyaline, apex obtuse or rounded, outer ones ovate or triangular-lanceolate, ca. 2 mm, middle and inner ones elliptic, ca. 3 mm. Florets yellow; marginal female florets ca. 16, corolla narrowly tubular, ca. 2 mm, apex 4-denticulate; disk florets: corolla tubular, ca. 3 mm. Achenes ca. 1 mm. Fl. and fr. Sep–Oct.

- Streamsides, wastelands, slopes; 1900–2100 m. Sichuan (Jinchuan).

28. *Ajania hypoleuca* Y. Ling ex C. Shih, Acta Phytotax. Sin. 32: 366. 1994.

下白亚菊 xia bai ya ju

Chrysanthemum hypoleucum (Y. Ling ex C. Shih) H. Ohashi & Yonekura.

Subshrubs, ca. 55 cm tall. Young branches white pubescent. Middle and distal stem leaves: petiole ca. 5 mm; leaf blade ovate, subovate, or ovate-elliptic, 1.2–2.5 × 1.3–2 cm, abaxially gray-white, densely and thickly tomentose, with sessile glands beneath indumentum, adaxially green, glabrous, with sessile glands, pinnately 3–5-paired, base truncate or subtruncate. Leaves below synflorescence similar, but smaller. Synflorescence a terminal flat-topped panicle, 1–5 cm in diam.; synflorescence branches and peduncles white tomentose. Capitula many. Involucres campanulate, ca. 3.5 mm in diam.; phyllaries in 4 rows, straw-colored, glossy, abaxially glabrous, scarious margin hyaline, apex obtuse or rounded, outer ones elliptic, ca. 1 mm, middle and inner ones elliptic to obovate-elliptic, ca. 3 mm. Florets yellow; marginal female florets 5 or 6, corolla narrowly tubular, minutely 3-denticulate; disk florets many, corolla tubular. Achenes ca. 0.6 mm. Fl. and fr. Jul.

- Roadsides; 600–700 m. Gansu, Sichuan.

29. *Ajania achilleoides* (Turczaninow) Poljakov ex Grubov, Novosti Sist. Vyssh. Rast. 9: 926. 1972.

蓍状亚菊 shi zhuang ya ju

Artemisia achilleoides Turczaninow, Bull. Soc. Imp. Nat-

uralistes Moscou 5: 195. 1832; *Chrysanthemum achilleoides* (Turczaninow) Handel-Mazzetti; *Tanacetum achilleoides* (Turczaninow) Candolle.

Subshrubs, 10–20 cm tall. Old branches short. Flowering branches appressed pubescent, especially in upper part. Middle stem leaves: petiole 2–3 mm; leaf blade ovate or cuneate, 1–1.5 × 0.5–1 cm, both surfaces white or gray-white, densely appressed pubescent, 2-pinnatisect; primary lateral segments 2-paired; ultimate segments linear or linear-elliptic. Proximal and distal leaves gradually smaller. Synflorescence a terminal flat-topped panicle, ca. 2 cm in diam. Capitula few to many. Involucres campanulate, ca. 3 mm in diam.; phyllaries in 4 rows, glossy, straw-colored, scarious margin hyaline, apex obtuse or rounded, outer ones elliptic-lanceolate, ca. 2 mm, abaxially puberulent, middle and inner ones ovate to lanceolate, ca. 2.5 mm, middle ones puberulent abaxially, inner ones glabrous abaxially. Florets yellow, exterior with sessile glands; marginal female florets 6, corolla narrowly tubular, ca. 2 mm, apex acutely 4-denticulate; disk florets: corolla tubular, ca. 2.2 mm. Achenes ca. 1 mm. Fl. and fr. Aug–Sep.

- Desert steppes, steppes; ca. 200 m. Nei Mongol [Mongolia].

30. *Ajania nitida* C. Shih, Bull. Bot. Lab. N. E. Forest. Inst., Harbin 6: 15. 1980.

光苞亚菊 guang bao ya ju

Chrysanthemum nitidum (C. Shih) H. Ohashi & Yonekura.

Herbs, perennial, ca. 30 cm tall. Stems erect, upper parts inflorescence-branched, pubescent. Middle stem leaves sessile, with divided pseudostipules; leaf blade ovate or oblanceolate, 1–1.5 × 0.3–0.6 cm, both surfaces gray-white, densely pubescent, bipalmate-pinnately 3–5-sect; primary lateral segments 1- or 2-paired; ultimate segments elliptic or triangular; leaves below synflorescence small, 3-sect or undivided. Synflorescence a terminal compound lax flat-topped panicle. Capitula many. Involucres campanulate, 3–4 mm in diam.; phyllaries in 4 rows, straw-colored, glossy, scarious margin hyaline, outer ones lanceolate, ca. 1 mm, sparsely pubescent, middle and inner ones ovate, elliptic, or ovate-elliptic, 2–2.7 mm, abaxially glabrous. Florets yellow; marginal female florets 8, corolla narrowly tubular, apex 3- or 4-denticulate; disk florets many, corolla tubular. Fl. Sep.

- Dry mountain slopes; ca. 3900 m. Sichuan.

31. *Ajania fruticulosa* (Ledebour) Poljakov, Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk S.S.S.R. 17: 428. 1955.

灌木亚菊 guan mu ya ju

Tanacetum fruticosum Ledebour, Icon. Pl. 1: 10. 1829; *Chrysanthemum aureoglobosum* (W. W. Smith & Farrer) Handel-Mazzetti; *C. neofruticulosum* Y. Ling; *T. aureoglobosum* W. W. Smith & Farrer.

Subshrubs, 8–40 cm tall. Old branches straw-colored. Flowering branches gray-white or gray-green, densely or sparsely pubescent. Middle stem leaves petiolate, with entire pseudostipules; leaf blade orbicular, triangular-ovate, reniform, or broadly ovate, 0.5–3 × 1–2.5 cm, both surfaces gray-white or

pale green, densely pubescent, bipalmately 3–5-sect or bipalmate, pinnately 3–5-sect; primary lateral segments 1- or 2-paired; ultimate segments linear-subulate, broadly linear, or narrowly oblanceolate. Lower and upper leaves narrowly oblanceolate, gradually smaller, palmately 3–5-sect. Synflorescence a terminal flat-topped panicle. Capitula few to many. Involucre campanulate, 3–4 mm in diam.; phyllaries in 4 rows, straw-colored, glossy, scarious margin hyaline, rarely brown, apex obtuse or rounded, outer ones ovate or lanceolate, ca. 1 mm, abaxially sparsely pubescent, middle and inner ones elliptic, 2–3 mm, abaxially glabrous. Florets yellow, exterior with sessile glands; marginal female florets 5–8, corolla narrowly tubular, ca. 2 mm, apex 3(–5)-denticulate; disk florets many, corolla tubular, 2–3 mm. Achenes 1.2–1.5 mm. Fl. and fr. Jun–Oct.

Deserts, desert steppes; 500–4400 m. Gansu, Jiangsu, Nei Mongol, Qinghai, Shaanxi, Xinjiang, Xizang [Kazakhstan, Mongolia, Russia, Turkmenistan].

32. *Ajania nematoloba* (Handel-Mazzetti) Y. Ling & C. Shih, Bull. Bot. Lab. N. E. Forest. Inst., Harbin 6: 16. 1980.

丝裂亚菊 *si lie ya ju*

Chrysanthemum nematolobum Handel-Mazzetti, Acta Horti Gothob. 12: 271. 1938.

Subshrubs, ca. 30 cm tall. Old branches short; young branches pale purple or pale green, glabrous. Lower and middle stem leaves sessile; leaf blade broadly ovate or cuneate, 1–2 × 1–4 cm, both surfaces green or pale green, glabrous or very sparsely puberulent, biternately palmatisect or palmate-pinnatisect; primary lateral segments 1-paired; ultimate segments filiform. Upper leaves small, 3–5-sect. Synflorescence a terminal flat-topped panicle. Capitula few to many. Involucre campanulate, 2.5–3 mm in diam.; phyllaries in 4 rows, straw-colored, glossy, abaxially glabrous, scarious margin hyaline, outer ones ovate, ca. 1 mm, middle and inner ones broadly obovate, 2.5–3 mm. Florets yellow; marginal female florets 5, corolla narrowly tubular, ca. 1.5 mm, apex laterally acutely 2-denticulate; disk florets: corolla tubular, ca. 2 mm. Achenes nearly 1 mm. Fl. and fr. Sep–Oct.

• Mountain slopes; 1700–2300 m. Gansu, Nei Mongol, Qinghai.

33. *Ajania pallasiana* (Fischer ex Besser) Poljakov, Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk S.S.S.R. 17: 420. 1955.

亚菊 *ya ju*

Artemisia pallasiana Fischer ex Besser, Tent. Abrot. 61. 1832; *Chrysanthemum pallasianum* (Fischer ex Besser) Komarov; *Pyrethrum pallasianum* (Fischer ex Besser) Maximowicz; *Tanacetum pallasianum* (Fischer ex Besser) Trautvetter & C. A. Meyer.

Herbs, perennial, 30–60 cm tall. Stems erect, solitary or fascicled, shortly branched, appressed pubescent, especially on upper parts including peduncles. Basal and lower stem leaves withered at anthesis. Middle stem leaves with petiole 0.5–1 cm; leaf blade ovate, narrowly elliptic, or rhomboid, 2–4 × 1–2.5 cm, abaxially white or gray-white, appressed densely and thickly pubescent, adaxially green, glabrous, bipalmate or bipal-

mate-pinnately 3–5-sect; primary lateral segments 1- or 2-paired; ultimate segments linear or linear-lanceolate. Upper stem leaves similar, progressively smaller. Synflorescence a terminal compound flat-topped panicle, 3–5 cm in diam. Capitula few to many. Involucre broadly campanulate, 6–7 mm in diam.; phyllaries in 4 rows, straw-colored, glossy, abaxially glabrous, outer ones narrowly elliptic, 2.5–3 mm, apex with rounded waxy hyaline appendage, middle and inner ones long ovate, ca. 4 mm. Florets yellow, exterior with sessile glands; marginal female florets ca. 3, corolla tubular, ca. 3.5 mm, apex 5-denticulate; disk florets many, corolla tubular, ca. 3.5 mm, apex 5-lobed. Achenes ca. 1.8 mm. Fl. and fr. Aug–Sep. $2n = 36$.

Thickets, mountain slopes; 200–2900 m. Gansu, Heilongjiang, Jilin, Liaoning, Shaanxi [Korea, Mongolia, Russia].

34. *Ajania fastigiata* (C. Winkler) Poljakov, Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk S.S.S.R. 17: 428. 1955.

新疆亚菊 *xin jiang ya ju*

Artemisia fastigiata C. Winkler, Trudy Imp. S.-Peterburgsk. Bot. Sada 11: 373. 1891; *Chrysanthemum fastigiatum* (C. Winkler) H. Ohashi & Yonekura.

Herbs, perennial, 30–90 cm tall. Stems erect, solitary or fascicled, branched or shortly branched from middle or above, pubescent. Lower stem leaves withered at anthesis. Middle stem leaves: petiole ca. 1 cm, leaf blade broadly triangular-ovate, 3–4 × 2–3 cm, both surfaces gray-white, densely appressed pubescent, 2-pinnatisect; primary lateral segments 2- or 3-paired; ultimate segments narrowly elliptic or oblanceolate. Upper stem leaves similar, progressively smaller. Synflorescence a terminal flat-topped panicle. Capitula many. Involucre campanulate, 2.5–4 mm in diam.; phyllaries in 4 rows, abaxially glabrous, scarious margin hyaline, apex obtuse, outer ones linear, 2.5–3.5 mm, middle and inner ones elliptic or oblanceolate, 3–4 mm. Florets yellow; marginal female florets 8, corolla narrowly tubular, ca. 1.5 mm, apex 3-denticulate; disk florets many, corolla tubular, 1.8–2.5 mm. Achenes 1–1.5 mm. Fl. and fr. Aug–Oct.

Steppes, semideserts, forest understories; 900–2300 m. Xinjiang [Afghanistan, Kazakhstan].

35. *Ajania gracilis* (J. D. Hooker & Thomson) Poljakov in Schischkin & Bobrov, Fl. URSS 26: 407. 1961.

纤细亚菊 *xian xi ya ju*

Tanacetum gracile J. D. Hooker & Thomson in J. D. Hooker, Fl. Brit. India 3: 318. 1881; *Chrysanthemum gracile* (J. D. Hooker & Thomson) B. Fedtschenko (1915), not (Schultz Bipontinus) Masferrer y Arquimbau (1881); *C. hookeri* Kitamura.

Subshrubs, 15–45(–60) cm tall, with thick woody root. Stems strongly branched at base and woody for much of length, densely grayish pubescent, hairs appressed, bifid. Lower stem leaves withered at anthesis. Middle stem leaves 2–3 cm; petiole rather long, wingless, base sometimes with linear pseudo-stipules; leaf blade rounded triangular, ca. 2.5 cm wide, both surfaces gray-green, appressed pubescent, twice ternately divi-

ded; ultimate segments oblong to linear, to 1.5 mm wide. Upper stem leaves reduced, subsessile, 3–5-lobed. Synflorescence a terminal flat-topped panicle. Capitula 20–60. Involucres 2.5–3 mm in diam.; phyllaries herbaceous, abaxially subglabrous, scarious margin broad, light or brown, apex broadened, middle

and inner phyllaries 2–3 × as long as outer, to 4 mm. Florets 15–25, corolla tubular; marginal female florets few; disk florets: corolla 1.5–2 mm. Achenes 1.2–1.5 mm.

Stony slopes; above 3000 m. Ningxia, Xizang [Kyrgyzstan, Tajikistan (Pamirs)].

148. *AJANIOPSIS* C. Shih, Acta Phytotax. Sin. 16(2): 86. 1978.

画笔菊属 hua bi ju shu

Shi Zhu (石铸 Shih Chu); Christopher J. Humphries, Michael G. Gilbert

Herbs, annual. Leaves alternate, biternately pinnatisect, 2-pinnatisect, or trisect. Synflorescences cymose; capitula many or few, in ± flat-topped panicles, rather small, heterogamous, disciform. Involucres obovoid, 4–5 mm in diam.; phyllaries in 2 rows. Receptacle convex, epaleate. Marginal florets in 1 row, female; corolla pitcher-shaped, tapering above; limb yellow, apex minutely 2-toothed, apically pilose with straight erect hairs. Disk florets many, bisexual; corolla tubular, apex 5-lobed. Anther bases obtuse; apical appendage subtriangular. Style branches truncate at apex. Achenes obovoid, 5- or 6-ribbed. Pappus absent.

• One species: China.

1. *Ajaniopsis penicilliformis* C. Shih, Acta Phytotax. Sin. 16(2): 87. 1978.

画笔菊 hua bi ju

Plants 5–10 cm tall. Stems few branched from base, branches prostrate in lower part, upper part ascending, white villous. Middle stem leaves: petiole ca. 0.5 mm; leaf blade broadly cuneate or suborbicular, 0.5–0.7 × ca. 1 cm, both surfaces densely villous, biternately pinnatisect or 2-pinnatisect; primary lateral segments 1-paired; ultimate segments linear or broadly linear, apex acute. Proximal and distal leaves small.

Synflorescence a flat-topped terminal panicle. Capitula many or few. Involucres obovoid, 4–5 mm in diam.; phyllaries in 2 rows, abaxially densely villous, scarious margin dark, outer ones elliptic, 3–3.5 mm, inner ones spatulate or oblanceolate, ca. 3 mm. Florets yellow, apically pilose with erect straight hairs; marginal female florets 7 or 8, corolla ascidiform, ca. 2 mm, tapering above; disk florets 12, corolla tubular, ca. 2.5 mm. Achenes obovoid, ca. 1.8 mm, 5- or 6-ribbed. Pappus absent. Fl. and fr. Sep.

• Steep slopes; 4600–5000 m. Xizang (Nanmulin).

149. *BRACHANTHEMUM* Candolle, Prodr. 6: 44. 1838.

短舌菊属 duan she ju shu

Shi Zhu (石铸 Shih Chu); Christopher J. Humphries, Michael G. Gilbert

Subshrubs, ± procumbent, woody at base, pubescent with basifixed, medifixed, or stellate hairs. Leaves alternate or subopposite, few lobed. Synflorescences cymose; capitula solitary or in ± flat-topped cymes or panicles, heterogamous, radiate, rarely homogamous and discoid. Involucres campanulate, hemispheric, or obconical; phyllaries in 4 or 5 rows, rigidly herbaceous, scarious margin white or brown. Receptacle flat or convex to conical, epaleate. Marginal florets female, fertile, rarely absent; lamina yellow, rarely white. Disk florets yellow, bisexual; corolla tubular, apex 5-lobed. Anther bases obtuse; apical appendage lanceolate. Style branches linear, apex truncate. Achenes terete, 5-striate. Corona absent.

Ten species: C Asia, China, Mongolia; six species (one endemic) in China.

- 1a. Capitula homogamous, ray florets absent; phyllaries abaxially prominently gland-dotted 6. *B. gobicum*
 1b. Capitula heterogamous, ray florets present; phyllaries abaxially not or only obscurely gland-dotted.
 2a. Plants with appressed stellate hairs 5. *B. pulvinatum*
 2b. Plants with simple or medifixed hairs.
 3a. Most leaves palmately 3(–5)-lobed.
 4a. Leaves sessile or subsessile, leaf blade obliquely elliptic or suborbicular, ca. 0.6 × 0.5 cm; achenes ca. 2.8 mm 1. *B. mongolicum*
 4b. Leaves rather long petiolate, leaf blade almost orbicular, to 1.5(–2) × ca. 1.5 cm including petiole; achenes 1.8–2.2 mm 2. *B. fruticosum*
 3b. Most leaves pinnately 4–7-lobed, uppermost leaves sometimes palmately 3-lobed.
 5a. Capitula (1–)3–15(–20), 2–4 crowded at apex, remainder on long divergent peduncles 3. *B. titovii*
 5b. Capitula 1(–5) on long erect peduncles 4. *B. kirghisorum*

1. *Brachanthemum mongolicum* Krascheninnikov, Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk S.S.S.R. 11: 196. 1949.

蒙古短舌菊 meng gu duan she ju

Subshrubs, 5–20 cm tall; indumentum of simple or bifurcate hairs. Old branches gray, twisted; young branches appressed pubescent. Leaves sessile or subsessile, leaf blade obliquely elliptic or suborbicular, ca. 0.6×0.5 cm, grayish green or green, appressed pubescent, glabrescent, palmate-pinnate, 3–5-divided; segments linear-subulate. Uppermost stem leaves entire. Synflorescence an irregular flat-topped cyme. Capitula 3 or 4. Involucres obconical or campanulate, 4–6 mm in diam.; phyllaries in 4 rows, outer ones ovate, ca. 2.5 mm, scarious margin brownish, middle ones elliptic, ca. 6 mm, inner ones oblanceolate, ca. 5 mm. Ray florets ca. 8; lamina yellow, apex minutely 2-denticulate. Achenes ca. 2.8 mm. Fl. and fr. Aug.

Gobi Desert. Gansu, Xinjiang [Mongolia].

2. *Brachanthemum fruticosum* Candolle, Prodr. 6: 45. 1838.

灌木短舌菊 guan mu duan she ju

Subshrubs, 5–20 cm tall; indumentum of simple or bifurcate hairs. Stems many from base, ascending or erect, woody for most of length, branched mainly above middle; young branches finely appressed, grayish tomentose. Petiole rather long, thickened at base; leaf blade almost orbicular, to $1.5(-2) \times$ ca. 1.5 cm including petiole, grayish green, finely tomentose, inconspicuously gland-dotted, palmately 3-partite, sometimes a few pinnately 4- or 5-partite, segments linear-subulate, apices cuspidate; uppermost leaves entire, linear. Synflorescence a lax irregular flat-topped cyme. Capitula (1–)3–15(–20). Involucres cup-shaped, $4.5-6 \times 5-6$ mm; outer phyllaries $1/3-2/5$ as long as inner, margin membranous, light colored or pale brown, inner phyllaries with much wider margin. Ray florets (3 or)4–10(–12); lamina yellowish white, broadly ovate, 2.2–3 mm. Disk florets 2–3 mm. Achenes 1.8–2.2 mm.

Stony slopes. Xinjiang [Kazakhstan].

3. *Brachanthemum titovii* Krascheninnikov, Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk S.S.S.R. 11: 196. 1949.

无毛短舌菊 wu mao duan she ju

Subshrubs, 10–35 cm tall; indumentum of simple or bifurcate hairs. Stems several from base, woody for most of length, branched mainly above middle; young branches finely appressed, grayish tomentose. Petiole rather long, thickened at base; leaf blade broadly ovate in outline, $2-2.5 \times$ ca. 1.5 cm including petiole, grayish green, finely tomentose, inconspicuously gland-dotted, pinnatisect, segments (1 or)2 or 3(or 4) each side, subulate, apices cuspidate; upper stem leaves palmately 3-lobed, uppermost leaf entire. Synflorescence an irregular flat-topped panicle. Capitula (1–)3–10(–18), 2–4 in dense apical cluster and remainder on long peduncles. Involucres cup-shaped, $4.5-6 \times 4-5$ mm; outer phyllaries $1/3-2/5$ as long as inner, margin membranous, rather broad, light colored or pale brown. Ray florets 1–8; lamina yellowish white, broadly ovate, 2.2–3 mm. Disk florets 2–3 mm. Achenes 2–2.5 mm.

Stony slopes, particularly on red conglomerates. Xinjiang (Tian Shan) [Kazakhstan].

4. *Brachanthemum kirghisorum* Krascheninnikov, Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk S.S.S.R. 9: 171. 1946.

吉尔吉斯短舌菊 ji er ji si duan she ju

Subshrubs, 5–25 cm tall; indumentum of simple or bifurcate hairs. Stems many from base, woody for most of length, simple or with 1–5 long lateral branches; young branches finely appressed, grayish tomentose. Petiole rather long, thickened at base; leaf blade broadly ovate in outline, $2-2.5 \times$ ca. 1.5 cm including petiole, grayish green, finely tomentose, inconspicuously gland-dotted, pinnatisect, segments (1 or)2 or 3(or 4) each side, subulate, apices cuspidate; upper stem leaves palmately 3-lobed, uppermost leaf entire. Capitula solitary, less often up to 5 per stem on long erect peduncles. Involucres cup-shaped, $4.5-6.5 \times 5-7$ mm; outer phyllaries $1/3-2/5$ as long as inner, margin membranous, rather broad. Ray florets 5–12(–15); lamina yellowish white, broadly ovate, 2.2–3 mm. Disk florets 2–3 mm. Achenes 1.8–2.4 mm.

Stony slopes; above 1000 m. Xinjiang (Tian Shan) [Kazakhstan].

5. *Brachanthemum pulvinatum* (Handel-Mazzetti) C. Shih, Bull. Bot. Lab. N. E. Forest. Inst., Harbin 6: 1. 1980.

星毛短舌菊 xing mao duan she ju

Chrysanthemum pulvinatum Handel-Mazzetti, Acta Horti Gothob. 12: 263. 1938; *Brachanthemum nanschanicum* Krascheninnikov.

Subshrubs, 15–45 cm tall; indumentum of stellate hairs. Old branches gray, twisted; young branches brownish, densely and appressed white powdery-puberulent. Petiole to 8 mm; leaf blade cuneate, elliptic, or suborbicular, $0.5-1 \times 0.4-0.6$ cm, gray-green, appressed powdery-puberulent, glabrescent, palmate-pinnately or pinnately 4- or 5-divided; segments linear; leaves below synflorescence 3-lobed. Synflorescence terminal, a solitary capitulum or irregular flat-topped cyme. Capitula apically solitary or 3–8; peduncles 2.5–7 cm. Involucres hemispheric or obconical, 6–8 mm in diam.; phyllaries in 4 rows, outer ones ovate or broadly ovate, ca. 2.5 mm, abaxially densely appressed powdery-puberulent, scarious margin brown, middle ones elliptic, 4–4.5 mm, abaxially densely and appressed powdery-puberulent, inner ones linear-oblanceolate, ca. 4 mm, abaxially glabrescent. Ray florets 5–15; lamina yellow, elliptic, apex minutely 2-denticulate. Achenes ca. 2 mm. Fl. and fr. Jul–Sep.

• Mountain slopes, Gobi Desert; 1200–3200 m. Gansu, Nei Mongol, Ningxia, Qinghai, Xinjiang.

Filatova (Rast. Tsentral. Azii 14a: 38. 2007) divided this species between two species: *Brachanthemum pulvinatum* with ovate ray floret lamina and smooth phyllary margins and *B. nanschanicum* with narrower, oblong ray floret lamina and lacerate-undulate phyllary margins.

6. *Brachanthemum gobicum* Krascheninnikov, Trudy Bot. Inst. Akad. Nauk S.S.S.R., Ser. 1, Fl. Sist. Vyssh. Rast. 1: 177. 1933.

戈壁短舌菊 ge bi duan she ju

Subshrubs, (15–)40–80 cm tall; indumentum “glandular pubescent.” Stems few from base, much branched, woody for most of length, bark yellowish white, branching slightly divaricate, sometimes ± spine-tipped, glabrescent. Petiole rather long; leaf blade spatulate to cuneate, 1–2 cm including petiole, pinnatifid, segments 1–3 each side, narrowly triangular, puberulent or subglabrous, with sunken glands; condensed lateral shoots with linear leaves sometimes present; uppermost leaves linear, entire. Capitula solitary or few in ill-defined cyme, on long slender peduncles. Involucre narrowly campanulate, 8–10 × 4–6 mm; phyllaries convex, abaxially ± densely puberulent and prominently gland-dotted, margin white scarious, apex rounded, outer ones obovate, inner ones lanceolate. Ray florets absent.

Disk florets tubular, bisexual, corolla with lower part greenish, sparsely pilose and glandular, upper part yellow. Achenes ca. 2 mm, 3-ribbed.

Nei Mongol [Mongolia].

Brachanthemum gobicum is used for livestock fodder and medicinally in Mongolia where it has been listed as “very rare” under Mongolian Law on Natural Plants (Biodiversity Conservation Action Plan; <http://www.cbd.int/doc/world/mn/mn-nbsap-01-p6-en.pdf>; accessed 23 Nov 2010). The material from Nei Mongol seems to be significantly larger than the 15–20 cm tall plant described in the protologue; it also appears to have more divaricate, apparently somewhat spinescent, branching. The homogamous capitula suggest that the generic placement of this species deserves closer examination.

150. CHRYSANTHEMUM Linnaeus, Sp. Pl. 2: 887. 1753, nom. cons.

菊属 ju shu

Shi Zhu (石铸 Shih Chu); Christopher J. Humphries, Michael G. Gilbert

Arctanthemum (Tzvelev) Tzvelev; *Dendranthema* (Candolle) Des Moulins; *Dendranthema* sect. *Arctanthemum* Tzvelev; *Pyrethrum* sect. *Dendranthema* Candolle.

Subshrubs or perennial herbs; indumentum absent or of basifixed or medifixed hairs. Leaves alternate, pinnately or palmately divided, serrate, or rarely entire. Synflorescence a lax irregular terminal cyme, often reduced to solitary capitulum. Capitula heterogamous, radiate, laxly corymbose or solitary. Involucres cup-shaped, rarely campanulate; phyllaries in 4 or 5 rows, scarious margin white, brown, or dark brown, or outer and middle ones herbaceous and pinnatifid or pinnatifid. Receptacle convex to conical, epaleate. Ray florets female, fertile, in 1 or many rows (in cultivars); lamina yellow, white, or red. Disk florets many, bisexual, fertile; corolla yellow, tubular, 5-lobed. Anther obtuse at base; apical appendage lanceolate-ovate or narrowly elliptic. Achenes subterete or obovoid, faintly 5–8-ribbed. Pappus absent.

Thirty-seven species: mostly in temperate Asia; 22 species (13 endemic) in China.

The florists' chrysanthemum, 菊花 (ju hua), is an enormous hybrid complex developed over many centuries (a Chinese account published in 1630 listed over 500 cultivars) into the huge array of ornamental cultivars available today. The primary parental species is *Chrysanthemum indicum*, but the other parentage is now obscure. More recent hardier “Korean chrysanthemums” include *C. zawadskii* in their parentage. This complex is most widely known as “*C. grandiflorum*” (Broussonet, Elench. Horti Bot. Monspel. 15. 1805, supposedly based on *Anthemis grandiflora* Ramatuelle, J. Hist. Nat. 2: 233. 1792), but Broussonet's name is a nomen nudum with no reference to Ramatuelle's name; and, even if it were validly published, it would be a later homonym of *C. grandiflorum* (Desfontaines) Dumont de Courset (Bot. Cult. 2: 467. 1802). The most common alternative name is *C. morifolium* Ramatuelle (loc. cit.: 240), but this is of uncertain status and identity. Further work is therefore needed to establish the most acceptable scientific name for the complex. As is to be expected for such an important horticultural plant, there is an extensive synonymy, including: *A. apiifolia* R. Brown, *A. artemisiifolia* Willdenow, *A. stipulacea* Moench, *C. hortorum* L. H. Bailey, ?*C. morifolium* var. *gracile* Hemsley, *C. sinense* Sabine, *C. sinense* var. *hortense* Makino ex Matsumura, *C. stipulaceum* (Moench) W. Wight, *Dendranthema grandiflorum* (Ramatuelle) Kitamura, *D. morifolium* (Ramatuelle) Tzvelev, *D. sinense* (Sabine) Des Moulins, and *Matricaria morifolia* Ramatuelle.

- 1a. Outer and sometimes middle phyllaries herbaceous, pinnatifid or pinnatifid.
 - 2a. Leaves undivided or lyrate-pinnatisect, abaxially grayish white, appressed and thickly villous 20. *C. argyrophyllum*
 - 2b. Middle and proximal stem leaves bipinnate- or bipalmate-pinnately divided, abaxially green, glabrous or nearly so 21. *C. mongolicum*
- 1b. Phyllaries with white, brown, or dark scarious margins.
 - 3a. Capitula 0.5–1 cm in diam.; ray floret lamina 1–3 mm.
 - 4a. Leaves 2-pinnatisect; capitula many, in dense flat-topped synflorescence 18. *C. glabriusculum*
 - 4b. Leaves pinnatisect; capitula 1–3 19. *C. dichroum*
 - 3b. Capitula 1.5–5 cm in diam., rarely smaller; ray floret lamina (1–)5 mm or more.
 - 5a. Leaf blade bipalmate, bipalmate-pinnatifid, bipinnatifid, or biternate-pinnatisect.
 - 6a. Ray florets white, pink, or purple-red.
 - 7a. Leaves bipalmate, bipalmate-pinnately divided, or biternate-pinnatisect; capitula solitary, rarely 2–5 10. *C. oreastrum*
 - 7b. Leaves bipinnatifid; capitula many, in lax cymes, rarely solitary.
 - 8a. Primary lobes of leaf blade pinnatifid or pinnatifid, ultimate lobes triangular or obliquely triangular, ca. 3 mm wide 16. *C. zawadskii*
 - 8b. Primary lobes of leaf blade pinnatisect or subpinnatisect, ultimate lobes linear or narrowly linear-lanceolate, 1–2 mm wide 17. *C. maximowiczii*

- 6b. Ray florets yellow or apricot-colored.
- 9a. Capitula solitary, terminal; outer phyllaries 5–7 mm.
- 10a. Leaves bipalmate, bipalmate-pinnately divided, or biternate-pinnatisect; stems unbranched 9. *C. hypargyreum*
- 10b. Leaves 1- or 2-pinnatipartite; stems laxly branched above middle.
- 11a. Capitula 1–1.5 cm in diam., subtending bracts elliptic, 5–7 × 3–4 mm, margins coarsely toothed 14. *C. foliaceum*
- 11b. Capitula 2.4–3 cm in diam., subtending bracts linear, 20–25 × 2–5 mm, entire 15. *C. longibracteatum*
- 9b. Capitula several to many, ± cymose; outer phyllaries 2.5–4 mm.
- 12a. Leaves on both surfaces densely or sparsely pubescent 11. *C. lavandulifolium*
- 12b. Leaves adaxially green, sparsely pubescent or glabrescent, abaxially gray-white, densely and thickly pubescent.
- 13a. Outer phyllaries linear or linear-oblongate, apex rounded scarious-ampliate, densely pubescent abaxially 12. *C. potentilloides*
- 13b. Outer phyllaries ovate or long ovate, apex not rounded scarious-ampliate, sparsely hairy only at base or adaxially 13. *C. arisanense*
- 5b. Leaf blade repand-remotely dentate, 1-toothed on each side, or entire, shallowly pinnatifid, or palmately to pinnately 3–7-divided.
- 14a. Ray florets yellow 3. *C. indicum*
- 14b. Ray florets white, pink, or purple.
- 15a. Ray florets purple; leaf blade ca. 1.5 × 1 cm, shallowly pinnatifid, lateral segments often 2-paired 22. *C. parvifolium*
- 15b. Ray florets white or pink, rarely purple; leaf blade not as above.
- 16a. Leaf blade repand-remotely dentate, 1-toothed on each side, or entire, densely and thickly pubescent abaxially.
- 17a. Leaves 3.5–7 × 2–4 cm, margin repand-dentate 1. *C. vestitum*
- 17b. Leaves 1–1.4 × 0.7–1.5 cm, entire or 1-toothed on each side 2. *C. rhombifolium*
- 16b. Leaf blade palmately or pinnately 3–7-divided or palmate-pinnately 3–7-divided.
- 18a. Rhizome thick and fleshy; achenes not slippery when wet 6. *C. arcticum*
- 18b. Rhizome not fleshy; achenes slippery when wet.
- 19a. Capitula 3 or more in irregular cymes (mainland).
- 20a. Leaf blade reniform, suborbicular, or broadly ovate, base somewhat cordate or truncate 4. *C. chanetii*
- 20b. Leaf blade elliptic, narrowly elliptic, or ovate, base cuneate or broadly cuneate 5. *C. naktongense*
- 19b. Capitula solitary, on peduncles to 20 cm (Taiwan).
- 21a. Plants erect; leaf blade pinnately lobed, lobes crenate or dentate; ray floret lamina ca. 6 mm 7. *C. horaimontanum*
- 21b. Plants ascending; leaf blade palmately 3- or 5-lobed, lobes subtentire; ray floret lamina ca. 15 mm 8. *C. morii*

1. *Chrysanthemum vestitum* (Hemsley) Stapf, Bot. Mag. 156: t. 9330. 1933.

毛华菊 mao hua ju

Herbs, perennial, ca. 60 cm tall, with procumbent rhizomes. Stems erect, long robust-branched in upper part or shortly corymbosely branched at apex, or spreading, densely and thickly pubescent or becoming sparsely pubescent. Lower stem leaves withered at anthesis. Middle stem leaves: petiole 0.5–1 cm; leaf blade ovate, broadly ovate, ovate-lanceolate, suborbicular, or spatulate, 3.5–7 × 2–4 cm, grayish green, abaxially densely and thickly appressed pubescent, adaxially sparsely pubescent, grayish white, margin above middle obtusely repand-dentate, rarely obtusely 2- or 3-lobed, cuneate toward base. Distal stem leaves sessile or subsessile, similar, simple.

Synflorescence a lax flat-topped cyme. Capitula 3–13, 2–5 cm in diam. Involucre cup-shaped, 1–1.5 cm in diam.; phyllaries in 4 rows, abaxially densely pubescent, scarious margin brown, outer ones triangular or triangular-ovate, 3.5–4.5 mm, middle ones lanceolate-ovate, ca. 6.5 mm, inner ones obovate or oblanceolate-elliptic, 6–7 mm. Ray floret lamina white, 1.2–2 cm. Achenes ca. 1.5 mm. Fl. and fr. Aug. $2n = 54^*$.

• Low mountain slopes, hills, shaded slopes, streamsides; 300–1500 m. Anhui, Henan, Hubei, Shaanxi.

- 1a. Stems erect; capitula 2–3 cm in diam. 1a. var. *vestitum*
 1b. Stems sprawling; capitula 4.5–5 cm in diam. 1b. var. *latifolium*

1a. *Chrysanthemum vestitum* var. *vestitum*

毛华菊(原变种) mao hua ju (yuan bian zhong)

Chrysanthemum sinense Sabine var. *vestitum* Hemsley, J. Linn. Soc., Bot. 23: 439. 1888; *Dendranthema vestitum* (Hemsley) Y. Ling.

Stems erect, robust. Middle stem leaf blades ovate, broadly ovate, ovate-lanceolate, suborbicular, or spatulate, 3.5–7 × 2–4 cm. Capitula 2–3 cm in diam.

• Low mountain slopes, hills; 300–1500 m. Anhui, Henan, Hubei, Shaanxi.

1b. *Chrysanthemum vestitum* var. *latifolium* J. Zhou & Jun Y. Chen, Bull. Bot. Res., Harbin 30: 649. 2010.

阔叶毛华菊 kuo ye mao hua ju

Stems sprawling. Middle stem leaf blades orbicular or ovate-orbicular, 4–7 × 3–5 cm. Capitula 4.5–5 cm in diam.

• Shaded slopes, streamsides; ca. 1500 m. Anhui, ?Henan.

2. *Chrysanthemum rhombifolium* (Y. Ling & C. Shih) H. Ohashi & Yonekura, J. Jap. Bot. 79: 190. 2004.

菱叶菊 ling ye ju

Dendranthema rhombifolium Y. Ling & C. Shih, Bull. Bot. Lab. N. E. Forest. Inst., Harbin 6: 2. 1980.

Subshrubs, ca. 1.5 m tall. Stems and branches densely white pubescent. Petiole ca. 5 mm; leaf blade rhomboid, 1–1.4 × 0.7–1.5 cm, abaxially white or grayish white, densely and thickly appressed pubescent, adaxially pale green or grayish green, sparsely pubescent, base cuneate, obtusely 1-triangular-dentate or obtusely shallowly lobed on each side. Leaves near synflorescence elliptic, ovate, or broadly linear, ca. 1 × 0.5–0.6 cm. Synflorescence a lax terminal cyme. Capitula few. Involucres cup-shaped, ca. 1 cm in diam.; phyllaries in 4 rows, scarious margin white or brown, outer ones linear or linear-lanceolate, 3–4 mm, adaxially densely pubescent, middle and inner ones elliptic, 4–5 mm, middle ones densely pubescent abaxially, inner ones glabrescent abaxially. Ray floret lamina white, ca. 8 mm, apex 3-denticulate. Achene ca. 1 mm. Fl. and fr. Oct.

• Mountain slopes. NE Chongqing (Wushan).

3. *Chrysanthemum indicum* Linnaeus, Sp. Pl. 2: 889. 1753.

野菊 ye ju

Chrysanthemum indicum var. *coreanum* H. Léveillé; *C. indicum* var. *edule* Kitamura; *C. indicum* var. *hibernum* Makino; *C. indicum* var. *litorale* Y. Ling; *C. indicum* var. *lushanense* (Kitamura) Handel-Mazzetti; *C. lushanense* Kitamura; *C. nankingense* Handel-Mazzetti; *C. procumbens* Loureiro; *C. sabinii* Lindley; *Dendranthema indicum* (Linnaeus) Des Moulins; *D. indicum* var. *huldaoense* G. Y. Zhang, L. J. Yu & Y. J. Liu; *D. nankingense* (Handel-Mazzetti) X. D. Cui; *Matricaria indica* (Linnaeus) Desrousseaux; *Pyrethrum indicum* (Linnaeus) Cassini (1826), not Sims (1813); *Tanacetum indicum* (Linnaeus) Schultz Bipontinus.

Herbs, perennial, 0.25–1 m tall, with long or short procumbent rhizomes. Stems erect or diffuse, branched, sparsely

pubescent. Lower leaves withered at anthesis. Middle stem leaves: petiole 1–2 cm; leaf blade ovate, long ovate, or elliptic-ovate, 3–7(–10) × 2–4(–7) cm, both surfaces pale green or olive, sparsely pubescent or less densely so abaxially, pinnatifid, pinnatifid, or inconspicuously divided, base truncate, somewhat cordate or broadly cuneate. Synflorescence a lax terminal flat-topped cyme. Capitula many or few. Phyllaries in 5 rows, scarious margin broad, white or brown, apex obtuse or rounded, outer ones ovate or ovate-triangular, 2.5–3 mm, middle ones ovate, 6–8 mm, inner ones narrowly elliptic, ca. 1.1 cm. Ray floret lamina yellow, 1–1.3 cm, apex entire or 3-denticulate. Achenes 1.5–1.8 mm. Fl. and fr. Jun–Nov. $2n = 18, 35–38, 36^*, 40, 54$.

Grasslands on mountain slopes, thickets, wet places by rivers, fields, roadsides, saline places by seashores, under shrubs; 100–2900 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Shandong, Sichuan, Taiwan, Yunnan [Bhutan, India, Japan, Korea, Nepal, Russia, Uzbekistan].

Chrysanthemum indicum is one of the main parents of the florists' chrysanthemum, "*C. grandiflorum*" (see note under genus). The natural distribution within China is not clear because of confusion with cultivated plants in the "*C. grandiflorum*" complex.

4. *Chrysanthemum chanetii* H. Léveillé, Repert. Spec. Nov. Regni Veg. 9: 450. 1911.

小红菊 xiao hong ju

Chrysanthemum erubescens Stapf; *C. maximoviczianum* Y. Ling; *C. maximoviczianum* var. *aristatomucronatum* Y. Ling; *Dendranthema chanetii* (H. Léveillé) C. Shih; *D. erubescens* (Stapf) Tzvelev.

Herbs, perennial, 15–60 cm tall, with procumbent rhizomes. Stems erect, branched from base or middle, but usually apically corymbosely branched, sparsely pubescent especially below capitula, rarely glabrous. Lower and middle stem leaves: petiole 3–5 cm; leaf blade reniform, suborbicular, or broadly ovate, 2–5 cm, ca. as long as wide, both surfaces green, sparsely pilose or glabrous, base slightly cordate or truncate, palmate or palmate-pinnate, 3–5-lobed, rarely -partite; lobe margins obtusely dentate, lateral lobes small, terminal ones large. Upper stem leaves elliptic or narrowly elliptic, narrowly elliptic or broadly linear near synflorescence. Synflorescence a terminal flat-topped cyme. Capitula 3–12. Involucres cup-shaped, 5–15 mm in diam.; phyllaries in 4 or 5 rows, outer ones broadly linear, 5–9 mm, abaxially sparsely villous, margin lacerate, apex rounded, broadly scarious, middle and inner ones 6–10 mm, oblanceolate or triangular-ovate to narrowly linear-elliptic, 6–10 mm, scarious margin white or brown. Ray floret lamina white, pink, or purple, 1.2–2.2 cm, apex 2- or 3-denticulate. Achenes ca. 2 mm. Fl. and fr. Jul–Oct. $2n = 36^*$.

Grasslands, forest margins on mountain slopes, floodlands, by ditches; 300–2700 m. Hebei, Heilongjiang, Jilin, Liaoning, Nei Mongol, Ningxia, Shaanxi, Shandong, Shanxi, Taiwan [Korea, Mongolia, Russia].

The identity of *Chrysanthemum sibiricum* (Candolle) Fischer ex Komarov var. *sinoalpinum* Nakai (J. Jap. Bot. 16: 75. 1940) is not clear.

5. *Chrysanthemum naktongense* Nakai, Bot. Mag. (Tokyo) 23: 186. 1909.

楔叶菊 xie ye ju

Chrysanthemum zawadskii Herbich subsp. *latilobum* (Maximowicz) Kitagawa; *C. zawadskii* var. *latilobum* (Maximowicz) Kitamura; *C. zawadskii* subsp. *naktongense* (Nakai) Y. N. Lee; *Dendranthema naktongense* (Nakai) Tzvelev; *D. zawadskii* (Herbich) Tzvelev var. *latilobum* (Maximowicz) Kitamura; *Leucanthemum sibiricum* Candolle var. *latilobum* Maximowicz.

Herbs, perennial, with procumbent rhizomes. Stems erect, 10–50 cm tall, branched above middle or apically shortly branched, rarely unbranched, sparsely pubescent, especially in upper part and near synflorescence or glabrescent to glabrous. Middle stem leaves long petiolate; leaf blade elliptic to narrowly elliptic or ovate, 1–3 × 1–2 cm, both surfaces glabrous or soon glabrescent, palmate-pinnately 3–7-lobed or -parted, base cuneate or broadly cuneate. Distal stem leaves obovate, oblanceolate, or narrowly oblanceolate, 3–5-divided or entire. Synflorescence a lax terminal flat-topped cyme. Capitula 2–9, 3.5–5 cm in diam. Involucres cup-shaped, 1–1.5 cm in diam.; phyllaries in 5 rows, abaxially sparsely villous or glabrescent, outer ones linear or linear-lanceolate, 4–6 mm, apex rounded, broadly scarious, middle and inner ones elliptic or narrowly elliptic, 4.5–6 mm, margin and apex white or brown scarious. Ray floret lamina white, pink, or pale purple, 1–1.5 cm, apex entire or 2-denticulate. Achenes ca. 2 mm. Fl. and fr. Jul–Aug. $2n = 36$.

Grasslands; 1400–1700 m. Gansu, Hebei, Heilongjiang, Jilin, Liaoning, Nei Mongol, Shandong, Shanxi [Korea, Mongolia, Russia].

6. *Chrysanthemum arcticum* Linnaeus, Sp. Pl. 2: 889. 1753.

北极菊 bei ji ju

Arctanthemum arcticum (Linnaeus) Tzvelev; *Dendranthema arcticum* (Linnaeus) Tzvelev; *Leucanthemum arcticum* (Linnaeus) Candolle; *L. arcticum* subsp. *gmelinii* (Ledebour) Kitamura; *L. gmelinii* Ledebour.

Herbs, perennial, 10–30 cm tall, with thick, fleshy, creeping rhizome. Stems erect or nearly so, solitary or few, simple or with a few lateral branches, glabrous or arachnoid pubescent and glabrescent. Basal and lower stem leaves many; petiole long, thick; leaf blade oblong to suborbicular, 9–12 × 3–4 cm, both surfaces glabrous or subglabrous, palmately to pinnately 3–7-lobed, usually divided to less than half way, base broadly cuneate, margin coarsely toothed to entire. Distal stem leaves linear. Synflorescence with 1–5 capitula; peduncles long. Involucres 1.2–2.2 × 0.4–0.7 cm; phyllaries abaxially glabrous or sparsely arachnoid pubescent at base, scarious margin broad, blackish brown or brownish. Ray floret lamina white, 10–22 × 3–5 mm; disk florets 2.3–3 mm. Achenes 1.8–2.6 × ca. 0.5 mm.

Stony and sandy places, gravel beds, grassy patches along coasts. Hebei [Russia (Far East); W North America].

7. *Chrysanthemum horaimontanum* Masamune, Trans. Nat. Hist. Soc. Formosa 29: 26. 1939.

蓬菜油菊 peng lai you ju

Dendranthema horaimontanum (Masamune) S. S. Ying.

Herbs, perennial. Stems in clumps, erect, densely silvery sericeous. Stem leaves obovate in outline, 1–3 × 0.5–2 cm, abaxially densely silvery sericeous, adaxially sparsely hairy, pinnatifid or pinnatipartite. Uppermost and lowermost leaves smaller. Capitula ca. 2 cm in diam., solitary, long pedunculate. Involucres subglobose, ca. 5 × 10–13 mm; outer phyllaries 3–6 × 1–3 mm, inner ones 4–6 × 2–3 mm. Ray florets white; lamina ca. 6 × 2.5 mm; disk florets greenish yellow, ca. 2 mm.

• Rocky slopes; 1200–1400 m. Taiwan.

8. *Chrysanthemum morii* Hayata, Icon. Pl. Formosan. 8: 61. 1919.

森氏菊 sen shi ju

Dendranthema morii (Hayata) Kitamura.

Herbs, perennial, with creeping rhizomes. Stems ascending, few branched, densely silvery sericeous, glabrescent. Stem leaves with petiole 7–17 mm; leaf blade broadly ovate to obovate, 2.5–4 × 1.5–2.5 cm, abaxially densely silvery sericeous, adaxially green, appressed pubescent, glabrescent, palmately pinnatifid or 3-fid, segments dentate, base cuneate into petiole, margin dentate, apex acute to obtuse. Capitula 2.5–3 cm in diam., solitary, long pedunculate. Involucres subhemispheric, ca. 15 × 7–8 mm; phyllaries with margin brown, outer ones ovate to oblong, middle and inner ones broadly ovate. Ray florets white; lamina ca. 15 × 4 mm; disk florets greenish yellow, ca. 3.5 mm, 5-toothed. Achenes ca. 2 mm, 5-grooved.

• Limestone cliffs, rare; 400–2400 m. Taiwan.

9. *Chrysanthemum hypargyreum* Diels, Bot. Jahrb. Syst. 36(Beibl. 82): 104. 1905.

黄花小山菊 huang hua xiao shan ju

Chrysanthemum licentianum W. C. Wu; *C. neo-oreastrum* C. C. Chang; *Dendranthema hypargyreum* (Diels) Y. Ling & C. Shih.

Herbs, perennial, 5–25 cm tall, with procumbent rhizomes. Stems erect, unbranched, sparsely pubescent or villous. Basal leaves: petiole to 2 cm; leaf blade flabelliform or broadly ovate, 0.4–1.6 × 0.8–1.6 cm, abaxially sparsely or densely pubescent, adaxially glabrescent to glabrous, 2-pinnatisect or bipalmate-pinnatisect; ultimate segments linear or broadly linear. Lower and middle stem leaves similar to basal leaves but smaller. Upper stem leaves usually pinnatisect, uppermost leaves 3-partite. Capitulum solitary, terminal, 2–3.5 cm in diam. Involucres cup-shaped, 1–2 cm in diam.; phyllaries in 4 rows, abaxially glabrous or sparsely villous, margin brown, outer ones linear or linear-lanceolate, 5–6 mm, middle and inner ones lanceolate or elliptic, 7–9 mm. Ray floret lamina yellow, 6–12 mm. Fl. Sep.

• Meadows on mountain slopes; 1400–3900 m. Shaanxi, Sichuan.

10. *Chrysanthemum oreastrum* Hance, J. Bot. 16: 108. 1878.

小山菊 xiao shan ju

Chrysanthemum sibiricum (Candolle) Fischer ex Komarov var. *alpinum* Nakai; *C. zawadskii* Herbich var. *alpinum* (Nakai)

Kitamura; *Dendranthema oreastrum* (Hance) Y. Ling; *D. sichotense* Tzvelev.

Herbs, perennial, 3–45 cm tall, with procumbent rhizomes. Stems erect, solitary, unbranched or rarely shortly 1- or 2-branched, densely villous or pubescent, lower parts glabrescent to glabrous. Basal and lower stem leaves: petiole 1–5 cm; leaf blade rhomboid, flabelliform, ovate, or broadly ovate, 0.5–2.5 × 0.5–3 cm, abaxially densely villous, biternate-pinnatisect; ultimate segments linear or broadly linear. Upper stem leaves similar but smaller; uppermost linear, entire. Capitula solitary, rarely 2 or 3, 2–4 cm in diam. Involucres cup-shaped; phyllaries in 4 rows, scarious margin deep or dark brown, outer ones linear, narrowly elliptic, or ovate, 5–9 mm, abaxially sparsely villous, middle and inner ones long ovate or oblanceolate, 6–8 mm, middle ones sparsely villous abaxially, inner ones glabrous abaxially. Ray floret lamina white or pink, apex 3-denticulate. Achenes ca. 2 mm. Fl. and fr. Jun–Aug. $2n = 54^*$.

Meadows; 1800–3000 m. Hebei, Jilin, Yunnan [Korea, Russia (Far East)].

11. *Chrysanthemum lavandulifolium* (Fischer ex Trautvetter) Makino, Bot. Mag. (Tokyo) 23: 20. 1909.

甘菊 gan ju

Herbs, perennial. Stems 30–150 cm, erect, corymbosely branched above middle or only in upper part, pilose, especially in upper part and on synflorescence branches. Basal and lower stem leaves withered by anthesis; middle stem leaves: petiole 0.5–1 cm; leaf blade ovate, broadly ovate, elliptic-ovate, narrowly elliptic, or ovate-lanceolate, 2–7 × 1.5–4.5 cm, surfaces concolorous or nearly so, 2-pinnatisect, 2-pinnatipartite, or inconspicuously 2-pinnatipartite; primary lateral segments 2 or 3(or 4) pairs; ultimate lobes elliptic. Upper stem leaves small, tripartite or entire. Synflorescence a lax or dense cyme. Capitula 1–1.5 cm in diam. Involucres cup-shaped, 5–7 mm in diam.; phyllaries in 5 rows, margin white or pale brown scarious, outer ones linear or linear-oblong, ca. 2.5 mm, abaxially sparsely pilose, middle and inner ones ovate, narrowly elliptic, or oblanceolate, ca. 4.5 mm. Ray florets yellow; lamina 1–7.5 mm. Achenes 1.2–1.5 mm. Fl. and fr. May–Nov. $2n = 18^*$, 36^* .

Mountain slopes, rocks, river valleys, riverbanks, wastelands, hilly lands; 600–2800 m. Anhui, Gansu, Guizhou, Hebei, Hubei, Jiangsu, Jiangxi, Jilin, Liaoning, Nei Mongol, Qinghai, Shaanxi, Shandong, Shanxi, Sichuan, Taiwan, Xinjiang, Yunnan, Zhejiang [India, Japan, Korea, Mongolia].

The infraspecific taxonomy of *Chrysanthemum lavandulifolium* needs more detailed investigation. *Dendranthema lavandulifolium* (Fischer ex Trautvetter) Kitamura var. *aromaticum* (Q. H. Liu & S. F. Zhang) S. J. Zhou & D. K. Zang (Bull. Bot. Res., Harbin 16: 297. 1996; *D. indicum* (Linnaeus) Des Moulins var. *aromaticum* Q. H. Liu & S. F. Zhang, J. Wuhan Bot. Res. 1: 237. 1983; *C. indicum* Linnaeus var. *aromaticum* (Q. H. Liu & S. F. Zhang) J. M. Wang & Y. T. Hou, Guihaia 30: 816. 2010), described from Hubei (Shennongjia), with ray floret lamina 3.5–4 mm, appears to be somewhat intermediate between *C. lavandulifolium* var. *discoideum* and *C. lavandulifolium* var. *lavandulifolium*, and it reportedly differs from both by the aromatic, minutely glandular, abaxial leaf surface.

1a. Ray floret lamina ca. 1 mm 11c. var. *discoideum*

1b. Ray floret lamina 5–7.5 mm.

2a. Leaf blade abaxially densely villous or pubescent 11b. var. *tomentellum*

2b. Leaf blade abaxially sparsely pubescent 11a. var. *lavandulifolium*

11a. *Chrysanthemum lavandulifolium* var. *lavandulifolium*

甘菊(原变种) gan ju (yuan bian zhong)

Pyrethrum lavandulifolium Fischer ex Trautvetter, Trudy Imp. S.-Peterburgsk. Bot. Sada 1: 181. 1872 [“*lavandulaefolium*”]; *Chrysanthemum bellum* Gruning; *C. bellum* var. *glabriusculum* Y. Ling; *C. bellum* var. *jucundum* (Nakai & Kitagawa) Handel-Mazzetti; *C. boreale* Makino (1909), not (Fischer ex Candolle) B. Fedtschenko (1915); *C. indicum* Linnaeus var. *acutum* Uyeki; *C. jucundum* Nakai & Kitagawa; *C. lavandulifolium* var. *acutum* (Uyeki) C. Y. Li; *C. lavandulifolium* var. *jucundum* (Nakai & Kitagawa) Kitamura; *C. lavandulifolium* var. *sianense* Kitamura; *C. namikawanum* Kitamura; *C. seticuspe* (Maximowicz) Handel-Mazzetti; *C. seticuspe* f. *boreale* (Makino) H. Ohashi & Yonekura; *C. seticuspe* var. *boreale* (Makino) Handel-Mazzetti; *C. wilsonianum* Handel-Mazzetti; *Dendranthema boreale* (Makino) Y. Ling ex Kitamura; *D. lavandulifolium* (Fischer ex Trautvetter) Kitamura; *D. lavandulifolium* var. *glabriusculum* (Y. Ling) Kitamura; *D. lavandulifolium* var. *seticuspe* (Maximowicz) C. Shih; *D. seticuspe* (Maximowicz) Kitamura; *D. seticuspe* f. *boreale* (Makino) Kitamura; *P. seticuspe* Maximowicz.

Leaves sparsely pubescent on both surfaces or adaxially glabrous. Capitula large, 1–1.5 cm in diam. Ray floret lamina 5–7.5 mm. $2n = 18^*$.

Mountain slopes, rocks, river valleys, riverbanks, wastelands, hilly lands; 600–2800 m. Gansu, Hebei, Hubei, Jiangsu, Jiangxi, Jilin, Liaoning, Qinghai, Shaanxi, Shandong, Shanxi, Sichuan, Xinjiang, Yunnan, Zhejiang [India, Japan, Korea, Mongolia].

11b. *Chrysanthemum lavandulifolium* var. *tomentellum* Handel-Mazzetti, Acta Horti Gothob. 12: 260. 1938.

毛叶甘菊 mao ye gan ju

Chrysanthemum boreale var. *tomentellum* (Handel-Mazzetti) Kitamura; *Dendranthema boreale* var. *tomentellum* (Handel-Mazzetti) Kitamura; *D. lavandulifolium* var. *tomentellum* (Handel-Mazzetti) Y. Ling & C. Shih; *D. seticuspe* var. *tomentellum* (Handel-Mazzetti) Kitamura.

Leaves abaxially densely villous. Capitula large, 1–1.5 cm in diam. Ray floret lamina 5–7.5 mm.

• Mountain slopes; 2000–2500 m. Jiangsu, Taiwan, Yunnan, Zhejiang.

11c. *Chrysanthemum lavandulifolium* var. *discoideum* Handel-Mazzetti, Acta Horti Gothob. 12: 259. 1938.

隐舌甘菊 yin she gan ju

Dendranthema lavandulifolium var. *discoideum* (Handel-Mazzetti) C. Shih.

Leaf blade abaxially sparsely pilose, adaxially similar or glabrous. Capitula small. Ray florets small; lamina ca. 1 mm.

• Mountain slopes; ca. 2700 m. Sichuan (Kangding).

12. *Chrysanthemum potentilloides* Handel-Mazzetti, Acta Horti Gothob. 12: 261. 1938.

委陵菊 wei ling ju

Dendranthema potentilloides (Handel-Mazzetti) C. Shih.

Herbs, perennial, 30–70 cm tall. Stems erect or bent at base, robust, corymbosely branched in upper parts, grayish white, densely and thickly appressed pubescent. Basal and lower stem leaves shed by anthesis. Middle stem leaves shortly petiolate, with divided auricle at base of petiole; leaf blade broadly ovate, ovate, or broadly triangular-ovate, 1.5–3 × 2–3.5 cm, abaxially grayish white, densely pubescent, adaxially green or pale green, sparsely pubescent, 2-pinnatisect; primary lateral segments 2-paired; ultimate segments elliptic, margin with few teeth or 1 tooth on one side. Distal leaves gradually smaller, similar to middle stem leaves. Synflorescence a flat-topped cyme. Capitula 1.5–2 cm in diam. Involucre cup-shaped; phyllaries in 4 rows, abaxially densely pubescent, scarious margin white or brown, outer ones linear or linear-oblongate, 3–4 mm, middle ones elliptic, 6–7 mm, inner ones shorter, ca. 5 mm. Ray floret lamina yellow, 8–10 mm, apex minutely 2- or 3-denticulate. Fl. summer.

• Foothills of low mountains; 1000–1500 m. Shaanxi, Shanxi.

13. *Chrysanthemum arisanense* Hayata, Icon. Pl. Formosan. 6: 26. 1916.

阿里山菊 a li shan ju

Dendranthema arisanense (Hayata) Y. Ling & C. Shih.

Herbs, perennial, ca. 40 cm tall, with creeping rhizomes. Stems ascending, shortly corymbosely branched from middle, densely pubescent, soon glabrescent. Lower stem leaves shed by anthesis. Middle stem leaves: petiole 1–2 cm; leaf blade ovate, 3–5 × 2–3 cm, 2-pinnatisect; primary segments 1- or 2-paired; ultimate segments obliquely triangular, abaxially grayish white, densely and thickly pubescent, adaxially green, sparsely pubescent. Distal stem leaves gradually smaller, similar to middle stem leaves. Synflorescence a terminal subumbellate panicle. Capitula many, ca. 1.2 cm in diam. Involucre cup-shaped, ca. 7 mm in diam.; phyllaries in 4 rows, scarious margin broad, white or brown, outer ones ovate or narrowly ovate, 3–4 mm, middle ones elliptic or narrowly elliptic, 4–4.5 mm, inner ones narrowly elliptic or broadly linear, ca. 3 mm. Ray floret lamina yellow, ca. 5 mm. Fl. summer. $2n = 18^*$.

• Jiagsu, Taiwan.

14. *Chrysanthemum foliaceum* (G. F. Peng, C. Shih & S. Q. Zhang) J. M. Wang & Y. T. Hou, Guihaia 30: 816. 2010.

叶状菊 ye zhuang ju

Dendranthema foliaceum G. F. Peng, C. Shih & S. Q. Zhang, Acta Phytotax. Sin. 37: 600. 1999.

Herbs, perennial, 50–80 cm tall. Stems erect, sparsely long branched above middle; stems and branches densely gray pubescent. Basal and lower stem leaves not seen. Middle stem leaves ovate or broadly ovate in outline, 2–3 × 1–1.5 cm, shallowly 2-pinnatisect, abaxially gray pubescent, adaxially sub-

glabrous; lateral lobes 2- or 3-paired; ultimate lobes elliptic or toothlike; upper stem leaves smaller, elliptic or ovate, pinnatisect to 3-lobed, lobes toothed. Capitula solitary, terminal on lateral branches, 1–1.5 cm in diam.; subtending bracts elliptic, 5–7 × 3–4 mm, shallowly pinnatisect, margin coarsely toothed. Involucre coryliform, 9–10 mm wide; phyllaries in 3 rows, outer ones narrowly elliptic, ca. 6 × 2 mm, margin hyaline-membranous, apex rounded, middle ones elliptic, ca. 4 × 1.8 mm, inner ones narrowly elliptic, ca. 8 × 2.2 mm. Ray floret lamina apricot-colored, apex 3-toothed; disk florets many, also apricot-colored. Achenes cylindrical, ca. 1 mm. Fl. Sep–Oct.

• Roadsides; 100–300 m. Shandong (Jinan).

15. *Chrysanthemum longibracteatum* (C. Shih, G. F. Peng & S. Y. Jin) J. M. Wang & Y. T. Hou, Guihaia 30: 816. 2010.

长苞菊 chang bao ju

Dendranthema longibracteatum C. Shih, G. F. Peng & S. Y. Jin, Acta Phytotax. Sin. 37: 598. 1999.

Herbs, perennial, 60–80 cm tall. Stem erect, sparsely long branched above middle; stems and branches densely gray pubescent. Basal and lower stem leaves not seen. Middle stem leaves subsessile, blade broadly ovate or (?narrowly) elliptic in outline, 1–5 × 1–2 cm, shallowly 2-pinnatisect, abaxially gray pubescent, adaxially subglabrous; lateral lobes primarily 2-jugate, ultimate lobes elliptic; upper stem leaves smaller, pinnatisect or 3-partite. Capitula terminal, solitary, 2.4–3 cm in diam.; subtending bracts many, linear, 20–25 × 2–5 mm. Involucre coryliform, 5–7 mm in diam.; phyllaries in 3 rows, outer ones linear or narrowly elliptic, ca. 7 × 2 mm, margin hyaline-membranous, apex obtuse or acuminate, middle and inner ones narrowly oblong, ca. 8 × 2 mm. Ray floret lamina apricot-colored, apex 2- or 3-toothed; disk florets many, apricot-colored. Achenes pyramidal, ca. 1 mm. Fl. and fr. Oct.

• Woodland margins, along paths; ca. 100 m. Shandong (Jinan).

16. *Chrysanthemum zawadskii* Herbich, Addit. Fl. Galic. 44. 1831.

紫花野菊 zi hua ye ju

Chrysanthemum gmelinii Ledebour; *C. hwangshanense* Y. Ling; *C. maximoviczianum* Y. Ling var. *dissectum* Y. Ling; *C. naktongense* Nakai var. *dissectum* (Y. Ling) Handel-Mazzetti; *C. sibiricum* (Candolle) Fischer ex Komarov; *C. sibiricum* var. *acutilobum* (Candolle) Komarov; *C. sibiricum* var. *gmelinii* (Ledebour) Nakai; *C. zawadskii* subsp. *acutilobum* (Candolle) Kitagawa; *Dendranthema zawadskii* (Herbich) Tzvelev; *Leucanthemum sibiricum* Candolle; *L. sibiricum* var. *acutilobum* Candolle; *Pyrethrum zawadskii* (Herbich) Nyman.

Herbs, perennial, 15–60 cm tall. Stems erect, upper parts with a few corymbose branches, rarely unbranched, lower and middle parts purple-red, sparsely pubescent, rather densely so in upper part and below synflorescence. Lower and middle stem leaves: petiole 1–4 mm; leaf blade ovate, broadly ovate, broadly triangular, or subrhomboid, 1.4–4 × 1–3.5 cm, 2-pinnatisect, surfaces concolorous, sparsely pubescent or glabrous; primary lateral segments 2 or 3 pairs; ultimate segments triangular or obliquely triangular, apex acute. Upper stem leaves elliptic or

broadly linear, gradually smaller, pinnatifid or entire. Synflorescence a lax flat-topped cyme. Capitula 2–5, 1.5–4.5 cm in diam. Involucres cup-shaped; phyllaries in 4 rows, abaxially glabrous or sparsely pubescent only in outer ones, scarious margin white or brown, outer ones linear or linear-lanceolate, 3.5–8 mm, middle and inner ones elliptic or narrowly elliptic, 3–7 mm. Ray floret lamina white or purple-red, 1–2 cm, apex entire or minutely emarginate. Achenes ca. 1.8 mm. Fl. and fr. Jul–Sep. $2n = 54^*$, 72.

Mountain slopes, streambanks, forest understories, grasslands, open places in forests; 800–1800 m. Anhui, Gansu, Hebei, Heilongjiang, Hubei, Jilin, Liaoning, Nei Mongol, Ningxia, Shaanxi, Shandong, Shanxi [Mongolia, Russia].

Chrysanthemum zawadskii played a significant role in the development of the frost-hardy “Korean chrysanthemums.”

17. *Chrysanthemum maximowiczii* Komarov, *Izv. Imp. Bot. Sada Petra Velikago* 16: 179. 1916.

细叶菊 xi ye ju

Dendranthema maximowiczii (Komarov) Tzvelev.

Herbs, biennial. Stems 8–30 cm tall, erect, solitary, branched above middle, lower parts sparsely pilose. Lower and middle stem leaves shortly petiolate; leaf blade ovate or broadly ovate, 2–2.5 × 2.5–3 cm, 2-pinnatisect; primary lateral segments 2-paired; ultimate segments linear or narrowly linear, apex long acuminate. Distal stem leaves and leaves below synflorescence pinnatisect. Synflorescence a lax flat-topped cyme. Capitula 2–4. Involucres shallowly cup-shaped, 1–1.5 cm in diam.; phyllaries in 4 rows, scarious margin white or brown, outer ones linear, 5–6 mm, abaxially sparsely pubescent, middle and inner ones elliptic to oblanceolate, 7–8 mm, middle ones abaxially sparsely pubescent or glabrous, inner ones abaxially glabrous. Ray floret lamina white or pink, 1–1.5 cm, apex minutely 3-denticulate. Fl. Jul–Sep.

Mountain slopes, nearby lakes, sand dunes; 1200–1300 m. Nei Mongol [Korea, Russia].

18. *Chrysanthemum glabriusculum* (W. W. Smith) Handel-Mazzetti, *Symb. Sin.* 7: 1112. 1936.

拟亚菊 ni ya ju

Tanacetum glabriusculum W. W. Smith, *Notes Roy. Bot. Gard. Edinburgh* 10: 202. 1918; *Ajania glabriuscula* (W. W. Smith) Y. Ling; *Chrysanthemum brachyglossum* Y. Ling; *Dendranthema glabriusculum* (W. W. Smith) C. Shih.

Herbs, perennial, 60–80 cm tall. Stems erect, branched above middle, pubescent especially in middle and upper parts. Middle stem leaves ovate, obovate, or elliptic, 2.5–6 × 1.5–3 cm, 2-pinnatisect, abaxially gray-white, densely and thickly appressed pubescent, adaxially green or pale green, sparsely pubescent or glabrous; primary lateral segments 2-paired; ultimate segments lanceolate or obliquely triangular. Synflorescence a terminal flat-topped compound panicle. Capitula many. Involucres campanulate, 5–10 mm in diam.; phyllaries in 4 rows, abaxially sparsely pubescent along midvein, scarious margin brown or white, outer ones lanceolate or triangular-lanceolate, 2–3 mm, middle and inner ones narrowly elliptic, 4–

5.5 mm. Ray floret lamina yellow, 1–2.5 mm, apex 2- or 3-denticulate or entire. Fl. Sep–Oct. $2n = 18^*$.

• Mountain slopes; 900–2600 m. Shaanxi, Sichuan, Yunnan.

19. *Chrysanthemum dichroum* (C. Shih) H. Ohashi & Yonekura, *J. Jap. Bot.* 79: 188. 2004 [“*dichrum*”].

异色菊 yi se ju

Dendranthema dichroum C. Shih, *Bull. Bot. Lab. N. E. Forest. Inst., Harbin* 6: 8. 1980 [“*dichrum*”].

Herbs, perennial, ca. 30 cm tall, with robust rhizomes. Primary stems inconspicuous, much branched from base, densely pubescent, leafy. Petiole ca. 5 mm; leaf blade oblique, elliptic or narrowly elliptic, 1–1.5 × 0.5–1 cm, pinnatisect, abaxially white or gray-white, densely appressed pubescent, adaxially green, glabrous or nearly so, lateral segments 1-paired, narrowly elliptic or lanceolate, terminal segments similar to lateral ones, 2-dentate on one side, 1-dentate on other; apex cuneate-attenuate; leaves below capitula linear, entire. Synflorescences terminal on branches. Capitula usually solitary (or up to 3), small; peduncles densely appressed pubescent. Involucres cup-shaped, ca. 5 mm in diam.; phyllaries in 3 rows, abaxially densely pubescent, scarious margin broad, outer ones lanceolate, ca. 1.5 mm, apex rounded, brown, scarious, middle and inner ones elliptic, ca. 2.5 mm, middle ones densely pubescent abaxially, inner ones glabrous abaxially. Ray floret lamina yellow, ca. 3 mm. Achenes ca. 1 mm. Fl. and fr. Aug.

• Mountain slopes. Hebei (Neiqiu).

In the protologue, the epithet is given as “*dichrum*,” which cannot be translated. It seems rather likely that it must be a typographical error for “*dichroum*,” perhaps referring to the 2-colored leaf blades mentioned in the protologue.

20. *Chrysanthemum argyrophyllum* Y. Ling, *Contr. Inst. Bot. Natl. Acad. Peiping* 3: 465. 1935.

银背菊 yin bei ju

Dendranthema argyrophyllum (Y. Ling) Y. Ling & C. Shih.

Herbs, perennial, 10–35 cm tall. Stems erect or ascending, robust branched, rarely unbranched, gray-white, densely and thickly villous. Basal leaves small, leaf blade orbicular or sub-orbicular; lower and middle stem leaves: petiole 2–3.5 cm; leaf blade orbicular, suborbicular, broadly elliptic, broadly ovate, or oblanceolate, 2–3 × 2.5–3.5 cm, abaxially silvery, densely and thickly appressed villous, adaxially green, glabrous or glabrescent, undivided or lyrate-pinnatifid, base cordate or truncate, margin dentate or double-dentate. Upper stem leaves smaller, oblanceolate or narrowly obovate, coarsely toothed or lyrate-pinnatifid. Synflorescence a terminal flat-topped cyme. Capitula (1–)3 or 4, 3–4 cm in diam. Involucre cup-shaped, 2–3 cm in diam.; phyllaries in 5 rows, abaxially densely appressed pubescent, scarious margin brown or white, outer ones large, herbaceous, elliptic or oblanceolate, pinnatifid, 1–1.5 cm, middle and inner ones broadly linear, linear-lanceolate, or elliptic, 8–9 mm. Ray floret lamina white, ca. 10 mm. Achenes ca. 2.2 mm. Fl. and fr. Aug–Sep.

• On rocks of mountain slopes; 1400–2100 m. Henan, Shaanxi.

21. *Chrysanthemum mongolicum* Y. Ling, Contr. Inst. Bot. Natl. Acad. Peiping 3: 463. 1935.

蒙菊 meng ju

Dendranthema mongolicum (Y. Ling) Tzvelev.

Herbs, perennial, 20–30 cm tall. Stems fascicled, branched from middle or base, lower part purple-red, sparsely pilose. Lower and middle stem leaves: petiole 1.5–2 cm; leaf blade broadly ovate, subrhomboid, or elliptic, 1–2 × 1.5–1.8 cm, 2-pinnatisect or inconspicuously bipalmate-pinnatisect, both surfaces glabrous or sparsely pubescent; primary lateral segments 1- or 2-paired; ultimate segments triangular, apex aristate-acute. Upper stem leaves narrowly elliptic, pinnatifid; lateral lobes 2–4(–8)-paired. Synflorescence a flat-topped cyme. Capitula (1 or) 2–7, 3–4.5 cm in diam. Involucres cup-shaped, 1–2 cm in diam.; phyllaries in 5 rows, abaxially glabrous, scarious margin white, outer ones leaflike, narrowly elliptic, 1–1.3 cm, pinnately lobed or pinnatifid, middle and inner ones narrowly elliptic, ca. 8 mm. Ray floret lamina pink or white, 15–20 mm. Achenes ca. 2 mm. Fl. and fr. Aug–Sep. $2n = 36, 54, 72$.

Rocky mountain slopes; 1500–2500 m. Nei Mongol [Mongolia, Russia].

22. *Chrysanthemum parvifolium* C. C. Chang, Bull. Fan Mem. Inst. Biol., Bot. 7: 159. 1936.

小叶菊 xiao ye ju

Dendranthema parvifolium (C. C. Chang) C. Shih.

Herbs, to 100 cm or more. Stems striate, pale brown, corymbosely branched above middle, branches slender, ascending, internodes shorter than leaves. Leaves ovate in outline, ca. 1.5 × 1 cm, abaxially densely hairy, adaxially shortly pilosulose, shallowly pinnatifid, lateral segments often 2-paired, subovate, entire or 1- or 2-denticulate, acute or shortly apiculate, base cuneate into indistinct petiole, apex subacuminate. Ray florets purple, small; disk florets yellow.

• Rocky slopes, near small rivers. Guizhou.

Chrysanthemum parvifolium seems to be known only from the type (*Cavalerie* 4233, P). It was likened by the author to *C. vestitum*.

151. ARTEMISIA Linnaeus, Sp. Pl. 2: 845. 1753.

蒿属 hao shu

Lin Yourun (林有润 Ling Yeou-ruenn, Ling Yuou-ruen); Christopher J. Humphries, Michael G. Gilbert

Herbs, annual or perennial, subshrubs, or shrubs, usually strongly and pleasantly aromatic, indumentum absent or of basifixed, medifixed, gland-tipped or viscid hairs. Leaves alternate, pinnate, rarely palmately divided or entire. Synflorescences racemose, sometimes spicate, usually grouped into panicles; capitula usually many, often secund, usually small, shortly pedunculate to sessile, heterogamous, disciform. Involucres globose, ovoid, or ellipsoid; phyllaries in 3 or 4 rows, completely scarious or herbaceous with broad to narrow scarious margin. Receptacle convex or flat, epaleate, glabrous or pubescent. Marginal florets in 1 (or 2) series, 3–10 or more, female; corolla tubular, rarely vasiform, cup-shaped, or conical, apex 2(–4)-toothed; style exerted, apex acute. Disk florets several to many, in 2 or more series, male or bisexual; corolla tubular, apex 5-toothed. Anthers with 2 obtuse basal appendages, apical appendage acute, triangular. Style ca. as long as or longer than corolla, divergent, and with a truncate or folding and pedunculate apex, or sometimes shorter than corolla, not divergent, apex clavate or funnelliform. Achenes obovoid, ovoid, or oblong, faintly striate. Corona absent or minute.

About 380 species: mainly in the N Hemisphere, also in Africa, Australia, and Central and South America; 186 species (82 endemic) in China.

Many species are rich in polyacetylenes, flavonoids, terpenoids, and cyanogenic glycosides and are well-known medicinal plants. Drugs based on artemisinin, originally derived from *Artemisia annua*, are particularly important for the treatment of chloroquine-resistant strains of malaria. *Artemisia abrotanum* Linnaeus, *A. absinthium*, *A. dracunculus*, and *A. vulgaris* are widely cultivated as culinary and medicinal herbs. Some are used to stabilize sand in desert or semidesert areas or as herbage for feeding livestock.

A possible record of *Artemisia quinqueloba* Trautvetter from China (Pampanini, Nuovo Giorn. Bot. Ital., n.s., 34: 685. 1927) cannot be confirmed, as the specimen on which it was based, “Songoria, Schrenk” (B), is no longer extant.

- 1a. Disk florets male, ovaries usually minute or absent; style shorter than corolla, usually not divergent, 2-cleft, with clavate or funnelliform apex.
- 2a. Lobules of leaf blade filiform, narrowly linear, lanceolate, or subulate and less than 1.5 mm wide, or pectinate and 1–2.5 × 1–2.5 mm, or leaf blade lanceolate or linear-lanceolate; ovaries of disk florets usually minute 6. *A. sect. Dracunculus* (p. 719)
- 2b. Lobules of leaf blade broadly linear to lanceolate or elliptic, more than (1–)1.5 mm wide, or leaf blade spatulate or obovate; ovaries of disk florets usually absent 7. *A. sect. Latilobus* (p. 731)
- 1b. Disk florets bisexual, ovaries well developed; style ca. as long as or longer than corolla, branches divergent, recurved at apex.
 - 3a. Receptacle pubescent or chaffy, sometimes hairs deciduous; corolla of female florets usually vasiform or narrowly conical, (2–)4-toothed 1. *A. sect. Absinthium* (p. 677)
 - 3b. Receptacle glabrous; corolla of female florets narrowly tubular or rarely narrowly conical, 2- or 3(or 4)-toothed or without teeth.

- 4a. Phyllaries scarious throughout, glabrescent, midvein not green 5. *A. sect. Albibractea* (p. 717)
 4b. Phyllaries scarious only at margin, midvein green or sometimes brown.
 5a. Plants glandular or viscid pubescent 4. *A. sect. Viscidipubes* (p. 711)
 5b. Plants not glandular or viscid, puberulent or glabrescent.
 6a. Capitula globose, rarely ovoid; lobules of leaf blade less than 1(–1.5) mm wide, if
 wider then pectinate 2. *A. sect. Abrotanum* (p. 685)
 6b. Capitula ellipsoid or oblong, rarely subglobose, campanulate, or hemispheric;
 lobules of leaf blade more than (1.5–)2 mm wide 3. *A. sect. Artemisia* (p. 694)

1. *Artemisia* sect. *Absinthium* (Miller) Candolle in Candolle & Lamarck, Fl. Franç. 4: 189. 1805.

茵蓯蒿组 shi luo hao zu

Absinthium Miller, Gard. Dict. Abr., ed. 4. 1754; *Absynthium* G. Gaertner, B. Meyer & Scherbius.

Shrubs, subshrubs, or annual, biennial, or perennial herbs, tomentose or puberulent, rarely arachnoid, without glandular or viscid hairs (sessile glands often present). Leaves 1–3-pinnatisect; lobes or lobules linear or filiform, serrate. Capitula globose or subglobose. Phyllary margin scarious. Receptacle pubescent or chaffy, hairs sometimes deciduous. Marginal florets (2–)4–30, sometimes in 2 series and up to 70; corolla vasiform or narrowly conical, (2–)4-toothed. Disk florets (8–)20–120, bisexual; ovaries well developed; style ca. as long as or longer than corolla, branches divergent, recurved at apex.

About 50 species: N Hemisphere, mostly in Asia and Europe, five species in North America, a few species in Africa and Central and South America; 23 species (three endemic) in China.

Most species contain monoterpenoids.

- 1a. Annual or biennial herbs; main root solitary, vertical, tapered or ± fusiform; basal leaves (including petiole) usually less than 8 cm.
 2a. Synflorescence a simple erect terminal raceme; capitula 5–10(–15) mm in diam. 1. *A. macrocephala*
 2b. Synflorescence a panicle with spreading lateral branches; capitula 1.5–4(–6) mm in diam.
 3a. Capitula 3–6 mm in diam.; marginal female florets 5–30, bisexual florets 30–120.
 4a. Plants 50–150 cm tall; middle stem leaf blades 4–8(–13) × 3–6(–15) cm; female florets 20–30, often in double series, bisexual florets 80–120 2. *A. sieversiana*
 4b. Plants 25–40 cm tall; middle stem leaf blades 1.5–2 × 1–1.5 cm; female florets 5–20 in single series, bisexual florets 30–50 22. *A. succulentoides*
 3b. Capitula 1.5–3(–4) mm in diam.; marginal female florets 3–6, bisexual florets 18–28.
 5a. Basal leaf blades 8–15 × 8–15 cm 19. *A. nakaii*
 5b. Basal leaf blades 3–4.5(–5) × 2–4 cm.
 6a. Capitula 2–3(–4) mm in diam.; bisexual florets 18–28 20. *A. anethifolia*
 6b. Capitula 1.5–2(–2.5) mm in diam.; bisexual florets 8–16 21. *A. anethoides*
 1b. Perennial herbs, subshrubs, or shrubs; roots several, not fusiform (if biennials with single fusiform root then basal leaves 11–18 cm); basal leaves usually more than 8 cm.
 7a. Disk florets 8–20.
 8a. Plants 15–25(–30) cm tall, densely gray or yellowish tomentose 16. *A. youngusbandii*
 8b. Plants 25–80 cm tall, gray or yellowish arachnoid tomentose or silky pubescent, lower parts sometimes glabrescent.
 9a. Middle stem leaf blades 3–5 × 3–5 cm; marginal female florets 2–5 18. *A. fauriei*
 9b. Middle stem leaf blades 0.5–2 × 0.8–2.8 cm; marginal female florets 4–10.
 10a. Ultimate leaf lobules narrowly spatulate, linear, or linear-oblongate, 1–3 × 0.5–1.5 mm 9. *A. xerophytica*
 10b. Ultimate leaf lobules elliptic-oblongate or elliptic-lanceolate, 6–12 × 1–1.5 mm 10. *A. rutifolia*
 7b. Disk florets 20–80.
 11a. Leaf blade entire or with apex crenately 3–5-lobed 12. *A. lagocephala*
 11b. Leaf blade 1–3-pinnatisect.
 12a. Capitula 2–4(–5) mm in diam.
 13a. Basal to middle stem leaves with petiole 2–12 cm; plants 60–150 cm tall 5. *A. absinthium*
 13b. Basal to middle stem leaves sessile or with petiole to 2 cm; plants 20–70 cm tall.
 14a. Middle stem leaves sessile, gland-dotted 11. *A. obtusiloba*
 14b. Middle stem leaves with petiole 5–20 mm, not gland-dotted.
 15a. Bisexual florets 20–30; perennial herbs or occasionally subshrubs with slender rootstock; plants densely yellowish or pale yellow sericeous 6. *A. frigida*
 15b. Bisexual florets 35–50; subshrubs with a thick woody rhizome ca. 1 cm or more in diam.; plants arachnoid puberulent, glabrescent 23. *A. persica*

- 12b. Capitula 4–10 mm in diam.
- 16a. Plants densely yellowish to yellow sericeous-tomentose; corolla with multicellular hairs; basal leaves 5–10 cm, with 7–13 pairs of lateral segments 17. *A. stracheyi*
- 16b. Plants pubescent or glabrescent; corolla glabrous; basal leaves less than 5 cm, with 3–7 pairs of lateral segments, or leaves 3-cleft.
- 17a. Plants 10–20 cm tall.
- 18a. Middle stem leaves with petiole 2–3 cm, blade pubescent, later glabrescent, greenish, abaxially gland-dotted; phyllary margin black scarious 13. *A. disjuncta*
- 18b. Middle stem leaves with petiole 0.4–1 cm, blade densely gray or yellowish tomentose, or glabrescent, abaxially not gland-dotted; phyllary margin brown scarious.
- 19a. Perennial herbs; middle stem leaves with (3 or)4(or 5) pairs of segments, segments serrate or with lobules 2–8 × 0.6–1 mm, pubescent, soon glabrescent; phyllaries with brown scarious margin, glabrescent 14. *A. nitakayamensis*
- 19b. Caespitose dwarf shrubs; middle stem leaves with 2(or 3) pairs of segments, 3–5-lobulate, lobules 1–2 × 0.5–1 mm; leaves and phyllaries densely yellowish or gray tomentose 15. *A. minor*
- 17b. Plants 20–70 cm tall.
- 20a. Middle stem leaves (1–)1.5–4 cm, densely yellowish or white sericeous-tomentulose; middle lobes 1.5–4 mm wide.
- 21a. Plants 40–60(–75) cm tall; middle stem leaves elliptic or ovate; phyllary with narrow, white scarious margin 3. *A. sericea*
- 21b. Plants 20–40(–50) cm tall; middle stem leaves suborbicular or orbicular-reniform; phyllary with wide, brown scarious margin 4. *A. aschurbajewii*
- 20b. Middle stem leaves 0.8–1.5 cm, tomentose, pubescent, or glabrescent; middle lobe less than 1 mm wide.
- 22a. Middle stem leaves with 5–7 pairs of segments, distal lobes pinnatisect or 3-lobulate, proximally not lobed, pubescent, glabrescent; phyllaries pubescent 8. *A. rupestris*
- 22b. Middle stem leaves with 2 or 3(–5) pairs of segments, segments parted or lobulate; leaves and phyllaries yellowish sericeous-tomentose or pubescent or glabrescent 7. *A. argrophylla*

1. *Artemisia macrocephala* Jacquemont ex Besser, Bull. Soc. Imp. Naturalistes Moscou 9: 28. 1836.

大花蒿 da hua hao

Artemisia griffithiana Boissier; *A. sieversiana* Ehrhart ex Willdenow var. *pygmaea* Krylov.

Herbs, annual, 10–30(–50) cm tall, occasionally ± woody at base, gray puberulent or pubescent. Stems usually not branched or only shortly branched. Basal and middle stem leaves: petiole 5–12 mm; leaf blade ovate, 2–4 × 1–1.5 cm, 2-pinnatisect; segments 2 or 3 pairs, basal and middle segments 3–5-sect; lobules narrowly linear or filiform, 1–4 × 0.5–1 mm. Uppermost leaves and leaflike bracts sessile, 3-lobed or entire, leaves or lobes linear. Synflorescence a lax, simple, erect raceme. Capitula shortly pedunculate, nodding. Involucre subglobose, 5–10(–15) mm in diam.; receptacle hemispheric, densely pubescent. Marginal female florets 40–70 in 1 or 2 series; corolla vasiform or narrowly conical, (2–)4-toothed. Disk florets 80–100, bisexual. Achenes ovoid or obovoid-ellipsoid. Fl. and fr. Aug–Oct. $2n = 18, 36$.

Steppes, hills, waste areas, dry places, saline or gravelly soils; 1500–5500 m. Gansu, Ningxia, Qinghai, Xinjiang, Xizang [Afghanistan, India, Kazakhstan, Kyrgyzstan, Mongolia, Pakistan, Russia, Tajikistan; SW Asia].

2. *Artemisia sieversiana* Ehrhart ex Willdenow, Sp. Pl. 3: 1845. 1803.

大籽蒿 da zi hao

Absinthium sieversianum (Ehrhart ex Willdenow) Besser; *Artemisia chrysolepis* Kitagawa; *A. koreana* Nakai; *A. moxa* Candolle; *A. scaposa* Kitagawa; *A. sieversiana* var. *blinii* H. Léveillé; *A. sieversiana* var. *grandis* Pampanini; *A. sieversiana* f. *microcephala* Pampanini; *A. sieversiana* f. *nana* Pampanini; *A. sparsa* Kitagawa; *Carpesium gigas* H. Léveillé & Vaniot.

Herbs, annual or biennial, 50–150 cm tall, gray pubescent or glabrescent. Basal and middle stem leaves: petiole (1–)2–4 cm; leaf blade broadly ovate or ovate-orbicular, 4–8(–13) × (2–)3–6(–15) cm, 2- or 3-pinnatisect or -partite, segments 2 or 3 pairs, lobules linear or linear-lanceolate, 2–10 × 1–1.5(–2) mm, rarely lacerate, apex acute or obtuse. Uppermost leaves and bracts sessile, pinnatisect or entire, leaves or lobes elliptic-lanceolate or lanceolate. Synflorescence a long, narrow panicle to 10–30 × 5–10 cm; branches ± erect, 5–10 cm, remote. Capitula many, remote, pedunculate or ± sessile, subtended by linear bracteoles. Involucre hemispheric or subglobose, (3–)4–6 mm in diam.; receptacle hemispheric, densely white pubescent. Marginal female florets 20–30 in (1 or)2 series; corolla conical, (2–)4-toothed. Disk florets 80–120, bisexual. Achenes oblong. Fl. and fr. Jun–Oct. $2n = 18$.

Roadsides, waste places, steppes, hillsides, forest margins; sea level to 4200 m. Gansu, N Guizhou, Hebei, Heilongjiang, Jilin, Liaoning, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shanxi, E and W Sichuan, Xinjiang, Xizang, W Yunnan [Afghanistan, India, Japan, Kazakhstan, Korea, Kyrgyzstan, Mongolia, Nepal, Pakistan, Russia, Tajikistan, Turkmenistan, Uzbekistan; E Europe].

The essential oils from *Artemisia sieversiana* are used in anti-inflammatory and hemostatic medicines.

3. *Artemisia sericea* (Besser) Weber ex Stechmann, *Artemis.* 16. 1775.

绢毛蒿 juan mao hao

Absinthium sericeum Besser, Bull. Soc. Imp. Naturalistes Moscou 1: 237. 1829; *A. grandiflorum* Besser; *A. nitens* Steven ex Besser; *Artemisia holosericea* Ledebour; *A. holosericea* var. *grandiflora* Ledebour; *A. holosericea* var. *parviflora* Ledebour; *A. nitens* (Steven ex Besser) Steven ex Krascheninnikov; *A. sericea* var. *gmeliniana* Besser; *A. sericea* var. *grandiflora* (Ledebour) Candolle; *A. sericea* var. *ledebouriana* Besser; *A. sericea* var. *nitens* (Steven ex Besser) Candolle; *A. sericea* var. *pallasiana* Besser; *A. sericea* f. *parviflora* (Ledebour) Pampanini; *A. sericea* var. *parviflora* (Ledebour) Candolle.

Subshrubs or perennial herbs, 40–60(–75) cm tall, with thick, creeping rhizomes. Stems single to several, usually not branched, gray sericeous or stems glabrescent. Basal leaves deciduous by anthesis. Middle stem leaves: petiole 5–8 mm; leaf blade elliptic or ovate, 3–5 × 2–4 cm, 2-pinnatisect; segments 4(–6) pairs, distal lobes 3-lobulate or subpalmatisect; lobules linear or linear-lanceolate, 10–17 × 1.5–2 mm, apex acute. Uppermost leaves and bracts pinnatisect or 3–5-sect. Synflorescence a ± narrow, racemelike panicle. Capitula shortly pedunculate, nodding. Involucre hemispheric, (4–)5–6(–9) mm in diam.; phyllaries with narrow white scarious margin; receptacle hemispheric, densely pubescent. Marginal female florets 10–14; corolla narrowly conical or tubular, 2- or 3-toothed. Disk florets 40–80, bisexual; corolla limb puberulent. Achenes ellipsoid or ellipsoid-ovoid. Fl. and fr. Jul–Oct. $2n = 18$.

Forest margins, hills, steppes, canyons, waste areas; 600–1600 m. Nei Mongol, Ningxia, N Xinjiang [India, Kazakhstan, Mongolia, N Pakistan, Russia; E Europe].

4. *Artemisia aschurbajewii* C. Winkler, *Trudy Imp. S.-Peterburgsk. Bot. Sada* 11: 332. 1890 [*“aschurbajewi”*].

褐头蒿 he tou hao

Artemisia sericea (Besser) Weber var. *turkestanica* C. Winkler.

Herbs, perennial, ± caespitose, 20–40(–50) cm tall, puberulent. Stems several, usually not branched. Basal and middle stem leaves: petiole 8–12 mm; leaf blade suborbicular or orbicular-reniform, 1–2.5(–3.5) × 1–2(–3) cm, 2-pinnatisect; segments 3–5 pairs, 3-lobulate; lobules lanceolate, 5–10 × 2–4 mm, margin serrate, rarely entire, apex obtuse. Uppermost leaves and bracts 3-lobed; lobes linear or linear-lanceolate. Synflorescence a racemelike panicle, compact near apex and lax near base. Capitula shortly pedunculate, nodding. Involucre globose or subglobose, 5–7 mm in diam.; phyllaries with wide

brown scarious margin; receptacle hemispheric, densely pubescent. Marginal female florets 10–15; corolla narrowly conical or tubular, 2- or 3-toothed. Disk florets 40–60, bisexual; corolla limb puberulent. Achenes ellipsoid. Fl. and fr. Jul–Oct. $2n = 36$.

Deserts or subalpine steppes, rocky hills; 1200–3500 m. NW Gansu, Qinghai, Xinjiang [Kazakhstan, Kyrgyzstan, Tajikistan].

5. *Artemisia absinthium* Linnaeus, *Sp. Pl.* 2: 848. 1753.

中亚苦蒿 zhong ya ku hao

Herbs, perennial, 60–150 cm tall, somewhat woody at base, gray sericeous or puberulent. Stems 1–3. Basal leaves: petiole 6–12 cm; leaf blade ovate-elliptic or ovate, 8–12 × 7–9 cm, 2- or 3-pinnatisect; segments 4 or 5 pairs, pinnately lobed; lobules lanceolate-elliptic or -linear, 8–15 × 2–4(–7) mm, apex obtuse. Middle stem leaves: petiole 2–6 cm; leaf blade ovate or elliptic-ovate, 2-pinnatisect; lobules linear-lanceolate, (8–)10–25 × 2–3(–5) mm. Uppermost leaves 4–6 × 2–4 cm, pinnatisect or 5-lobed; leaflike bracts 3-lobed or entire; lobes lanceolate or linear-lanceolate. Synflorescence usually a broad conical panicle; primary branches straight, ascending or ± oblique spreading, up to 30 cm and secondary branches up to 12 cm. Capitula shortly pedunculate, nodding. Involucre globose or subglobose, 2.5–3.5(–4) mm in diam.; receptacle hemispheric, densely pubescent. Marginal female florets 15–25; corolla yellow, obliquely 2-toothed. Disk florets 30–70(–90), bisexual; corolla yellow. Achenes oblong, 0.8–1 mm, with apical corona or not. Fl. and fr. Aug–Sep. $2n = 18$.

Hillsides, steppes, scrub, forest margins, often in locally moist situations; 1100–1500 m. Jiangsu, NW and W Xinjiang [Afghanistan, India, Japan, Kazakhstan, Kyrgyzstan, Pakistan, Russia; N Africa, SW Asia, Europe, North America].

Artemisia absinthium is used in anti-inflammatory and anthelmintic medicines.

6. *Artemisia frigida* Willdenow, *Sp. Pl.* 3: 1838. 1803.

冷蒿 leng hao

Herbs, perennial, or occasionally subshrubs, (10–)30–60(–70) cm tall, densely yellowish or pale yellow sericeous, sometimes stem bases glabrescent. Stems several, woody at base, shortly branched or not. Lower stem leaves: petiole 5–20 mm; leaf blade oblong or obovate-oblong, 0.8–1.5 × 0.8–1.5 cm, 2(or 3)-pinnatisect; segments (2–)4 pairs; lobules linear-lanceolate or lanceolate. Middle stem leaves: blade oblong or obovate-oblong, 5–7 × 5–7 mm, 1- or 2-pinnatisect; lobules lanceolate to linear-lanceolate, 2–3 × 0.5–1.5 mm. Uppermost leaves and bracts pinnately or 3–5-lobed. Synflorescence a spike or raceme, sometimes branched to form a panicle. Capitula nodding. Involucre hemispheric, globose, or ovoid, (2–)2.5–4.5 mm in diam.; receptacle densely white pubescent. Marginal female florets 8–13; corolla limb yellow or purple. Disk florets 20–30, bisexual. Achenes oblong or ellipsoid-obovate, with a minute apical corona. Fl. and fr. Jun–Oct. $2n = 18, 36$; ($n = 9+3b, 18, 18+2b, 36$).

Steppes, subalpine meadows, dry hillsides, stable dunes, dry waste

areas; 1000–4000 m. Gansu, Hebei, W Heilongjiang, N Hubei, W Jilin, W Liaoning, Nei Mongol, Ningxia, Qinghai, N Shaanxi, Xinjiang, Xizang [Kyrgyzstan, Mongolia, Russia, Tajikistan; SW Asia, E Europe].

- 1a. Stems 30–60 cm; synflorescence branched; capitula 2–3 mm in diam.; corolla limb yellow 6a. var. *frigida*
 1b. Stems 10–20 cm; synflorescence rarely branched; capitula 3.5–4.5 mm in diam.; corolla limb purple 6b. var. *atropurpurea*

6a. *Artemisia frigida* var. *frigida*

冷蒿(原变种) leng hao (yuan bian zhong)

Absinthium frigidum (Willdenow) Besser; *A. frigidum* var. *fischerianum* Besser; *A. frigidum* var. *willdenowianum* Besser; *Artemisia frigida* var. *fischeriana* (Besser) Candolle; *A. frigida* var. *intermedia* Trautvetter; *A. frigida* var. *mongolica* Kitamura; *A. frigida* var. *willdenowiana* (Besser) Candolle.

Stems 30–60(–70) cm. Synflorescence branched to form a panicle. Capitula globose or ovoid, 2–3 mm in diam. Corolla limb yellow.

Steppes, subalpine meadows, dry hillsides, stable dunes, dry waste areas; 1000–4000 m. Gansu, W Heilongjiang, N Hubei, W Jilin, W Liaoning, Nei Mongol, Ningxia, Qinghai, N Shaanxi, Xinjiang, Xizang [Kyrgyzstan, Mongolia, Russia, Tajikistan; SW Asia, E Europe].

6b. *Artemisia frigida* var. *atropurpurea* Pampanini, *Nuovo Giorn. Bot. Ital.*, n.s., 34: 655. 1927.

紫花冷蒿 zi hua leng hao

Stems 10–20 cm. Synflorescence a simple raceme, ± spikelike. Capitula hemispheric, 3.5–4.5 mm in diam. Corolla limb purple.

- Dry hills; 2000–2600 m. Gansu, Ningxia, Xinjiang.

So many differences exist between these two varieties of *Artemisia frigida* that there is a case for recognizing them as distinct species.

7. *Artemisia argyrophylla* Ledebour, *Fl. Altaic*. 4: 166. 1833.

银叶蒿 yin ye hao

Herbs, perennial, or shrubs, 30–50 cm tall, ± woody at base, densely silvery or hoary pubescent. Lower and middle stem leaves: petiole 5–10 mm; leaf blade obovate-elliptic or elliptic, 0.5–0.8 × 0.5–0.8 cm, 1- or 2-pinnatisect; segments 2 or 3 pairs, distal lobes 2–4-lobulate; lobules elliptic or elliptic-lanceolate, 2–4 × 0.5–1.5 mm, recurved or flat, apex obtuse. Uppermost leaves and leaflike bracts pinnatisect. Synflorescence a somewhat broad panicle. Capitula sessile or shortly pedunculate, nodding. Involucre subglobose or subovoid-campanulate, 4–7 mm in diam. Marginal female florets 5–10; corolla limb purple or yellow, white puberulent. Disk florets 20–40, bisexual. Achenes oblong or obovoid-oblong, with apical corona or not. Fl. and fr. Jul–Oct.

Steppes, dry areas, hills; ca. 2400 m or below. W Gansu, SW Nei Mongol, Ningxia, Xinjiang [Mongolia, Russia].

- 1a. Capitula sessile; corolla limb purple 7a. var. *argyrophylla*

- 1b. Capitula pedunculate; corolla limb yellow 7b. var. *brevis*

7a. *Artemisia argyrophylla* var. *argyrophylla*

银叶蒿(原变种) yin ye hao (yuan bian zhong)

Artemisia frigida Willdenow var. *argyrophylla* (Ledebour) Trautvetter.

Stems densely silvery to hoary pubescent. Capitula sessile. Corolla limb purple.

Steppes, dry areas; below 2000 m. W Gansu, SW Nei Mongol, Ningxia, E Xinjiang [Mongolia, Russia].

7b. *Artemisia argyrophylla* var. *brevis* (Pampanini) Y. R. Ling, *Bull. Bot. Res.*, Harbin 8(4): 7. 1988.

小银叶蒿 xiao yin ye hao

Artemisia brevis Pampanini, *Rendiconti Seminario Fac. Sci. Univ. Cagliari* 8: 165. 1938.

Stems flexuous, ascending, shortly branched or not, puberulent or glabrescent. Synflorescence a narrow, racemelike panicle. Capitula shortly pedunculate. Corolla limb yellow.

- Hills; ca. 2400 m. Xinjiang.

8. *Artemisia rupestris* Linnaeus, *Sp. Pl.* 2: 847. 1753.

岩蒿 yan hao

Absinthium rupestre (Linnaeus) Schrank; *A. rupestre* var. *oelandicum* Besser; *A. rupestre* var. *thuringiacum* Besser; *A. viride* Besser; *A. viridifolium* (Ledebour) Besser; *Artemisia dentata* Willdenow; *A. rupestris* var. *oelandica* (Besser) Candolle; *A. rupestris* var. *thuringiaca* (Besser) Candolle; *A. rupestris* var. *viridifolia* (Ledebour) Candolle; *A. rupestris* var. *viridis* (Besser) Candolle; *A. viridifolia* Ledebour.

Herbs, perennial, usually caespitose, 20–50 cm tall, ± woody at base, pubescent, glabrescent. Stems brown or dark brown, shortly branched or not. Leaves thinly textured. Lower stem leaves petiolate. Middle stem leaves ovate-elliptic or oblong, 1.5–3(–5) × 1–2(–2.5) cm, pinnatisect; segments 5–7 pairs, pectinate, ± clasping; lobules linear-lanceolate or linear, 1–6 × 0.5–1.5 mm. Uppermost leaves and leaflike bracts pinnatisect or 3-lobed. Synflorescence a spikelike or racemelike panicle. Capitula pedunculate or sessile, nodding. Involucre globose or subglobose, 4–7 mm in diam.; phyllaries pubescent, scarious margin lacerate; receptacle hemispheric, pubescent. Marginal female florets 8–16; corolla vasiform or narrowly conical, 3- or 4-toothed. Disk florets 30–70, bisexual. Achenes oblong or oblong-ovoid, usually with a minute apical crown. Fl. and fr. Jul–Oct. $2n = 18, 34$.

Dry hills, desert or semidesert steppes, grassy marshlands, dry river valleys, riverbeds, scrub, forest margins; 1100–2900 m. Xinjiang [Afghanistan, Kazakhstan, Kyrgyzstan, Mongolia, Russia, Tajikistan; E and N Europe].

The whole plant is used in anti-inflammatory and hemostatic medicines.

9. *Artemisia xerophytica* Krascheninnikov, Bot. Mater. Gerb. Glavn. Bot. Sada R.S.F.S.R. 3: 24. 1922.

内蒙古旱蒿 nei meng gu han hao

Shrubs, dwarf, caespitose, 30–40 cm tall, with thick woody roots, rootstocks, and branches, densely gray or yellowish sericeous, glabrescent at base; stems brown or brownish. Leaves ± leathery. Middle stem leaves: petiole 3–5 mm; leaf blade ovate or suborbicular, 1–1.5 × 0.4–0.6 cm, 2-pinnatisect, segments 2 or 3 pairs, distal lobes 3–5-lobulate; lobules narrowly spatulate, linear, or linear-oblongate, 1–3 × 0.5–1.5 mm. Uppermost leaves and leaflike bracts sessile, pinnatisect or 3–5-lobed. Synflorescence a panicle. Capitula shortly pedunculate. Involucre subglobose, 3.5–4.5 mm in diam.; phyllaries yellowish pubescent; receptacle pubescent. Marginal female florets 4–10. Disk florets 10–20, bisexual; corolla limb puberulent. Achenes obovoid-oblong. Fl. and fr. Aug–Oct.

Gobi Desert, semidesert steppes, dunes; 1700–3500 m. N Gansu, Nei Mongol, Ningxia, N Qinghai, N Shaanxi, N Xinjiang [Mongolia].

Artemisia xerophytica is used in windbreaks and for sand stabilization. It is also an important source of herbage for livestock.

10. *Artemisia rutifolia* Stephen ex Sprengel, Syst. Veg. 3: 488. 1826.

香叶蒿 xiang ye hao

Subshrubs or shrubs, caespitose, 20–80 cm tall, strongly aromatic, silky puberulent, glabrescent; rootstock woody, much branched, 1.5–2.5 cm thick. Stem branches 20–30 cm. Lower and middle stem leaves: petiole 0.3–1 cm; leaf blade suborbicular or reniform, 0.5–2 × 0.8–3 cm, 2-ternately lobed or nearly 2-palmatisect; segments 1 or 2 pairs; lobules narrowly elliptic-oblongate or elliptic-lanceolate, 6–12 × 1–1.5 mm, recurved or flat. Uppermost leaves and leaflike bracts palmatisect, 3-lobed, or entire. Synflorescence a racemelike panicle, ± oblong, 15–20 × 3–4 cm; branches 4–6(–8) cm, obliquely erect. Capitula pedunculate, nodding. Involucre globose or subglobose, 3–9 mm in diam.; receptacle with deciduous paleaceous hairs. Florets 15–40, yellow, pinkish tinged; corolla glandular and hairy. Marginal female florets 5–10; corolla narrowly tubular, 2-toothed. Disk florets (10–)12–15(–28), bisexual; corolla limb puberulent or glabrescent. Achenes ellipsoid-obovoid, ca. 1.25 mm. Fl. and fr. Jul–Oct.

Hills, dry river valleys, basins, steppes, semideserts, Gobi Desert; 1300–5000 m. Nei Mongol, Qinghai, Xinjiang, Xizang [Afghanistan, Kazakhstan, Kyrgyzstan, Mongolia, Nepal, Pakistan, Russia, Tajikistan; SW Asia].

1a. Involucre 4–9 mm in diam. 10c. var. *ruoqiangensis*

1b. Involucre 3–4 mm in diam.

2a. Leaves reniform or semiobicular, 10–20 mm, lobules recurved 10a. var. *rutifolia*

2b. Leaves suborbicular, 5–10 mm, lobules flat 10b. var. *altaica*

10a. *Artemisia rutifolia* var. *rutifolia*

香叶蒿(原变种) xiang ye hao (yuan bian zhong)

Artemisia falconeri C. B. Clarke; *A. turczaninoviana* Bes-

ser; *A. turczaninoviana* var. *dasyantha* Schrenk; *A. turczaninoviana* var. *falconeri* (C. B. Clarke) O. Fedtschenko.

Leaf blade reniform or semiobicular, 1–2 cm; lobules recurved. Involucre 3–4 mm in diam.

Hills, dry river valleys, basins, steppes; 1300–5000 m. Qinghai, Xinjiang, Xizang [Afghanistan, Kazakhstan, Kyrgyzstan, Mongolia, Nepal, Pakistan, Russia, Tajikistan; SW Asia].

10b. *Artemisia rutifolia* var. *altaica* (Krylov) Krascheninnikov in Krylov, Fl. Zapadnoi Sibiri 11: 2789. 1949.

阿尔泰香叶蒿 a er tai xiang ye hao

Artemisia turczaninoviana var. *altaica* Krylov, Fl. Altai 3: 61. 1904.

Leaf blade suborbicular, 5–10 × 5–10 mm; lobules flat, strict. Involucre 3–4(–5) mm in diam.

Semideserts, Gobi Desert. E and N Xinjiang [W Mongolia].

10c. *Artemisia rutifolia* var. *ruoqiangensis* Y. R. Ling, Guihaia 12: 312. 1992.

诺羌香叶蒿 nuo qiang xiang ye hao

Leaf blade suborbicular, 5–10 × 5–10 mm; lobules recurved. Involucre 4–9 mm in diam.

• Semidesert steppes, Gobi Desert; 3100–4200 m. SE Xinjiang (Ruoqiang).

11. *Artemisia obtusiloba* Ledebour, Fl. Altaic. 4: 68. 1833.

钝裂蒿 dun lie hao

Herbs, perennial, caespitose, 10–35 cm tall, with woody rootstocks and branches, shortly branched or not, densely gray pubescent, glabrescent, purple or brown. Leaves and phyllaries densely pubescent, sometimes glabrescent; leaves usually gland-dotted. Middle stem leaves sessile, with pseudostipules; leaf blade oblong, broadly ovate, or obovate, 0.3–2 × 0.2–1.5(–1.7) cm, 1- or 2-pinnatisect and panduratisect; segments 2–4 pairs, distal lobes falcate, usually 3–5-palmatisect; lobules linear, linear-lanceolate, or elliptic-lanceolate, 1.5–6 × 0.5–1.5 mm, rarely lacerate, apex obtuse. Uppermost leaves and leaflike bracts pinnatisect or entire. Synflorescence a ± narrow spikelike panicle. Capitula sessile. Involucre globose or broadly ovoid, 1.5–3(–4) mm in diam.; phyllaries yellowish pubescent; receptacle pubescent or glabrous. Marginal female florets 6–12. Disk florets 15–30, bisexual; corolla limb puberulent or glabrescent. Achenes ellipsoid. Fl. and fr. Jul–Aug.

Dry hills, semidesert steppes, roadsides, saline-alkaline soils, rocky slopes, canyons; below 1700 m. N Xinjiang [Kazakhstan, Mongolia, Russia].

Krasnoborov (Fl. Sibir. 13: 138–140. 1997) recognized four subspecies within *Artemisia obtusiloba*, the typical subspecies plus three further subspecies endemic to Siberia: *A. obtusiloba* subsp. *altaica* (Krascheninnikov) Krasnoborov, *A. obtusiloba* subsp. *martjanovii* (Krascheninnikov ex Poljakov) Krasnoborov, and *A. obtusiloba* subsp. *subviscosa* (Turczaninow ex Besser) Krasnoborov.

1a. Receptacle pubescent; leaf blade 0.6–2 × 0.5–1.5(–1.7) cm 11a. var. *obtusiloba*

- 1b. Receptacle glabrous; leaf blade
0.3–0.7 × 0.2–0.5 cm 11b. var. *glabra*

11a. *Artemisia obtusiloba* var. *obtusiloba*

钝裂蒿(原变种) *dun lie hao* (*yuan bian zhong*)

Artemisia obtusiloba var. *gracilis* Ledebour.

Middle stem leaves: blade oblong or broadly ovate, 0.6–2 × 0.5–1.5(–1.7) cm, 2-pinnatisect and panduratisect; segments 2 or 3 pairs, lobules linear, linear-lanceolate, or elliptic-lanceolate, 1.5–3 × 0.5–1.5 mm, rarely lacerate, apex obtuse. Involucre 2–3(–4) mm in diam.; receptacle pubescent. Marginal female florets 6–12. Disk florets 20–30.

Dry hills, semidesert steppes, roadsides, saline-alkaline soils; 900–1700 m. N Xinjiang [Kazakhstan, Mongolia, Russia (W Siberia)].

11b. *Artemisia obtusiloba* var. *glabra* Ledebour, Fl. Altaic. 4: 70. 1833.

亮绿蒿 *liang lü hao*

Artemisia glabella Karelina & Kirilov; *A. obtusiloba* var. *glabella* (Karelina & Kirilov) Poljakov.

Middle stem leaves: blade ovate or obovate, 0.3–0.7 × 0.2–0.5 cm, 1- or 2-pinnatisect; segments (2 or)3 or 4 pairs; lobules linear or linear-lanceolate, 3–6 × 0.5–1.5 mm. Involucre 1.5–2.5(–3.5) mm in diam.; receptacle glabrous. Female florets 6–10. Disk florets 15–25. Achenes ellipsoid. Fl. and fr. Jul–Sep.

Rocky slopes, steppes, canyons; low elevations. N Xinjiang [Russia].

Artemisia obtusiloba var. *glabra* has been treated as a distinct species belonging to *A. sect. Abrotanum* because it lacks the hairy receptacle characteristic of *A. sect. Absinthium*. In all other characters it is a good match with *A. obtusiloba*.

12. *Artemisia lagocephala* (Fischer ex Besser) Candolle, Prodr. 6: 122. 1838.

白山蒿 *bai shan hao*

Absinthium lagocephalum Fischer ex Besser, Bull. Soc. Imp. Naturalistes Moscou 1: 233. 1829; *Artemisia besseriana* Ledebour; *A. besseriana* var. *integrifolia* Ledebour; *A. besseriana* var. *triloba* Ledebour; *A. kruhsiana* Besser; *A. lagocephala* var. *besseriana* (Ledebour) Pampanini; *A. lagocephala* f. *integrifolia* (Ledebour) Pampanini; *A. lagocephala* f. *triloba* (Ledebour) Pampanini; *A. lagocephala* var. *triloba* (Ledebour) Herder.

Subshrubs or herbs, caespitose, 40–80 cm tall, with woody rootstock, shortly branched, densely gray or brownish pubescent. Lowermost and middle stem leaves sessile, spatulate, elliptic-oblancheolate, or lanceolate, 3–6 × 0.3–1 cm, 3–5-crenately cleft or entire apically, cuneate basally, lacerate and serrate. Upper leaves and leaflike bracts lanceolate or linear-lanceolate, apex obtuse or acute. Synflorescence a racemelike panicle. Capitula pedunculate. Involucre hemispheric or subglobose, 4–6 mm in diam.; receptacle hemispheric, pubescent. Marginal female florets 7–10; corolla 3(or 4)-toothed. Disk florets 30–80, bisexual; corolla limb puberulent. Achenes ellipsoid or obovoid. Fl. and fr. Aug–Oct. $2n = 18$.

Hills, rocky slopes, ridges, outer forest margins, roadsides, forest steppes; below 2600 m. Heilongjiang, Jilin, E Nei Mongol, Sichuan [E Russia].

Material of this species has sometimes been included within *Artemisia chinensis* (here treated as *Crossostephium chinensis*). Komarov (Fl. Manshur. 3: 668. 1907) placed material of this taxon within *A. stelleriana* Besser. Krasnoborov (Fl. Sibir. 13: 136–137. 1997) recognized *A. kruhsiana* as distinct:

Artemisia kruhsiana is distinguished by florets glabrous (vs. florets pubescent with slender crispate hairs in *A. lagocephala*); leaves white tomentose abaxially, fairly deeply once or twice trisect on vegetative shoots (vs. radical leaves gray tomentose abaxially, rather shallowly 3-lobate, with 3 teeth or entire in *A. lagocephala*); and plants to 40 cm tall (vs. plants 40–80 cm tall in *A. lagocephala*).

13. *Artemisia disjuncta* Krascheninnikov, Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk S.S.S.R. 9: 176. 1946.

矮丛光蒿 *ai cong guang hao*

Herbs, perennial, caespitose, 10–15 cm tall, with woody rootstock, usually not branched. Basal and lower stem leaves: petiole 20–30 mm, ± clasping; basal leaf blades oblong or elliptic, 4–6 × 2–4 cm, abaxially gland-dotted, 2- or 3-pinnatipartite or -sect; segments 3 or 4 pairs; lobes 2- or 3-partite; lobules elliptic-lanceolate or lanceolate, occasionally 1–3-serrate; rachis narrowly winged. Uppermost leaves oblong, 1(or 2)-pinnatipartite, 10–20 × 5–18 mm, leaflike bracts minute, pinnatipartite or entire. Synflorescence racemelike. Capitula nodding; peduncle 5–15 mm. Involucre subglobose, 5–8 mm in diam.; phyllaries glabrescent, scarious margin black; receptacle convex, pubescent. Marginal female florets 8–12. Disk florets 30–50, bisexual; corolla limb puberulent. Achenes ovoid-ellipsoid. Fl. and fr. Aug–Oct.

Slopes or rocky hills; 1700–2700 m. E Xinjiang [W Mongolia].

14. *Artemisia niitakayamensis* Hayata, Bot. Mag. (Tokyo) 20: 16. 1906.

玉山艾 *yu shan ai*

Herbs, perennial, 10–20 cm tall, with ± woody rootstock and branches, most parts puberulent, glabrescent. Basal and middle stem leaves: petiole 5–10 mm; leaf blade ovate or obovate, 1–2.5 × 0.7–1.6 cm, 2-pinnatisect; segments (3 or)4(or 5) pairs, serrate or lobulate; lobules 2–4 pairs, pectinate, 2–8 × 0.6–1 mm. Uppermost leaves and leaflike bracts 1- or 2-pinnatisect or -partite or entire, lobes or entire leaves lanceolate. Synflorescence racemelike. Capitula few, apically congested; peduncle 5–20 mm. Involucre hemispheric, 7–10 mm in diam.; phyllaries glabrescent, scarious margin brown, lacerate; receptacle convex, pubescent. Marginal female florets 10–18, (2 or)3- or 4-toothed. Disk florets 40–60, bisexual. Achenes oblong or obovoid-oblong. Fl. and fr. Aug–Sep.

• Alpine situations; 3000–3800 m. Taiwan.

15. *Artemisia minor* Jacquemont ex Besser, Bull. Soc. Imp. Naturalistes Moscou 9: 22. 1836.

垫型蒿 *dian xing hao*

Artemisia sieversiana Ehrhart ex Willdenow var. *tibetica*

C. B. Clarke; *A. tibetica* (C. B. Clarke) J. D. Hooker & Thomson.

Herbs or dwarf subshrubs, caespitose, 10–15 cm tall, with horizontally creeping thick woody rootstock and branches, stems covered with broad dry leaf bases, most parts densely gray or yellowish silky-villous. Basal and middle stem leaves: petiole 0.4–0.8 cm; leaf blade suborbicular, flabellate, or reniform, (0.4–)0.6–1.2 × 0.5–1 cm, 2-pinnatisect; segments in 2 (or 3) pairs, narrowly oblanceolate, 3–5-lobulate; lobules linear or linear-lanceolate, 1–2 × 0.5–1 mm, apex obtuse. Uppermost leaves and leaflike bracts minute, pinnatisect or 3-lobed or entire. Synflorescence spikelike or racemelike. Capitula usually 6–9, subsessile, remote, secund. Involucre hemispheric or subglobose, (3–)5–10 mm in diam.; outer phyllaries sparsely hairy, scarious margin broad, lacerate, purple or dark brown, apex acute; receptacle hemispheric, pubescent. Florets many, all fertile. Marginal female florets 10–18, (2 or)3- or 4-toothed. Disk florets 50–80, bisexual; corolla limb purple. Achenes brown, obovoid, ca. 0.8 mm. Fl. and fr. Jul–Oct.

Slopes, canyons, peaks, shores of salt lakes, saline soils, rocky grasslands, waysides; 3000–5800 m. W Gansu, W Qinghai, S Xinjiang, Xizang [N India, N Pakistan; SW Asia (Iran)].

16. *Artemisia younghusbandii* J. R. Drummond ex Pampanini, *Nuovo Giorn. Bot. Ital.*, n.s., 34: 708. 1927.

藏白蒿 zang bai hao

Herbs or subshrubs, caespitose, 15–25(–30) cm tall, with thick woody stock and branches, much branched, densely gray or yellowish tomentose. Basal and middle stem leaves: petioles 2–4 mm; leaf blades ovate, broadly ovate, or subreniform, 5–10 × 5–8 mm, 1 (or 2)-pinnatisect; segments 2 or 3 pairs, entire or lobulate; lobes or lobules minute, lanceolate or elliptic-lanceolate, 1–2 × 0.5–1 mm. Uppermost leaves and leaflike bracts pinnatisect, 3-lobed, or entire. Synflorescence a broad panicle. Capitula nodding. Involucre hemispheric or broadly ovoid, (2.5–)3–4 mm in diam.; receptacle conical, pubescent. Marginal female florets 4–8. Disk florets 8–14; corolla limb purple, glabrous. Achenes obovoid-ellipsoid. Fl. and fr. Jul–Oct.

• Canyons, hills, rocky slopes, waysides; 4000–4700 m. Xizang.

17. *Artemisia stracheyi* J. D. Hooker & Thomson ex C. B. Clarke, *Compos. Ind.* 164. 1876.

冻原白蒿 dong yuan bai hao

Artemisiella stracheyi (J. D. Hooker & Thomson ex C. B. Clarke) Ghafoor.

Herbs, perennial, caespitose, 15–45 cm tall, with thick woody root and stock, usually not branched, densely gray yellow or yellowish sericeous-tomentose, fetid. Basal leaves: petiole 5–8 cm, ± clasping; leaf blade narrowly ovate, oblong, or elliptic, 5–10 × 1–2 cm, 2- or 3-pinnatisect; segments 7–13 pairs, 1–3-lobulate; lobules narrowly linear-lanceolate or linear, 3–5 × 1–1.5 mm. Middle and uppermost leaves 1- or 2-pinnatisect; leaflike bracts pinnatisect or entire. Synflorescence racemelike, sometimes dense and spikelike. Capitula shortly pedunculate, nodding. Involucre hemispheric, 6–10 mm in diam.;

receptacle hemispheric, deciduously pubescent. Marginal female florets 4–10. Disk florets 50–60, bisexual; corolla with adhering multicellular hairs. Achenes obovoid. Fl. and fr. Jul–Nov. $2n = 18$.

Hills, floodlands, lakesides, rocky slopes, meadows, shrublands; 4300–5200 m. Xizang [N India, N Pakistan].

18. *Artemisia fauriei* Nakai, *Bot. Mag. (Tokyo)* 29: 7. 1915.

海州蒿 hai zhou hao

Artemisia fukudo Makino var. *mokpensis* Pampanini; *A. haichowensis* C. C. Chang.

Herbs, perennial, 20–40 cm tall, root solitary; most parts gray and arachnoid tomentose, glabrescent. Basal leaves ± in rosette, soon withering; petiole 5–13 cm; leaf blade ovate or broadly ovate, 11–18 × 8–16 cm, 3- or 4-pinnatisect; lobules filiform, (10–)15–30 × 0.5–1.5 mm. Middle and upper stem leaves: leaf blade broadly ovate, 3–5 × 3–5 cm, 2- or 3-pinnatisect; segments 3 or 4 pairs; lobules filiform, 5–15 × 0.5–1.5 mm. Uppermost leaves and leaflike bracts 3–5-pinnatisect or entire; lobes of entire leaves 1–3 cm. Synflorescence a panicle with ascending main branches and many short lateral racemes. Capitula pedunculate, nodding. Involucre ovoid or obovoid, 2–3(–4) mm in diam.; receptacle pubescent. Marginal female florets 2–5. Disk florets 8–15, bisexual. Achenes obovoid, slightly compressed. Fl. and fr. Aug–Oct.

Coastal beaches, sand banks of sea and river mouths; near sea level. Hebei, Jiangsu, Shandong [Japan, Korea].

The original concept of *Artemisia fauriei* also included *Faurie 361*, now the type of *A. nakaii*, which differs by its biennial habit and basal leaves with shorter, 6–15 mm, filiform lobules.

19. *Artemisia nakaii* Pampanini, *Nuovo Giorn. Bot. Ital.*, n.s., 34: 682. 1927.

矮滨蒿 ai bin hao

Herbs, biennial, 30–60 cm tall, long branched, densely arachnoid and sericeous pubescent or glabrescent. Basal leaves ± forming rosettes; petiole 4–10 cm; leaf blade suborbicular or ovate, 8–15 × 8–15 cm, 3-pinnatisect; lobules filiform, 6–15 mm. Lower and middle stem leaves: leaf blade orbicular or ovate, 1.5–8 × 0.8–1.5 cm, 1- or 2-pinnatisect; segments 2 or 3 pairs; lobules linear or filiform, 4–15 × ca. 0.5 mm. Uppermost leaves and leaflike bracts 1 (or 2)-pinnatisect. Synflorescence a narrow to broad panicle. Capitula nodding. Involucre ellipsoid or obconical, (2–)3(–4) mm in diam.; phyllaries minutely tomentose, ± glabrescent; receptacle white pubescent. Marginal female florets 2–5. Disk florets 8–16, bisexual. Achenes obovoid-ellipsoid. Fl. and fr. Aug–Oct.

Sand banks along rivers, grasslands; low elevations. Hebei, Liaoning, SE Nei Mongol [Korea].

Artemisia nakaii is based on the gathering *Faurie 361*, originally included within *A. fauriei*, which differs by its perennial habit and basal leaves with longer, (10–)15–30 mm, filiform lobules.

20. *Artemisia anethifolia* Weber ex Stechmann, *Artemis.* 29. 1775.

碱蒿 jian hao

Absinthium divaricatum Fischer ex Besser; *Artemisia anethifolia* var. *erectiflora* Candolle; *A. anethifolia* f. *gracilis* Pampanini; *A. anethifolia* var. *multicaulis* (Ledebour) Candolle; *A. anethifolia* f. *shansiensis* Pampanini; *A. anethifolia* var. *stelleriana* Candolle; *A. multicaulis* Ledebour.

Herbs, annual or biennial, 20–55 cm tall, stems sometimes very slender; all parts pubescent, often glabrescent. Basal leaves elliptic or ovate-elliptic in outline, 3–4.5 × 1.5–2.5(–3) cm, 2- or 3-pinnatisect; segments 3 or 4 pairs, distal lateral lobes lobulate; lobules filiform, 6–12 × 0.5–1.5 mm. Uppermost leaves and leaflike bracts 3–5-lobed or entire. Synflorescence a broad panicle with flowering shoots from most upper nodes. Capitula closely to widely spaced, pedunculate, often bracteolate. Involucre hemispheric or broadly ovoid, wider than long, 2–3(–4) mm in diam.; phyllaries ± densely puberulent, sometimes ± glabrescent; receptacle convex, white pubescent. Marginal female florets 3–6. Disk florets 18–28, bisexual; corolla limb yellow or red. Achenes ellipsoid or obovoid. Fl. and fr. Aug–Oct.

Slopes, dry canyons, saline soils, saline steppes, wastelands, stable dunes, *Hippophae* thickets; 800–2500 m. Gansu, Hebei, W Heilongjiang, Nei Mongol, Ningxia, Qinghai, Shaanxi, N Shanxi, Xinjiang [Mongolia, Russia].

This species is used as herbage for feeding livestock.

21. *Artemisia anethoides* Mattfeld, Repert. Spec. Nov. Regni Veg. 22: 249. 1926.

蒹蒿 shi luo hao

Artemisia anethifolia Weber ex Stechmann var. *anethoides* (Mattfeld) Pampanini; *A. zhaodongensis* G. Y. Chang & M. Y. Liou.

Herbs, annual or biennial, 30–60(–90) cm tall, gray pubescent. Basal and lowermost stem leaves: leaf blade ovate or elliptic-ovate, 3–4(–5) × 2–4 cm, 3(or 4)-pinnatisect; lobules filiform or linear-lanceolate. Middle stem leaves: leaf blade ovate or broadly ovate in outline, 2–4 × 1–3 cm, 2- or 3-pinnatisect; segments (1 or)2 or 3 pairs; lobules filiform, 2–5 × 0.3–0.5 mm. Uppermost leaves and leaflike bracts 3-lobed or entire. Synflorescence a narrow panicle, to 15 × 3 cm, most nodes producing racemes or flowering branches to form a broad compound panicle. Capitula many, pedunculate, bracteolate, nodding. Involucre subglobose, 1.5–2(–2.5) mm in diam.; phyllaries and receptacle densely pubescent. Marginal female florets 3–6. Disk florets 8–16, bisexual. Achenes obovoid. Fl. and fr. Jul–Oct.

Hills, slopes, saline soils, sand banks of rivers and lakes, roadsides, wastelands, steppes, semidesert steppes, desert forests; low elevations to 3300 m. Gansu, Hebei, Heilongjiang, N Henan, Jilin, Liaoning, Nei Mongol, Ningxia, Qinghai, Shaanxi, N Shandong, Shanxi, N Sichuan, Xinjiang [Mongolia, Russia].

Artemisia anethoides is used for feeding livestock.

22. *Artemisia succulentoides* Y. Ling & Y. R. Ling, Acta Phytotax. Sin. 18: 504. 1980.

肉质叶蒿 rou zhi ye hao

Herbs, annual or biennial, 25–40 cm tall, puberulent, glabrescent. Middle stem leaves: petiole 1.5–2.5 cm; leaf blade ovate, 1.5–2 × 1–1.5 cm, 1- or 2-pinnatisect; segments 2 or

3 pairs, deeply pectinately serrate; teeth obtuse, gland-tipped. Middle and upper stem leaves pinnatifid or entire. Uppermost leaves linear; leaflike bracts linear or linear-lanceolate, 10–25 × 1–1.5 mm. Synflorescence a broad panicle. Capitula nodding. Involucre globose or hemispheric, 3–5 mm in diam.; receptacle densely white pubescent. Marginal female florets 5–20. Disk florets 30–50, bisexual; corolla limb puberulent. Achenes minute. Fl. and fr. Aug–Oct.

• Grasslands, sandy riverbanks; 3700–3800 m. Xizang (Lhasa).

23. *Artemisia persica* Boissier, Diagn. Pl. Orient., ser. 1, 6: 91. 1846.

伊朗蒿 yi lang hao

Herbs or subshrubs, 25–70 cm tall, much branched, arachnoid pubescent, glabrescent, with thick and woody rootstock and basal branches, branchlets ascending or erect, spine-tipped or not, densely leafy. Lower and middle stem leaves: petiole 0.5–1 cm; leaf blade suborbicular or ovate, 1.2–3.5(–4.5) × (0.8–)1.5–2.5 cm, 2- or 3-pinnatisect; segments 3–5 pairs; lobules minute, pectinately linear-lanceolate or linear, 4–6 × ca. 0.5 mm. Uppermost leaves and leaflike bracts 1- or 2-pinnatisect. Synflorescence a ± cylindric to conical panicle, to 30 × 8–12 cm; branches ascending to obliquely erect, 6–20 cm. Capitula secund, nodding; peduncles (1–)2–4 mm. Involucre hemispheric, 3–4(–5) mm in diam.; phyllaries densely arachnoid pubescent in middle, margin scarious, apex obtuse; receptacle densely pubescent, glabrescent. Florets 40–50, all yellow. Marginal female florets 10–15; corolla compressed, gland-dotted. Disk florets 35–50, bisexual; corolla limb purple, densely long puberulent or glabrescent. Achenes light brown, ellipsoid-ovoid or ovoid, ca. 1 mm. Fl. and fr. Jul–Oct. 2n = 18.

Rocky slopes, sandy beaches; 2900–4000 m. W Qinghai, Xizang [Afghanistan, N India, Kazakhstan, Kyrgyzstan, Myanmar, N Pakistan, Tajikistan; SW Asia (Iran)].

- 1a. Branchlets not spine-tipped 23a. var. *persica*
1b. Branchlets spine-tipped 23b. var. *subspinescens*

23a. *Artemisia persica* var. *persica*

伊朗蒿(原变种) yi lang hao (yuan bian zhong)

Artemisia togusbulakensis O. Fedtschenko.

Branchlets not spine-tipped.

Rocky slopes, sandy beaches; 2900–4000 m. W Qinghai, Xizang [Afghanistan, N India, Kazakhstan, Kyrgyzstan, Myanmar, N Pakistan, Tajikistan; SW Asia (Iran)].

Artemisia persica is used as an anti-inflammatory, a hemostatic, or for aiding digestion.

23b. *Artemisia persica* var. *subspinescens* (Boissier) Boissier, Fl. Orient. 3: 374. 1875.

微刺伊朗蒿 wei ci yi lang hao

Artemisia subspinescens Boissier, Diagn. Pl. Orient., ser. 1, 6: 91. 1846.

Branches and branchlets with hard, thorny tips.

Xizang [Afghanistan; SW Asia (S Iran)].

2. *Artemisia* sect. *Abrotanum* (Duhamel du Monceau) Besser, Bull. Soc. Imp. Naturalistes Moscou 1: 222. 1829.

艾蒿组 ai hao zu

Abrotanum Duhamel du Monceau, Traité Arbres Arbust. 1: 19. 1755.

Herbs, annual or perennial, rarely subshrubs, pubescent, tomentose, or glabrous, rarely arachnoid, without glandular or viscid hairs (sessile glands often present). Leaves 2–4-pinnatisect; lobules pectinate, filiform, narrowly linear, or lanceolate, less than 1(–1.5) mm wide. Capitula hemispheric, globose, or subglobose, rarely ovoid. Phyllary margins scarious, midvein green or sometimes colored. Receptacle glabrous. Marginal florets (1–)3–20; corolla narrowly tubular or rarely narrowly conical, 2- or 3(or 4)-toothed or without teeth. Disk florets (7–)10–80, bisexual, ovaries well developed; style ca. as long as or longer than corolla, branches divergent, recurved at apex.

About 65 species: N Hemisphere, mostly in Asia and Europe, a few species extending into N Africa, Oceania, and the Americas; 30 species (seven endemic) in China.

Most species contain mainly monoterpenoids and also a few sesquiterpenoids. This section has been confused with *Artemisia* sect. *Artemisia*.

- 1a. Leaves pinnatisect, with ultimate lobules filiform, linear-filiform, filiform-clavate, narrowly lanceolate, or linear-lanceolate, (5–)10+ × 0.5–1(–1.5) mm, apex acute.
 - 2a. Herbs annual, biennial, or short-lived perennial; rootstock a simple taproot, sometimes ± fusiform.
 - 3a. Herbs biennial or short-lived perennial; capitula obconical, 4–5 mm in diam. 52. *A. fukudo*
 - 3b. Herbs annual; capitula ovoid or subglobose, 2–3 mm in diam.
 - 4a. Middle stem leaves pinnatisect, segments 2(or 3) pairs; plants pubescent, ± glabrescent 53. *A. przewalskii*
 - 4b. Middle stem leaves 2- or 3-pinnatisect, segments (2 or)3 or 4 pairs; plants glabrous or nearly so.
 - 5a. Stem branches short or absent; middle stem leaves (1 or)2-pinnatisect, segments (2 or)3 or 4 pairs; capitula 2–10 grouped, in narrow panicles 46. *A. palustris*
 - 5b. Stem branches divaricate; middle stem leaves 2- or 3-pinnatisect, segments 4 or 5 pairs; capitula 2–5 grouped, in broad lax panicles 47. *A. aurata*
 - 2b. Herbs perennial, subshrubs, or shrubs; rootstock often branched, ± woody.
 - 6a. Middle stem leaves 2- or 3-pinnatisect, lobules narrowly linear, densely silvery gray or yellowish sericeous-tomentose; corolla limb puberulent 49. *A. austriaca*
 - 6b. Middle stem leaves 1- or 2-pinnatisect, lobules linear, filiform, or filiform-clavate, pubescent or arachnoid pubescent, sometimes glabrescent later, or densely white tomentose abaxially; corolla limb glabrous.
 - 7a. Stem much branched; middle stem leaves 2–4 cm, 2(or 3)-pinnatisect; abaxial leaf surface and phyllaries densely white tomentose 50. *A. brachyloba*
 - 7b. Stem shortly capitellate branched or not; middle stem leaves 0.8–2.5(–3) cm, 1- or 2-pinnatisect; leaves and phyllaries puberulent or leaves glabrescent.
 - 8a. Stem terete; lobules of middle stem leaves filiform, apex acute 44. *A. adamsii*
 - 8b. Stem 4-ribbed; lobules of middle stem leaves filiform-clavate or linear-filiform, apex obtuse 45. *A. dalai-lamae*
- 1b. Leaves pinnatipartite or pinnatisect, with ultimate lobules pectinate, serrate, or smoothly obtusely lacerate, less than 5(–8) × 1.5(–2) mm, or lobules minute but then lobes 1–2 mm wide with obtuse apex.
 - 9a. Herbs annual or biennial; stem solitary, more than 20 cm; rootstock a simple taproot, sometimes ± fusiform.
 - 10a. Leaves ± succulent, middle stem leaves 1- or 2-pinnatisect, segments 1 or 2 pairs, with obtuse apex, entire or 1–3-crenate or cleft 51. *A. succulenta*
 - 10b. Leaves thinly papery, middle stem leaves 2- or 3-pinnatisect, segments 2 or more pairs, lobes or lobules acute or obtuse apically.
 - 11a. Basal leaves many, forming rosettes, segments more than 20 pairs; phyllaries with brown or purple-brown scarious margins; marginal female florets 3–8 41. *A. hedinii*
 - 11b. Basal leaves not forming distinct rosettes, segments 3–8(–10) pairs; marginal female florets 10–12.
 - 12a. Involucre 5–7 mm in diam.; phyllaries puberulent; disk florets 80–150; middle stem leaf segments 3 or 4 pairs, lobes serrate 38. *A. shangnanensis*
 - 12b. Involucre 1.5–5(–7) mm in diam.; phyllaries glabrescent; disk florets 10–40; middle stem leaf segments 4–10 pairs, lobes pectinate.
 - 13a. Lower stem leaf petioles 2–6 cm; leaf blades minutely and lanceolately pectinate; synflorescence narrow and spikelike 42. *A. tournefortiana*
 - 13b. Lower stem leaf petioles less than 2 cm; leaf blades pectinate; synflorescence broader, often a conical, compound panicle.

- 14a. Middle stem leaves abaxially gray-yellowish or yellowish and gland-dotted; leaf rachis usually not pectinate, midvein obvious, slightly prominent; capitula 1.5–2.5 mm in diam. 40. *A. annua*
- 14b. Middle stem leaves abaxially green, not gland-dotted; leaf rachis pectinate, midvein flat; capitula 3.5–5(–7) mm in diam. 39. *A. caruifolia*
- 9b. Herbs perennial or subshrubs; stems several or many, rarely solitary; roots usually woody, or herbs dwarf, less than 20 cm and with thick stock and ± fusiform root.
- 15a. Herbs dwarf perennial, main root ± fusiform; stem usually less than 15 cm tall; leaves 1(or 2)-palmatisect, segments 1 or 2 pairs, without lobules or occasionally with 2 or 3 minute lobules; synflorescence spikelike 48. *A. caespitosa*
- 15b. Herbs perennial or subshrubs, roots woody; stem more than 15 cm tall; leaves 1(or 2)-pinnatisect, segments 3 or more pairs; synflorescence paniculate, racemelike, or spikelike.
- 16a. Capitula broadly ovoid; phyllaries gray arachnoid pubescent; lobes of leaves suborbicularly and obtusely serrate 31. *A. baimaensis*
- 16b. Capitula hemispheric, globose, or subglobose; phyllaries puberulent, later glabrescent; lobes of leaves pectinate, or lobules lanceolate or linear-lanceolate, rarely linear-falcate.
- 17a. Middle stem leaves 1- or 2-pinnatipartite, lobules pectinate.
- 18a. Subshrubs; stem more than 70 cm; lobules of leaves elliptic or lanceolate and serrate; capitula 4–6 mm in diam. 32. *A. medioxima*
- 18b. Herbs perennial; stem 20–70 cm; lobules of leaves pectinate; capitula 3–4 mm in diam. 35. *A. latifolia*
- 17b. Middle stem leaves 2- or 3(or 4)-pinnatisect, lobules serrate.
- 19a. Capitula hemispheric, rarely subglobose, 4–7 mm in diam., in racemes, spikes, or panicles.
- 20a. Herbs perennial; corolla limb puberulent.
- 21a. Middle stem leaves pinnatisect, segments 5–7(or 8) pairs, lobes pectinate or deeply serrate; phyllaries with entire broad brown scarious margins 36. *A. phaeolepis*
- 21b. Middle stem leaves 2-pinnatisect or -partite, segments 4(or 5) pairs, lateral mid-lobes deeply 2–4-serrate; phyllaries with lacerate brown scarious margins 43. *A. tsugitakaensis*
- 20b. Subshrubs; corolla limb often glabrous.
- 22a. Petioles of middle stem leaves 6–16 cm; leaves 1(or 2)-pinnatisect, lobes minutely irregularly pectinate-serrate 34. *A. maximovicziana*
- 22b. Petioles of middle stem leaves less than 3 cm; leaves 2 or 3(or 4)-pinnatisect, lobules minutely serrate.
- 23a. Middle stem leaves ± sessile, 2(or 3)-pinnatisect, lobules minutely linear or linear-lanceolate or falcate, 0.5(–1) mm wide; capitula sessile or shortly pedunculate; phyllaries pubescent 24. *A. macrantha*
- 23b. Middle stem leaves petiolate, 2 or 3(or 4)-pinnatisect, lobules minute, pectinate, linear, elliptic, or ovate, (0.5–)1–1.5 mm wide; capitula pedunculate; phyllaries glabrescent or puberulent.
- 24a. Middle stem leaves 3(or 4)-pinnatisect, segments 5–8 pairs, abaxial midvein obviously convex; peduncles 2–4 mm; phyllaries glabrescent 26. *A. polybotryoidea*
- 24b. Middle stem leaves 2(or 3)-pinnatisect, segments 3(or 4) pairs, abaxial midvein not convex; peduncles 4–15 mm; phyllaries puberulent 27. *A. aksaiensis*
- 19b. Capitula subglobose, 2.5–4 mm in diam., in panicles.
- 25a. Middle stem leaves with 6–8 pairs of segments, abaxially white tomentulose 37. *A. tanacetifolia*
- 25b. Middle stem leaves with 3–5 pairs of segments, abaxially pubescent or glabrescent.
- 26a. Plants with short, woody vegetative shoots and slender, virgate synflorescences; petiole of middle stem leaves 0.3–0.5 cm; capitula with 16–20 disk florets 33. *A. freyniana*
- 26b. Plants much branched with most shoots fertile; petiole of middle stem leaves 0.8–5 cm; capitula usually with 20–60 disk florets (*A. vestita* with 12–20).

- 27a. Leaf blade 0.3–0.7 × 0.2–0.5 cm 11. *A. obtusiloba* (see *A. sect. Absinthium*)
- 27b. Leaf blade 2–10 × 0.7–8 cm.
- 28a. Lobules of middle stem leaves entire, apex obtuse 25. *A. pontica*
- 28b. Lobules of middle stem leaves serrate or pectinate, apex acute.
- 29a. Middle stem leaves abaxially yellow arachnoid pubescent, lobules linear or narrowly lanceolate; capitula with 40–60 disk florets 29. *A. stechmanniana*
- 29b. Middle stem leaves abaxially gray pubescent, often glabrescent, lobules serrate or pectinate; capitula with 12–40 disk florets.
- 30a. Middle stem leaves triangular or elliptic-ovate in outline, lobules with triangular teeth; phyllaries puberulent or glabrescent; capitula with 20–40 disk florets 28. *A. gmelinii*
- 30b. Middle stem leaves ovate, elliptic-ovate, or suborbicular in outline, lobules deeply serrate; phyllaries densely pubescent; capitula with 12–20 disk florets 30. *A. vestita*

24. *Artemisia macrantha* Ledebour, Mém. Acad. Imp. Sci. St. Pétersbourg Hist. Acad. 5: 573. 1815.

亚洲大花蒿 ya zhou da hua hao

Subshrubs or herbs, 20–100 cm tall, with woody rootstock and branches, densely white pubescent. Branches 8–18 cm. Lower and middle stem leaves: leaf blade ovate or oblong, 4–8 × 2–7 cm, 2(or 3)-pinnatisect; segments (3 or 4) or 5 pairs, lobules minute, linear or linear-lanceolate, serrate, teeth 3–5(–8) × 0.5(–1) mm, apex acute, sometimes falcately curved. Uppermost leaves and leaflike bracts pinnatisect or entire; lobes or entire leaves linear-lanceolate and longer than those of flowering branches. Synflorescence a ± narrow panicle. Involucre subglobose or hemispheric, 4–7 mm in diam.; phyllaries with scarious margin brown; receptacle convex. Marginal female florets 10–20. Disk florets 30–38 or more, bisexual; corolla limb puberulent. Achenes ellipsoid-ovoid. Fl. and fr. Aug–Oct. $2n = 108$.

Canyons, steppes, meadows, shrublands, waysides; low elevations to 1500 m. W Nei Mongol, E Xinjiang [Kazakhstan, Kyrgyzstan, Mongolia, Russia, Tajikistan, Turkmenistan, Uzbekistan; SW Asia].

25. *Artemisia pontica* Linnaeus, Sp. Pl. 2: 847. 1753.

西北蒿 xi bei hao

Subshrubs or herbs, 30–60(–100) cm tall, with woody rootstock and basal branches, densely pubescent, or stem glabrescent, much branched. Basal leaves in rosettes. Leaves abaxially sparsely pubescent; basal and lower stem leaves: leaf blades ovate or broadly ovate, 2–5 × 1.5–3 cm, 2- or 3-pinnatisect. Middle stem leaves 2-pinnatisect; segments 3 or 4 pairs; lobules elliptic or linear, 3–5 × 0.5–1 mm, obtuse apically. Uppermost leaves and leaflike bracts pinnatisect or entire; lobes of entire leaves linear or linear-lanceolate. Synflorescence a ± narrow panicle. Capitula many, nodding. Involucre globose, 2.5–3(–3.5) mm in diam. Marginal female florets 8–12. Disk florets 30–40, bisexual; corolla limb puberulent or later glabrescent. Achenes obovoid. Fl. and fr. Jul–Oct. $2n = 18$.

Rocky slopes, dry valleys, steppes, hills; low to middle elevations.

Gansu, Ningxia, E and N Xinjiang [Kazakhstan, Russia; C and E Europe, North America].

26. *Artemisia polybotryoidea* Y. R. Ling, Bull. Bot. Res., Harbin 5(2): 1. 1985.

甘新青蒿 gan xin qing hao

Herbs, perennial, caespitose, 50–60 cm tall, with woody rootstock and branches, much branched. Leaves abaxially glabrescent or puberulent, gland-dotted; middle stem leaves: petiole 2.5–3.5 cm; leaf blade ovate or elliptic, 4–5.5 × 2.5–3.5 cm, 3(or 4)-pinnatisect; segments 5–8 pairs; lobules minute, pectinate or shortly linear, 1–3 × (0.5–)1–1.5 mm; rachis serrate, occasionally serrulate; midrib obviously prominent abaxially. Uppermost leaves and leaflike bracts 2- or 3-pinnatisect. Synflorescence of many axillary conical to cylindric panicles forming large compound panicle. Capitula many. Involucre globose, 4–5 mm in diam.; phyllaries glabrescent. Marginal female florets 8–12. Disk florets 25–35, bisexual. Achenes obovoid. Fl. and fr. Aug–Oct.

• Hills, waysides; 1000–1500 m. Gansu, Xinjiang.

27. *Artemisia aksaiensis* Y. R. Ling, Bull. Bot. Res., Harbin 5(2): 3. 1985.

阿克塞蒿 a ke sai hao

Herbs or subshrubs, caespitose, 40 cm tall or more, with woody rootstock and branches, gray puberulent or sparsely puberulent or glabrescent, much branched. Leaves gland-dotted. Lower and middle stem leaves: petiole 1–2 cm; leaf blade ovate, 2–2.5 × 1.5–2 cm, 2(or 3)-pinnatisect; segments 3(or 4) pairs; lobules minute, elliptic or ovate, 3 or 4 pairs, 2–4 × 1–1.5 mm, occasionally with 1 or 2 teeth. Uppermost leaves and leaflike bracts 1- or 2-pinnatisect. Synflorescence a broad panicle. Capitula peduncle 5–15 mm, rarely less than 4 mm. Involucre hemispheric or globose, 5–8 mm in diam.; phyllaries white puberulent. Marginal female florets 6–11. Disk florets 12–18, bisexual. Achenes obovoid. Fl. and fr. Aug–Oct.

• Hills; 3100–3800 m. W Gansu.

28. *Artemisia gmelinii* Weber ex Stechmann, *Artemis.* 30. 1775 [“*gmelinii*”].

细裂叶莲蒿 xi lie ye lian hao

Subshrubs, caespitose, 50–100(–150) cm tall, from woody rhizomes, densely pubescent, or glabrescent. Stems branched from upper parts. Leaves gland-dotted. Middle stem leaves: petiole 1–5 cm, triangular- or elliptic-ovate, 2–10 × 2–8 cm, 2- or 3-pinnatisect; segments 3–5 pairs; lobules serrate or pectinate; rachis serrate. Uppermost leaves and leaflike bracts 1- or 2-pinnatisect or entire; lobes linear or linear-lanceolate. Synflorescence a broad panicle. Capitula nodding. Involucre globose, 2–3.5(–5) mm in diam.; phyllaries puberulent, sometimes glabrescent. Marginal female florets 10–12; corolla narrowly tubular, ca. 1.3 mm, densely gland-dotted. Disk florets 20–40, bisexual; corolla ca. 1.8 mm. Achenes ellipsoid-ovoid or ellipsoid-conical. Fl. and fr. Aug–Oct. $2n = 18, 36$.

Hills, waysides, shrublands, slopes, often dominant on S slopes, roadsides, forest steppes, steppes, meadows, dry floodlands, wastelands; 1000–4900 m or below. Anhui, Gansu, Guangdong, Hebei, Heilongjiang, Henan, Hubei, Jiangsu, Jilin, Liaoning, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi, Sichuan, Xinjiang, Xizang; one variety widespread throughout China [Afghanistan, N India, Japan, Kazakhstan, Korea, Kyrgyzstan, Mongolia, Nepal, N Pakistan, Russia, Tajikistan, Uzbekistan; E Europe].

Poljakov (Fl. URSS 26: 465. 1961) showed that *Artemisia sacrorum* and the type of *A. gmelinii* are conspecific. Most material previously identified as *A. gmelinii* by Chinese authors belongs to *A. stechmanniana*.

- 1a. Leaves 2(or 3)-pinnatisect, sparsely pubescent adaxially, densely pubescent abaxially 28b. var. *messerschmidiana*
 1b. Leaves 2- or 3-pinnatisect, gray pubescent on both surfaces, sometimes glabrescent.
 2a. Leaves glabrescent 28a. var. *gmelinii*
 2b. Leaves persistently pubescent 28c. var. *incana*

28a. *Artemisia gmelinii* var. *gmelinii*

白莲蒿(原变种) bai lian hao (yuan bian zhong)

Artemisia gmelinii var. *intermedia* (Ledebour) Krascheninnikov; *A. gmelinii* var. *legitima* Besser; *A. iwayomogi* Kitamura; *A. messerschmidiana* Besser f. *laxiflora* Nakai; *A. messerschmidiana* var. *viridis* Besser; *A. sacrorum* Ledebour; *A. sacrorum* f. *intermedia* (Ledebour) Pampanini; *A. sacrorum* subsp. *intermedia* (Ledebour) Kitamura; *A. sacrorum* var. *intermedia* Ledebour; *A. sacrorum* var. *laciniiformis* Nakai; *A. sacrorum* var. *latiloba* Ledebour; *A. sacrorum* subf. *laxiflora* (Nakai) Pampanini; *A. sacrorum* subsp. *laxiflora* (Nakai) Kitagawa; *A. vestita* Wallich ex Besser var. *viridis* (Besser) Wang & H. T. Ho ex H. C. Fu.

Leaves 2- or 3-pinnatisect, both surfaces gray pubescent, later glabrescent.

Hills, waysides, shrublands, slopes, often dominant on S slopes, roadsides, forest steppes; 1500–4900 m. Anhui, Gansu, Guangdong,

Hebei, Henan, Hubei, Jiangsu, Jilin, Liaoning, Nei Mongol, Ningxia, Shaanxi, Shanxi, Sichuan, Xinjiang, Xizang [Afghanistan, N India, Japan, Kazakhstan, Korea, Kyrgyzstan, Mongolia, Nepal, N Pakistan, Russia, Tajikistan].

28b. *Artemisia gmelinii* var. *messerschmidiana* (Besser) Poljakov in Schischkin & Bobrov, Fl. URSS 26: 464. 1961 [“*Messerschmidiana*”].

密毛白莲蒿 mi mao bai lian hao

Artemisia messerschmidiana Besser, Tent. Abrot. 27. 1832; *A. gmelinii* var. *messerschmidiana* (Besser) Poljakov; *A. sacrorum* var. *messerschmidiana* (Besser) Y. R. Ling.

Leaves 2(or 3)-pinnatisect, both surfaces gray or yellowish pubescent, abaxially densely pubescent, adaxially sparsely so.

Hills, waysides. Gansu, Hebei, Heilongjiang, Henan, Jiangsu, Jilin, Liaoning, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi, Xinjiang [Afghanistan, Japan, Korea, Mongolia, Russia].

28c. *Artemisia gmelinii* var. *incana* (Besser) H. C. Fu in Ma, Fl. Intramongol. 6: 152. 1982.

灰莲蒿 hui lian hao

Artemisia messerschmidiana var. *incana* Besser, Tent. Abrot. 28. 1832; *A. freyniana* (Pampanini) Krascheninnikov f. *discolor* (Komarov) Kitagawa; *A. gmelinii* var. *discolor* (Komarov) Nakai; *A. gmelinii* var. *vestita* (Komarov) Nakai; *A. sacrorum* f. *discolor* Komarov; *A. sacrorum* f. *incana* (Besser) Pampanini; *A. sacrorum* var. *incana* (Besser) Y. R. Ling; *A. sacrorum* subsp. *manshurica* Kitamura; *A. sacrorum* f. *vestita* Komarov; *A. sacrorum* subf. *vestita* (Komarov) Pampanini; *A. vestita* var. *discolor* (Komarov) Kitagawa.

Leaves 2- or 3-pinnatisect, abaxially gray pubescent to white tomentose, adaxially sparsely gray pubescent.

Hills, waysides, shrublands, slopes, often dominant on S slopes, roadsides, forest steppes; 1000–1300 m or below. Widespread throughout China [Japan, Korea, Mongolia].

29. *Artemisia stechmanniana* Besser, Tent. Abrot. 35. 1832.

白莲蒿 bai lian hao

Artemisia gmelinii Weber ex Stechmann var. *biebersteiniana* Besser; *A. sacrorum* f. *minor* Freyn; *A. sacrorum* var. *minor* Ledebour; *A. sacrorum* var. *santolinifolia* Pampanini; *A. sacrorum* f. *thomsonii* Pampanini; *A. sacrorum* subf. *tripinnata* Pampanini; *A. stechmanniana* var. *sibirica* Besser; *A. santolinifolia* (Pampanini) Krascheninnikov; *A. turschaninowiana* Krasnov.

Subshrubs, (7–)10–40(–80) cm tall, caespitose, with woody basal parts and branches, much branched, densely pubescent, or glabrescent except on leaves. Middle stem leaves: petiole 8–13 mm. Lower and middle stem leaves; leaf blade ovate or triangular-ovate, 2–4 × 1–2 cm, gland-dotted, gray or yellowish arachnoid pubescent, 2–4-pinnatisect; segments 4 or 5 pairs; lobules pectinately linear or linear-lanceolate, usually serrulate, teeth 1–2 × 0.2–0.5 mm. Uppermost leaves 1- or 2-pinnatisect

and leaflike bracts divided or entire; bracts lanceolate or linear-lanceolate. Synflorescence a leafy, narrowly conical panicle, 20–40 × 5–12 cm; primary branches ascending, 5–10 cm. Capitula many, shortly pedunculate or ± sessile, nodding, remote or approximate toward branch apices. Involucre globose, 3–5(–6) mm in diam.; outer phyllaries linear-oblong, green, not scarious margined, sparsely arachnoid. Marginal female florets 10–12; corolla slender, glandular, 2-toothed. Disk florets 40–60, glabrous. Achenes brown, oblong, ca. 1 mm. Fl. and fr. Aug–Oct. $2n = 18, 54$.

Hills, steppes, semidesert steppes, meadows, rocky slopes, scrub, dry floodlands, wastelands; 1500–4900 m. Gansu, Hubei, W Nei Mongol, Ningxia, Qinghai, Shaanxi, W Sichuan, Xinjiang, Xizang [Kazakhstan, Korea, Kyrgyzstan, Mongolia, Russia, Tajikistan, Uzbekistan; E Europe].

Chinese material of *Artemisia stechmanniana* has been incorrectly named as *A. gmelinii*.

30. *Artemisia vestita* Wallich ex Besser, Tent. Abrot. 25. 1832.

毛莲蒿 mao lian hao

Artemisia potentillifolia H. Léveillé (1912), not Fischer ex Sprengel (1826); *A. sacrorum* Ledebour subf. *obscura* Pampanini; *A. sacrorum* f. *platiloba* Pampanini; *A. sacrorum* var. *vestita* (Wallich ex Besser) Kitamura; *A. sacrorum* f. *wallichiana* Pampanini.

Subshrubs, caespitose, 50–120 cm tall, with woody rootstock and basal branches, arachnoid pubescent, especially on adaxial surface of leaves, much branched, strongly aromatic. Lower and middle stem leaves: petiole 0.8–2 cm; leaf blade ovate, elliptic-ovate, or suborbicular, (2–)3.5–7.5 × (1.5–)2–4 cm, 2(or 3)-pinnatisect; segments 4–6 pairs; lobules deeply serrate; teeth elliptic, 1–2 × 0.2–0.5 mm; rachis serrate. Uppermost leaves and leaflike bracts smaller, pinnatisect or entire; bracts lanceolate, sparsely pectinate. Synflorescence a ± broad panicle. Capitula many. Involucre globose or hemispheric, 2.5–3.5(–4) mm in diam. Marginal female florets 6–10. Disk florets 12–20, bisexual. Achenes oblong or obovoid. Fl. and fr. Aug–Oct. $2n = 18$.

Hills, rocky slopes, grasslands, shrublands, outer forest margins; 2000–4300 m. Gansu, NW Guangxi, Guizhou, N Hubei, Liaoning, Qinghai, W Sichuan, Xinjiang, Xizang, Yunnan [N India, Nepal, N Pakistan].

Artemisia vestita is used in anti-inflammatory and antifebrile medicines.

31. *Artemisia baimaensis* Y. R. Ling & Z. C. Chou, Bull. Bot. Res., Harbin 4(2): 16. 1984.

班玛蒿 ban ma hao

Subshrubs, ca. 60 cm tall or more, much branched, densely gray pubescent or arachnoid pubescent. Middle and upper stem leaves: petiole 3–5 mm; leaf blade ovate, 3–4 × 2–2.5 cm, sparsely gland-dotted, 2- or 3-pinnatisect; segments 3 or 4 pairs; lobules 3 or 4 pairs; teeth minute, elliptic, 3–5 × 1–2 mm; rachis narrowly winged. Leaflike bracts 1- or 2-pinnatisect. Synflo-

rescence a broad panicle. Capitula many. Involucre broadly ovoid, 2.5–3 mm in diam.; phyllaries gray arachnoid pubescent. Marginal female florets 5–8. Disk florets 8–15, bisexual. Achenes ellipsoid-ovoid or ellipsoid-obovoid. Fl. and fr. Aug–Oct.

• Forest margins; ca. 3400 m. Qinghai.

32. *Artemisia medioxima* Krascheninnikov ex Poljakov, Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk S.S.S.R. 17: 405. 1955.

尖栉齿叶蒿 jian zhi chi ye hao

Subshrubs, 70–120 cm tall, shortly and capitately branched or not apically, white or gray pubescent, with a few branches. Lowermost and middle stem leaves: petiole 1.5–3 cm; leaf blades elliptic or oblong, 4–6(–9) × 2–4 cm, thin, gland-dotted, 1- or 2-pinnatisect; segments (4 or)5(or 6) pairs; lobes lanceolate or elliptic-lanceolate, pectinately serrate; teeth shortly lanceolate or linear-lanceolate, 4–10 × 1–2 mm, obtuse apically. Uppermost leaves and leaflike bracts 1- or 2-pinnatisect. Capitula in narrow racemose or racemose-panicles, hemispheric, 4–6 mm in diam., pedunculate below and without peduncles above. Marginal female florets 8–10. Disk florets 20–40, bisexual; corolla limb puberulent or glabrescent. Achenes oblong, slightly oppressed. Fl. and fr. Jul–Oct.

Steppes, forest steppes, outer forest margins; low to middle elevations. N Hebei, Heilongjiang, E Nei Mongol, N Shanxi [E Russia].

33. *Artemisia freyniana* (Pampanini) Krascheninnikov, Spisok Rast. Gerb. Fl. S.S.S.R. Bot. Inst. Vsesojuzn. Akad. Nauk 11: 42. 1949.

绿栉齿叶蒿 lü zhi chi ye hao

Artemisia sacrorum Ledebour f. *freyniana* Pampanini, Nuovo Giorn. Bot. Ital., n.s., 34: 688. 1927.

Subshrubs, 18–35(–45) cm tall, with thick woody rootstock, with short sterile shoots, with peeling grayish brown bark, and slender, erect, flowering shoots, with branches short or absent, lower parts glabrescent, upper parts more persistently puberulent. Middle stem leaves: petiole 3–5 mm, with pinnatifid basal auricles or pseudostipules; leaf blade elliptic-ovate or elliptic, 2–3 × 0.7–1.5 cm, 2-pinnatisect, abaxially puberulent, adaxially dark green, glabrous; segments 4 or 5 pairs, elliptic, 5–15 × 3–4 mm, pectinately divided; lobules lanceolate, entire or serrulate. Uppermost leaves and leaflike bracts divided or entire; bracts linear or linear-lanceolate. Capitula in dense spicate- or racemose-panicles, globose, 2–3 mm in diam. Marginal female florets 6–8. Disk florets 16–20, bisexual. Achenes obovoid or ellipsoid. Fl. and fr. Aug–Oct.

Steppes, slopes, dry river valleys, riverbanks, outer forest margins; low to middle elevations. N Gansu, Heilongjiang, W Jilin, Nei Mongol, Ningxia [Mongolia, E Russia].

34. *Artemisia maximovicziana* Krascheninnikov ex Poljakov, Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk S.S.S.R. 17: 403. 1955.

东亚栉齿蒿 dong ya zhi chi hao

Subshrubs or herbs, 60–125 cm tall, with thick rootstock, puberulent or glabrescent. Basal and lowermost stem leaves: petiole 6–16 cm; leaf blade ovate or orbicular-ovate, 10–18 × 8–15 cm. Middle and upper leaves: leaf blade ovate or orbicular-ovate, 10–18 × 8–15 cm, 1(or 2)-pinnatifid or -sect; segments 5 or 6 pairs; lobes linear or linear-lanceolate, pectinate to pectinate-serrate, apex acute. Leaflike bracts 3–5-lobed or entire, linear or linear-lanceolate, 45–65 × 4–8 mm. Synflorescence a long, narrow panicle. Involucre hemispheric or spherical, 4–6 mm in diam. Marginal female florets 10–15. Disk florets 30–40, bisexual. Achenes oblong or oblong-obovoid. Fl. and fr. Aug–Oct.

Steppes, dry river valleys, hills, wastelands, forest steppes; low to middle elevations. N Heilongjiang, N Nei Mongol [E Russia].

35. *Artemisia latifolia* Ledebour, Mém. Acad. Imp. Sci. St. Pétersbourg Hist. Acad. 5: 569. 1815.

宽叶蒿 kuan ye hao

Artemisia laciniata Willdenow var. *glabriuscula* Ledebour; *A. laciniata* var. *latifolia* (Ledebour) Maximowicz; *A. tanacetifolia* Linnaeus var. *laxa* Kitamura.

Herbs, perennial, 20–70 cm tall, shortly capitately branched or not apically, puberulent, soon glabrescent. Leaves gland-dotted; basal and middle stem leaves: petiole 3–6 cm, basal leaf blade oblong or ovate, (1 or 2)-pinnatisect. Lower and middle stem leaves: leaf blade elliptic-oblong or elliptic-ovate, 4–14(–18) × 2–7(–9) cm, 1- or 2-pinnatisect; segments 5–7; lobes lanceolate or ovate-lanceolate, pectinately and deeply serrate; teeth (3–)5–13 × (1–)2–3 mm. Uppermost leaves pectinate-pinnatisect; leaflike bracts linear, entire. Synflorescence a narrow panicle. Involucre globose or hemispheric, 3–4 mm in diam.; phyllary margin brown, lacerate. Marginal female florets 5–9. Disk florets 18–25, bisexual. Achenes obovoid. Fl. and fr. Jul–Oct. $2n = 36$.

Steppes, forest steppes, outer forest margins, wastelands, shrublands, meadows, saline soils; low to middle elevations. NE Gansu, W Heilongjiang, W Jilin, W Liaoning, E and N Nei Mongol [Kazakhstan, Korea, Mongolia, Russia, Uzbekistan; SW Asia, C and E Europe].

36. *Artemisia phaeolepis* Krascheninnikov, Sovetsk. Bot. 5: 7. 1943.

褐苞蒿 he bao hao

Artemisia laciniata Willdenow var. *turtschaninoviiana* Besser, Bull. Soc. Imp. Naturalistes Moscou 9: 48. 1836; *A. laciniata* f. *racemosa* Krylov; *A. laciniata* f. *tomentosa* Krylov, p.p.

Herbs, perennial, 15–40 cm tall, shortly and capitately branched, pubescent, soon glabrescent, strongly aromatic. Leaves gland-dotted. Basal leaves: petiole 3–5 cm; leaf blade 2- or 3-pinnatisect. Middle stem leaves: petiole 3–5 cm; leaf blade elliptic or oblong, 2–6 × 1.5–3 cm, 2-pinnatisect; segments 5–7(or 8) pairs; lobes pectinately or deeply serrate, sometimes serrulate, with thick margins; midvein prominent abaxially. Uppermost leaves 1- or 2-pinnatisect; leaflike bracts lanceolate or linear, entire. Synflorescence a narrow, racemelike panicle. Capit-

ula few, shortly pedunculate, nodding. Involucre hemispheric, 4–6 mm in diam.; scarious phyllary margin broad, brown. Marginal female florets 12–18. Disk florets 40–80, bisexual; corolla limb puberulent. Achenes oblong or oblong-obovoid. Fl. and fr. Jul–Oct. $2n = 36$.

Hills, canyons, waysides, grassy marshlands, meadows, dry floodlands, outer margins of forests and shrublands, rocky hills, semidesert steppes; 2500–3600 m. Gansu, Nei Mongol, Ningxia, Qinghai, Shanxi, N Xinjiang, Xizang [Kazakhstan, Mongolia, Russia].

37. *Artemisia tanacetifolia* Linnaeus, Sp. Pl. 2: 848. 1753.

裂叶蒿 lie ye hao

Artemisia laciniata Willdenow; *A. laciniata* f. *dissecta* Pampanini; *A. laciniata* var. *glabriuscula* Ledebour, p.p.; *A. laciniata* var. *macrobotrys* (Ledebour) Maximowicz; *A. macrobotrys* Ledebour; *A. orthobotrys* Kitagawa; *A. sacrorum* Ledebour f. *japonica* Pampanini; *A. sacrorum* var. *major* Pampanini; *A. sacrorum* f. *platyphylla* Pampanini; *A. serreana* Pampanini.

Herbs, perennial, 50–70(–90) cm tall, rootstock horizontally creeping to obliquely rising, ± woody, shortly branched apically, pubescent, glabrescent. Basal leaves long petiolate. Lower and middle stem leaves: petiole 3–12 mm; leaf blade elliptic-oblong or elliptic-ovate, 3–12 × 1.5–5(–8) cm, sparsely gland-dotted, abaxially densely hairy, adaxially glabrous or sparsely hairy, 2- or 3-pinnatisect; segments 6–8 pairs; lobes pectinately lobulate; lobules elliptic-lanceolate, sometimes sparsely serrulate; rachis narrowly winged. Uppermost leaves and leaflike bracts 1- or 2-pinnatisect or entire; bracts linear or linear-lanceolate. Synflorescence a few to many branched panicle, 10–15 × 4–8 cm. Capitula many, shortly pedunculate, nodding, approximate or not. Involucre globose or hemispheric, 2–3(–3.5) mm in diam.; phyllaries glabrous or nearly so, outermost oblong-oval, greenish, scarious margin narrow, brown with colorless edge. Florets yellow, 48–52. Marginal female florets 8–15; corolla narrowly tubular, glandular. Disk florets 30–40, bisexual; corolla limb puberulent. Achenes ellipsoid-obovoid, finely longitudinally striate. Fl. and fr. Jul–Oct.

Forest steppes, steppes, meadows, outer forest margins, saline soils, hills, shrublands; low elevations to 2400 m. Gansu, N Hebei, Heilongjiang, Jilin, Liaoning, Nei Mongol, Ningxia, N Shaanxi, N Shanxi [Kazakhstan, Korea, Mongolia, Russia; C and E Europe, North America (Alaska, Canada)].

Artemisia tanacetifolia is used as herbage for feeding livestock.

38. *Artemisia shangnanensis* Y. Ling & Y. R. Ling, Bull. Bot. Res., Harbin 4(2): 14. 1984.

商南蒿 shang nan hao

Herbs, annual or biennial, 80–150 cm tall, much branched, yellowish or gray-yellow puberulent. Basal and lower stem leaves: petiole 2–4 cm; leaf blade ovate-orbicular, (2 or 3)-pinnatifid. Middle stem leaves: leaf blade ovate or elliptic-ovate, 10–12 × 6–8 cm, 2- or 3-pinnatisect; segments 3 or 4 pairs, 4–5 × 2–3 cm, deeply pectinately serrate; teeth 3 or 4 pairs, more than 3 mm wide. Uppermost leaves 1- or 2-pinnatifid; leaflike bracts elliptic-lanceolate, 3–5-lobed or entire.

Synflorescence a broad panicle. Capitula pedunculate, nodding. Involucre globose or hemispheric, 5–7 mm in diam.; phyllaries puberulent. Marginal female florets 15–20. Disk florets 80–150, bisexual. Achenes obovoid or ellipsoid. Fl. and fr. Aug–Oct.

• Hills, outer forest margins; low to middle elevations. SW Henan, Hubei, S Shaanxi, E Sichuan, N Yunnan.

39. *Artemisia caruifolia* Buchanan-Hamilton ex Roxburgh, Fl. Ind., ed. 1832, 3: 422. 1832 [*“carnifolia”*].

青蒿 qing hao

Herbs, annual or biennial, 30–150 cm, much branched, glabrous. Basal and lowermost stem leaves usually withering before anthesis. Middle stem leaves: petiole 5–10 mm; leaf blade oblong, oblong-ovate, or elliptic, 5–15 × 2–5.5 cm, abaxially green, 2- or 3-pinnatisect; segments 4–6 pairs, pectinate or lanceolate; lobules pectinate, acutely or acuminate serrate; rachis serrate. Uppermost leaves and leaflike bracts 1(or 2)-pinnatisect and pectinatisect. Synflorescence a moderately broad panicle. Capitula many; peduncle slender, 2–6 mm, nodding. Involucre hemispheric, 3.5–7 mm in diam.; phyllaries oblong, radiately spreading or not, scarious margin yellow. Marginal female florets 10–20; corolla ca. 1.5 mm. Disk florets 30–40, bisexual; corolla yellowish, ca. 1.8 mm. Achenes oblong or ellipsoid, ca. 1 mm. Fl. and fr. Jun–Sep.

Riverbanks, floodlands, waysides, outer forest margins, canyons, coastal beaches; low to high elevations. Anhui, Fujian, Guangdong, Guangxi, Guizhou, S Hebei, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, S Shaanxi, Shandong, E Sichuan, Yunnan, Zhejiang [N India, Japan, Korea, Myanmar, Nepal, N Vietnam].

The epithet of this species has been given both as *“caruifolia”* and as *“carvifolia”* and is based on the similarity of the leaves to those of *Carum carvi* Linnaeus (Apiaceae). Both forms are therefore orthographically correct, depending on whether they are based on the genus name or the species epithet, and there is no case for regarding either as an orthographical error. The protologue actually gives the spelling as *“carnifolia.”* It seems rather likely that the “n” is an upside-down “u” and that the correct spelling should be *“caruifolia.”*

Artemisia caruifolia contains abrotanine used in anti-inflammatory and antifebrile drugs.

- 1a. Leaf margins with acuminate teeth;
involucre 3.5–4.5 mm in diam.,
phyllaries erect after anthesis 39a. var. *caruifolia*
- 1b. Leaf margins with acute teeth;
involucre 4.5–7 mm in diam.,
phyllaries radiate after anthesis 39b. var. *schochii*

39a. *Artemisia caruifolia* var. *caruifolia*

青蒿(原变种) qing hao (yuan bian zhong)

Artemisia apiacea Hance; *A. caruifolia* var. *apiacea* (Hance) Pampanini; *A. thunbergiana* Maximowicz.

Middle stem leaves with lobes acuminate-serrate. Involucre 3.5–4.5 mm in diam.; phyllaries not radiate after anthesis.

Moist riverbanks, floodlands, waysides, outer forest margins, canyons, coastal beaches; low elevations. Anhui, Fujian, Guangdong,

Guangxi, Guizhou, S Hebei, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, S Shaanxi, Shandong, E Sichuan, Yunnan, Zhejiang [N India, Japan, Korea, Myanmar, Nepal, N Vietnam].

39b. *Artemisia caruifolia* var. *schochii* (Mattfeld) Pampanini, Nuovo Giorn. Bot. Ital., n.s., 34: 649. 1927.

大头青蒿 da tou qing hao

Artemisia schochii Mattfeld, Repert. Spec. Nov. Regni Veg. 22: 245. 1926; *A. apiacea* var. *schochii* (Mattfeld) Handel-Mazzetti.

Middle stem leaves with lobes acutely serrate. Involucre 4.5–7 mm in diam.; phyllaries radiate and florets deciduous after anthesis.

• Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangsu, Jiangxi, Yunnan.

40. *Artemisia annua* Linnaeus, Sp. Pl. 2: 847. 1753.

黄花蒿 huang hua hao

Artemisia annua f. *macrocephala* Pampanini; *A. chamomilla* C. Winkler; *A. stewartii* C. B. Clarke; *A. wadei* Edgeworth.

Herbs, annual, 70–160(–200) cm tall, much branched, sparsely puberulent, soon glabrous, strongly aromatic. Leaves gland-dotted. Lowermost stem leaves: leaf blade ovate or triangular-ovate, 3–7 × 2–6 cm, 3(or 4)-pinnatipartite; segments 5–8(–10) pairs. Middle stem leaves: petiole 1–2 cm; leaf blade 2(or 3)-pinnatisect or pectinatisect; lobules deeply serrate to pectinate; teeth triangular, 1–2 × ca. 0.5 mm; rachis narrowly winged, sparsely serrate or not; midvein prominent adaxially. Uppermost leaves and leaflike bracts 1(or 2)-pinnatipartite. Synflorescence a panicle to 15 × 8 cm, produced from most nodes to form broad, conical compound panicle. Capitula many, shortly pedunculate, closely subtended by whorl of bracteoles, nodding. Involucre globose, 1.5–2.5 mm in diam.; phyllaries broad and scarious, ± glabrous. Marginal female florets 10–18. Disk florets 10–30, bisexual; corolla dark yellow or yellow. Achenes ellipsoid-ovoid. Fl. and fr. Aug–Oct. $2n = 18$.

Hills, waysides, wastelands, outer forest margins, steppes, forest steppes, dry floodlands, terraces, semidesert steppes, rocky slopes, roadsides, saline soils; 2000–3700 m. Anhui, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi, Sichuan, Taiwan, Xinjiang, Xizang, Yunnan, Zhejiang [widely distributed in N Africa, Asia, Europe, and North America].

Artemisia annua contains, among other essential oils, artemisinin (青蒿素 qing hao su). It is well known in Traditional Chinese Medicine for its anti-inflammatory, antifebrile, and hemostatic properties, and artemisinin has become widely valued as an effective treatment for strains of *Plasmodium* resistant to other anti-malarial drugs.

41. *Artemisia hedinii* Ostenfeld in Hedin, S. Tibet 6(3): 41. 1922.

臭蒿 chou hao

Herbs, annual, 15–60(–100) cm tall, purple, capitate

branches 4–8 cm, sparsely glandular puberulent, fetid. Petioles of basal and lowermost stem leaves 4–5 cm. Basal leaves many; leaf blade rosulate or elliptic, 10–14 × 2–3.5 cm, 2-pinnatisect; segments more than 20 pairs; lobules pectinately lanceolate or triangularly serrate, 2–3 × 0.2–1 mm, acute apically. Lowermost and middle stem leaves: leaf blade elliptic, 6–12 × 2–4 cm, 2-pinnate; segments 5–10 pairs, 0.3–1.5 × 0.2–0.4 mm, lobulate and serrate; rachis serrate; midvein prominent. Uppermost leaves and leaflike bracts pinnately divided; lobes serrate. Capitula in dense narrow panicles, globose or hemispheric, 3–4(–5) mm in diam. Phyllaries with brown or purple-brown scarious margin. Marginal female florets 3–8. Disk florets 15–30, bisexual; corolla limb purple. Achenes oblong-obovoid. Fl. and fr. Jul–Oct.

Grassy marshlands, floodlands, rocky slopes, waysides, outer forest margins; 1000–4800(–5000) m. Gansu, SW Nei Mongol, Qinghai, W Sichuan, N Xinjiang, Xizang, W Yunnan [N India, Nepal, N Pakistan, Tajikistan].

Artemisia hedini has anti-inflammatory, antifebrile, detoxifying, and hemostatic properties.

42. *Artemisia tournefortiana* Reichenbach, Iconogr. Bot. Exot. 1: 6. 1824.

湿地蒿 shi di hao

Herbs, annual, (40–)110–150(–200) cm tall, purple-brown, puberulent or glabrescent; capitata branches 2–5 cm. Lower and middle stem leaves: petiole 2–6 cm; leaf blade elliptic-ovate or oblong, 5–18 × 2–8 cm, 2(or 3)-pinnatisect; segments 5–8 pairs, pectinately lobulate; lobules elliptic-lanceolate, 3–5 × 3–4 mm, occasionally serrulate; rachis serrate. Uppermost leaves and leaflike bracts 1- or 2-pinnatisect or entire; bracts linear-lanceolate, serrate. Synflorescence a dense cylindrical panicle, 30–70 × 1.5–5 cm; branches ascending to erect-appressed, spicate. Capitula many, erect, almost sessile, congested. Involucre ovoid or ovoid-orbicular, 1.5–2 mm in diam.; phyllaries in 3 rows, outer glabrous, widely scarious on both sides of green midrib, obtuse; receptacle conical, glabrous. Marginal female florets 10–20; corolla greenish yellow, glandular, 2-toothed. Disk florets 10–15(–35), bisexual, basally glandular. Achenes brown, ellipsoid-ovoid, 0.8–1 mm, finely striate. Fl. and fr. Aug–Nov. $2n = 18$.

Hills, terraces, dry floodlands, waste fields, steppes, open forests, semi-marshlands; 800–1500 m. Xinjiang, Xizang [Afghanistan, Kazakhstan, Mongolia, N Pakistan; SW Asia (Caucasus, Iran, Turkey); introduced in Europe].

The name *Artemisia biennis* Willdenow has been misapplied to the species treated here as *A. tournefortiana*, e.g., in Fl. Pakistan (207: 132. 2002).

Artemisia tournefortiana is used in NW China as a source of anti-inflammatory, antifebrile, anthelmintic, and antitoxic drugs.

43. *Artemisia tsugitakaensis* (Kitamura) Y. Ling & Y. R. Ling, Bull. Bot. Res., Harbin 2(2): 43. 1982.

雪山艾 xue shan ai

Artemisia nitakayamensis Hayata var. *tsugitakaensis* Kitamura, Acta Phytotax. Geobot. 9: 32. 1940.

Herbs, perennial, 10–20 cm tall, few and shortly branched

apically, all parts puberulent. Lower and middle stem leaves shortly petiolate; leaf blade elliptic, ovate, or elliptic-obovate, 1–2.5 × 0.7–1.4 cm, 2-pinnatisect; segments 4(or 5) pairs; lobules 2–8 × 0.6–1 mm. Leaflike bracts lanceolate or linear-lanceolate, pinnatisect or entire. Synflorescence a racemelike panicle. Capitula peduncles 5–15(–20) mm. Involucre hemispheric or subglobose, 7–10 mm in diam.; phyllaries with scarious margin lacerate. Marginal female florets 8–12. Disk florets 30–40, bisexual; corolla limb puberulent. Achenes oblong or ovoid-oblong. Fl. and fr. Aug–Nov.

• Slopes; ca. 3900 m. Taiwan.

44. *Artemisia adamsii* Besser, Tent. Abrot. 27. 1832.

东北丝裂蒿 dong bei si lie hao

Herbs, perennial, or subshrubs, 15–40 cm, branched apically, arachnoid pubescent or glabrescent. Lower stem leaves ± sessile; leaf blade (2 or)3-pinnatisect. Middle stem leaves: leaf blade ovate, 1.5–2.5(–3) × 1.5–2.5(–3) cm, 1- or 2-pinnatisect; segments 3 or 4 pairs; lobules filiform, 2–3 × 0.5–1 mm, apically acute; leaflike bracts subpalmatisect. Synflorescence a narrow panicle. Involucre subglobose, 2–3 mm in diam. Marginal female florets 9–12. Disk florets 35–45, bisexual. Achenes ellipsoid-ovoid. Fl. and fr. Jul–Oct.

Saline steppes, meadows, riverbanks, hills; low elevations. W Heilongjiang, E Nei Mongol [E Mongolia, E Russia].

45. *Artemisia dalai-lamae* Krascheninnikov, Bot. Mater. Gerb. Glavn. Bot. Sada R.S.F.S.R. 3: 17. 1922.

米蒿 mi hao

Subshrubs, densely caespitose, 10–20(–35) cm tall, rarely branched above base, gray puberulent, strongly aromatic. Stems ± 4-angled, leaves clustered on short shoots. Stem leaves subsessile; leaf blade ovate or broadly ovate, 8–12 × 7–10 mm, 1- or 2-pinnatisect to ± palmatisect; segments 2 or 3 pairs; lobules filiform-clavate or linear-filiform, 2–4 × ca. 0.5 mm, apically obtuse. Uppermost leaves and leaflike bracts 3- or 5-lobed. Synflorescence terminal, ± spikelike, often unbranched. Capitula few, separated, subsessile. Involucre hemispheric or ovoid, 3–3.5(–4) mm in diam. Marginal female florets 1–3. Disk florets 8–20, bisexual; corolla yellow. Achenes obovoid. Fl. and fr. Jul–Sep.

• Rocky slopes, steppes, semidesert steppes, saline-alkaline soils, dry floodlands, gravelly areas, sometimes locally dominant; 1800–3200 m. W Gansu, SW Nei Mongol, Qinghai, Xizang.

46. *Artemisia palustris* Linnaeus, Sp. Pl. 2: 846. 1753.

黑蒿 hei hao

Herbs, annual, 10–40 cm tall, much branched. Lower and middle stem leaves thin, ovate or elliptic-ovate, 2–5 × 1.5–3 cm, (1 or)2-pinnatisect; segments (2 or)3 or 4 pairs; lobules narrowly linear, 15–35 × 0.5–1 mm. Synflorescence a narrow panicle. Capitula in groups of 2–10 along branches. Involucre subglobose, 2–3 mm in diam. Marginal female florets 10–13. Disk florets 20–26, bisexual. Achenes ellipsoid. Fl. and fr. Aug–Nov. $2n = 18$.

Steppes, forest steppes, riverbanks, floodlands; middle or low elevations. N Hebei, W Heilongjiang, W Jilin, W Liaoning, E and S Nei Mongol [Korea, Mongolia, E Russia].

47. *Artemisia aurata* Komarov, Trudy Imp. S.-Peterburgsk. Bot. Sada 18: 422. 1901.

黄金蒿 huang jin hao

Artemisia palustris Linnaeus var. *aurata* (Komarov) Pampanini.

Herbs, annual, 20–50(–80) cm tall, much branched. Leaves thin. Middle stem leaves: petiole 2–5 cm; leaf blade triangular-ovate or triangular-elliptic-ovate, 4–6(–11) × 2–3 cm, 2- or 3-pinnatisect; segments 4 or 5 pairs; lobules narrowly linear-lanceolate or filiform, 3–6 × 0.5–1 mm. Synflorescence a broad panicle; capitula usually in groups of 2–5. Involucre subglobose, 2–3 mm in diam. Marginal female florets 10–14. Disk florets 14–25, bisexual. Achenes ovoid-ellipsoid. Fl. and fr. Aug–Nov. $2n = 18$.

Rocky hills; middle or low elevations. Heilongjiang, Jilin, Liaoning [Japan, Korea, E Russia].

48. *Artemisia caespitosa* Ledebour, Fl. Altaic. 4: 80. 1833.

矮丛蒿 ai cong hao

Artemisia frigidoidea H. C. Fu & S. Y. Zhu.

Herbs, perennial, caespitose, 5–15(–20) cm tall, shortly and capitately branched apically or stems not branched, yellowish sericeous-puberulent. Lower and middle stem leaves: petiole 6–10 mm. Lowermost leaf blades ± palmately 3–5-lobed. Middle stem leaves: leaf blade elliptic or ovate, 5–10 × 5–10 mm, ± 1- or 2-palmatisect; segments 1 or 2 pairs; lobes or lobules linear or narrowly linear-lanceolate, 3–6 × 1.5–2 mm. Uppermost leaves and leaflike bracts 3–5-lobed or entire; bracts linear or linear-lanceolate. Synflorescence a dense, short, ± spikelike panicle. Involucre hemispheric, subglobose, or ovoid-campanulate, 3–4 mm in diam. Marginal female florets 5–7. Disk florets 15–22, bisexual; corolla limb puberulent. Achenes obovoid or obovoid-ellipsoid. Fl. and fr. Aug–Oct.

Rocky hills, desert steppes; middle or low elevations. NW Nei Mongol, N Xinjiang [Mongolia, S Russia].

49. *Artemisia austriaca* Jacquemont in Murray, Syst. Veg., ed. 14, 744. 1784.

银蒿 yin hao

Artemisia austriaca var. *jacquiniana* Candolle; *A. austriaca* f. *microcephala* Pampanini; *A. austriaca* var. *orientalis* (Willdenow) Candolle; *A. nivea* Redowsky ex Willdenow; *A. orientalis* Willdenow; *A. repens* Pallas ex Willdenow.

Herbs, perennial, or subshrubs, 15–50 cm tall, caespitose, silvery gray or yellowish sericeous-pubescent. Leaves sessile, lowermost leaves 3-pinnatisect. Middle stem leaves: leaf blade elliptic-ovate or ovate, 1.5–4 × 1–2.5 cm, 2- or 3-pinnatisect; segments 2 or 3 pairs; lobules narrowly linear, 2–12 × 0.5–1 mm. Uppermost leaves and leaflike bracts pinnatisect or 3-sect or entire; bracts linear. Synflorescence a broad panicle. Involucre subglobose or ovoid-campanulate, 1–2 mm in diam. Mar-

ginal female florets 3–7. Disk florets 7 or 8, bisexual; corolla limb puberulent. Achenes ellipsoid. Fl. and fr. Aug–Oct. $2n = 16, 32, 36$.

Dry terraces, floodlands, saline-alkaline soils, open forests, semi-desert steppes, wastelands; middle or low elevations. N and W Nei Mongol, N Xinjiang [Kazakhstan, Kyrgyzstan, Russia, Tajikistan; SW Asia (Iran), C, E, and SW Europe].

The essential oils from *Artemisia austriaca* are used as a perfume; the whole plant is used as herbage.

50. *Artemisia brachyloba* Franchet, Nouv. Arch. Mus. Hist. Nat., sér. 2, 6: 51. 1883.

山蒿 shan hao

Artemisia licentii Pampanini.

Subshrubs or small shrubs, 30–60 cm tall, with strong woody rootstock, much branched, pubescent; stems glabrescent. Lower and middle stem leaves sessile; leaf blade broadly ovate or ovate, 2–4 × 1.5–2 cm, 2(or 3)-pinnatisect; segments 3 or 4 pairs; lobules narrowly linear or linear-lanceolate, 3–6(–8) × 0.3–1 mm. Uppermost leaves and leaflike bracts pinnatifid or 3-lobed or entire; bracts linear. Synflorescence a narrow panicle. Involucre ovoid or ovoid-campanulate; phyllaries densely white tomentose. Marginal female florets 10–15. Disk florets 20–25, bisexual. Achenes ovoid. Fl. and fr. Jul–Oct.

Sunny or rocky slopes or steppes, Gobi Desert, semidesert steppes; middle or low elevations. Gansu, N Hebei, Liaoning, Nei Mongol, Ningxia, N Shaanxi, N Shanxi [Mongolia].

Artemisia brachyloba is used in anti-inflammatory, antifebrile, diuretic, and anthelmintic medicines.

51. *Artemisia succulenta* Ledebour, Fl. Altaic. 4: 81. 1833.

苏联肉质叶蒿 su lian rou zhi ye hao

Herbs, annual or biennial, or subshrubs, 30–50 cm tall, much branched, tomentose or glabrescent. Leaves ± succulent; lower and middle stem leaves sessile; leaf blade elliptic or obovate, 10–30 × 5–10 mm, 1- or 2-pinnatisect or -partite; segments 1 or 2 pairs; lobes linear or linear-oblongate, 0.5–1.5 × 0.1–0.2 mm, 1–3-crenate or cleft or obtuse apically. Uppermost leaves and leaflike bracts 2- or 3-lobed or entire; bracts linear or linear-oblongate. Synflorescence a ± broad panicle. Involucre hemispheric, 4–5 mm in diam. Marginal female florets 15–20. Disk florets 60–80, bisexual. Achenes obovoid or ellipsoid-obovoid. Fl. and fr. Jul–Sep.

Marshlands, canyons, waste fields; 1000–1400 m. E Xinjiang [Kazakhstan, Russia].

52. *Artemisia fukudo* Makino, Bot. Mag. (Tokyo) 23: 146. 1909.

滨艾 bin ai

Herbs, biennial or short-lived perennial, 50–90 cm tall, much branched, gray arachnoid pubescent, glabrescent; stems purplish. Leaves thickly textured, basal ones rosulate, withering before anthesis; petiole 3–13 cm; leaf blade 11–18 × 8–16 cm, arachnoid when young, 2- or 3-pinnatisect, flagellate, or pal-

mately 2- or 3-partite; segments 3(or 4) pairs, linear, ca. 2 mm wide, apex rounded. Lower and middle stem leaves: leaf blade elliptic-ovate, 3–5 × 3–5 cm, pinnatisect; segments 2 or 3 pairs; lobes 8–12 × 1.5–2 mm. Uppermost stem leaves 3–5-sect; leaf-like bracts narrowly linear-lanceolate, 10–30 × 1.5–2 mm. Synflorescence a moderately broad panicle, main branches ascending, relatively long. Capitula pedunculate, bracteolate, nodding. Involucre obconical, 4–5 mm in diam. Marginal female florets 10–15; corolla 1.5–2 mm. Disk florets 20–30, bisexual; corolla 1.5–2.5 mm. Achenes obovoid-ellipsoid, 1.2–2 mm, base cuneate, apex rounded, glabrous. Fl. and fr. Jul–Oct. *2n* = 16.

Coastal beaches. N Taiwan, E Zhejiang [Japan, Korea].

53. *Artemisia przewalskii* Krascheninnikov, Bot. Mater. Gerb. Glavn. Bot. Sada R.S.F.S.R. 2: 191. 1921.

甘青小蒿 gan qing xiao hao

Herbs, annual, 20–30 cm tall, pubescent or ± glabrescent. Lower and middle stem leaves ± sessile; leaf blade oblong or elliptic, 2–3 × 1–1.5 cm, pinnatisect; segments 2(or 3) pairs; lobes linear or filiform, 5–8 × 1–2 mm. Leaflike bracts like lowermost stem leaves; bracts filiform. Synflorescence a panicle. Involucre ovoid or hemispheric, 2.5–3 mm in diam. Marginal female florets 8–12. Disk florets 10–18, bisexual. Achenes ovoid or obovoid. Fl. and fr. Jul–Oct.

• Gobi Desert, gravelly soils; 2700–3300 m. N Gansu, NW Qinghai.

3. *Artemisia* sect. *Artemisia*

艾组 ai zu

Herbs, perennial, rarely shrubs, usually arachnoid tomentose or pubescent, or glabrous, without glandular or viscid hairs (sessile glands often present). Leaves 1 or 2(or 3)-pinnatipartite to pinnatisect, or entire; lobes or lobules linear, linear-lanceolate, elliptic, or narrowly elliptic, more than (1.5–)2 mm wide, lacerate, or lobules broadly serrate, more than 5 × 5 mm. Capitula usually ellipsoid or ovoid, rarely campanulate, hemispheric, or subglobose; phyllary margins scarious, midvein green or sometimes brown. Receptacle glabrous. Marginal florets (1–)3–15(–20); corolla narrowly tubular or rarely narrowly conical, 2- or 3(or 4)-toothed or without teeth. Disk florets 4–45, bisexual, ovaries well developed; style ca. as long as or longer than corolla, branches divergent, recurved at apex.

About 100 species: more than 70 species in Asia and Europe, 27 species in North America, a few species in S Hemisphere; 56 species (28 endemic) in China.

Many species contain monoterpenoids and sesquiterpenoids.

- 1a. Leaves obviously white or brown gland-dotted, with concave reticulate venation or glands, glands deciduous.
 - 2a. Middle stem leaves 1- or 2-pinnatisect, segments (3 or)4 or 5 pairs.
 - 3a. Stem, branches, and phyllaries glabrous or sparsely puberulent, glabrescent; leaves brown gland-dotted, lobes acuminate 79. *A. occidentalisinensis*
 - 3b. Stem, branches, and phyllaries pubescent; leaves white gland-dotted, lobes obtuse.
 - 4a. Stem, branches, and phyllaries rust-colored or brown tomentose or pubescent; leaves abaxially gray tomentose; capitula hemispheric or subovoid, 3–4(–5) mm in diam., in relatively long narrow panicles 99. *A. imponens*
 - 4b. Stem, branches, and phyllaries gray puberulent; leaves abaxially arachnoid pubescent; phyllaries puberulent initially, later glabrescent; capitula subglobose or ovoid, 1–2 mm in diam., in broad, much-branched panicles 61. *A. zhongdianensis*
 - 2b. Middle stem leaves entire, or 2- or 3-cleft, or pinnatifid, if pinnatisect then segments 1–3 pairs only.
 - 5a. Middle stem leaves entire or 2- or 3-cleft or -partite, mixed sparsely serrate, attenuate basally, sessile; capitula 3–4 mm in diam.; phyllaries abaxially arachnoid tomentose with dark brown center 54. *A. stolonifera*
 - 5b. Middle stem leaves 1- or 2-pinnatipartite, or 1- or 2-pinnatisect and then segments 1–3 pairs only; capitula 1.5–3 mm in diam.; phyllaries pubescent or not, but without dark brown center.
 - 6a. Middle stem leaves 1- or 2-pinnatisect.
 - 7a. Branches (3–)5–10 cm; middle stem leaves 5–10 × 3–8 cm, lobules lanceolate or linear-lanceolate, more than 3 mm wide.
 - 8a. Middle stem leaves (1 or)2-pinnatisect, adaxially arachnoid pubescent, later glabrescent; phyllaries arachnoid tomentose 58. *A. lavandulifolia*
 - 8b. Middle stem leaves 1(or 2)-pinnatisect, adaxially subglabrous; phyllaries sparsely arachnoid pubescent, later glabrescent 59. *A. verlotorum*
 - 7b. Branches 2–3(–5) cm; middle stem leaves less than 4 × 4 cm, lobules linear, less than 3 mm wide.
 - 9a. Leaves adaxially sparsely pubescent, abaxially densely tomentose, apex obtuse; phyllaries densely arachnoid tomentose 60. *A. kanashiroi*
 - 9b. Leaves adaxially puberulent, later glabrescent, abaxially densely arachnoid tomentose, lobules acute; phyllaries puberulent initially, later glabrescent 64. *A. lancea*
 - 6b. Middle stem leaves 1- or 2-pinnatipartite to -pinnatifid.
 - 10a. Middle stem leaf segments 2 or 3 pairs, lobes 2–3(–4) mm wide 55. *A. argyi*

- 10b. Middle stem leaf segments 1 or 2 pairs, lobes usually (3–)5–30 mm wide.
- 11a. Middle stem leaves 3-lobed, middle lobe 6–10 × 1.5–3 cm, larger than laterals, abaxially densely gray or yellowish and arachnoid pubescent; leaf apex acuminate.
- 12a. Plants (30–)80–150 cm tall; phyllaries densely arachnoid pubescent; bisexual florets 7–13 56. *A. gilvescens*
- 12b. Plants 150–200 cm tall or more; phyllaries sparsely pubescent or glabrescent; bisexual florets 12–16 57. *A. austroyunnanensis*
- 11b. Middle stem leaves (3 or)5-lobed, middle lobe 2–6 × 0.3–0.6(–1) cm, subequal to or slightly larger than lateral lobes, abaxially yellow pubescent, veins sparsely puberulent; leaf apex acute.
- 13a. Middle lobe of leaf blade slightly larger than lateral lobes, adaxially sparsely puberulent; capitula in broad panicles, ovoid; phyllaries pubescent 62. *A. calophylla*
- 13b. Middle lobe of leaf blade subequal to lateral lobes, adaxially sparsely barbate; capitula in narrow panicles, ellipsoid; phyllaries sparsely arachnoid pubescent 63. *A. velutina*
- 1b. Leaves without concave reticulate venation, usually not gland-dotted.
- 14a. Middle stem leaves entire, margin serrate or not, or 3–5-partite.
- 15a. Middle stem leaves palmately or ternately 3- or 5-partite.
- 16a. Synflorescence a lax, broad panicle; capitula 4–5 mm in diam. 88. *A. tafelii*
- 16b. Synflorescence a long, narrow panicle; capitula 2–2.5 mm in diam. 105. *A. selengensis*
- 15b. Middle stem leaves entire.
- 17a. Leaves 8–13 cm, margin serrulate 87. *A. viridissima*
- 17b. Leaves less than 8 cm, margin entire or occasionally 1–3-serrate or remotely toothed.
- 18a. Stem, branches, leaves, and phyllaries glabrous or puberulent initially, glabrescent; capitula subglobose, ovoid, or ovoid-campanulate.
- 19a. Middle stem leaves widest above middle; capitula 3–3.5 mm in diam. 106. *A. keiskeana*
- 19b. Middle stem leaves widest at or below middle; capitula 1–2 mm in diam. 82. *A. nilagirica*
- 18b. Stem, branches, leaves, and phyllaries arachnoid tomentose and pubescent; capitula ellipsoid or oblong.
- 20a. Middle stem leaves 0.3–0.6 cm wide, apex obtuse, usually entire, rarely 1- or 2-serrate 84. *A. subulata*
- 20b. Middle stem leaves (0.7–)1.5–2.5(–3) cm wide, apex acuminate, 1–3-serrate or lacerate at apex.
- 21a. Capitula (2.5–)3–4 mm in diam.; bisexual florets 20–30 83. *A. integrifolia*
- 21b. Capitula 2–2.5 mm in diam.; bisexual florets 10–15 105. *A. selengensis*
- 14b. Middle stem leaves pinnately 1–3-divided.
- 22a. Middle stem leaves with 1 or 2 pairs of segments.
- 23a. Subshrubs, 10–20 cm tall; middle stem leaves 1–1.5 cm, lobe apices obtuse 69. *A. nujianensis*
- 23b. Perennial herbs, 80–200 cm tall; middle stem leaves 6–12 cm, lobe apices acuminate 86. *A. viridisquama*
- 22b. Middle stem leaves with 2–6(or 7) pairs of segments.
- 24a. Capitula 5–10 mm in diam., bisexual florets 30–60.
- 25a. Capitula 6–10 mm in diam., synflorescence a simple terminal raceme; phyllaries densely yellowish pubescent 100. *A. smithii*
- 25b. Capitula 5–7 mm in diam., synflorescence a slender panicle with at least lower capitula on lateral branches; phyllaries rust-colored pubescent 101. *A. speciosa*
- 24b. Capitula 1.5–5 mm in diam., bisexual florets 4–25 (30–35 in *A. moorcroftiana*).
- 26a. Capitula (3–)3.5–5 mm in diam.
- 27a. Leaf blade abaxially glabrous 92. *A. tainingensis*
- 27b. Leaf blade abaxially puberulent to tomentose.
- 28a. Leaf blade abaxially pubescent or puberulent, sometimes arachnoid or silky.
- 29a. Plants 8–30 cm tall; middle stem leaves 1.5–4 × 0.5–2 cm.
- 30a. Phyllaries puberulent; leaf blade abaxially densely gray pubescent; plant 30–50 cm tall 95. *A. youngii*
- 30b. Phyllaries densely brown-yellow tomentose; leaf blade abaxially yellowish pubescent; plant 8–30 cm tall 97. *A. comaiensis*
- 29b. Plants 60–130(–200) cm tall; middle stem leaves 6–22 × 4–18 cm.
- 31a. Middle stem leaves with 2 or 3(or 4) pairs of segments 70. *A. robusta*
- 31b. Middle stem leaves with (3 or)4–6 pairs of segments.
- 32a. Leaves 3.5–4 cm wide, lobules 5–8 mm 104. *A. somae*
- 32b. Leaves 4–12 cm wide, lobules 10–15 mm.
- 33a. Capitula subglobose; phyllaries not brown, pubescent 102. *A. sinensis*
- 33b. Capitula ovoid-campanulate or ovoid; phyllaries brown, glabrescent 109. *A. taibaishanensis*
- 28b. Leaf blade abaxially tomentose, sometimes pubescent on veins.
- 34a. Middle stem leaves 13–19 cm 89. *A. montana*

- 34b. Middle stem leaves 6–12 cm.
- 35a. Plants 8–30(–35) cm tall.
- 36a. Perennial herbs; phyllaries white tomentose; female florets 13–16 92. *A. tainingensis*
- 36b. Subshrubs; phyllaries densely pubescent; female florets 8–10.
- 37a. Leaf blade abaxially densely white tomentose, adaxially sparsely sericeous-tomentose 103. *A. kawakamii*
- 37b. Leaf blade abaxially densely gray or yellowish tomentose, adaxially glabrescent 94. *A. campbellii*
- 35b. Plants 30–150 cm tall.
- 38a. Middle stem leaves with 2 or 3 pairs of segments.
- 39a. Synflorescence a ± broad panicle; phyllaries gray arachnoid tomentose; leaf blades adaxially gray tomentose when young 81. *A. igniaria*
- 39b. Synflorescence a narrow panicle; phyllaries arachnoid pubescent; leaf blades adaxially sparsely arachnoid pubescent.
- 40a. Leaf blade pinnatipartite, adaxially glandular punctuate 68. *A. leucophylla*
- 40b. Leaf blade pinnatisect, adaxially not glandular punctuate 85. *A. brachyphylla*
- 38b. Middle stem leaves with (3 or)4–6 pairs of segments.
- 41a. Largest leaf blade (1.5–)3–5.5 × (1.5–)2–3 cm; plants 30–70 cm tall; female florets 5–9; bisexual florets 8–15 98. *A. orientalihengduangensis*
- 41b. Largest leaf blade 6–14 × 3.5–4 cm; plants 70–130(–150) cm tall; female florets 10–20; bisexual florets 15–35.
- 42a. Perennial herbs 80–150 cm tall; synflorescence a lax, much-branched, broad panicle 71. *A. qinlingensis*
- 42b. Subshrubs 50–70 cm tall; synflorescence a narrow panicle 90. *A. moorcroftiana*
- 26b. Capitula 1.5–3(–3.5) in diam., ellipsoid, oblong, ovoid, or ovoid-oblong, usually in laxer synflorescences.
- 43a. Middle stem leaves with 4–6 pairs of segments.
- 44a. Plants 30–40 cm tall.
- 45a. Plants glabrescent; phyllaries ± glabrous; middle stem leaves 0.5–1.5 cm wide, ultimate lobules elliptic, 3–4 mm 93. *A. orientalexizangensis*
- 45b. Plants tomentose; phyllaries sparsely yellowish tomentose; middle stem leaves 1.5–2.5 cm wide, ultimate lobules linear-lanceolate, 5–8 mm 96. *A. jilongensis*
- 44b. Plants (45–)50–160 cm tall.
- 46a. Leaf blade abaxially sparsely gray pubescent or glabrescent 107. *A. fulgens*
- 46b. Leaf blade abaxially densely arachnoid tomentose.
- 47a. Capitula 3–3.5 mm in diam., usually widely spaced along branches; female florets 10–15 71. *A. qinlingensis*
- 47b. Capitula 1.5–3(–3.5) mm in diam., if more than 3 mm then densely spaced; female florets 2–10.
- 48a. Middle stem leaves ± sessile; bisexual florets 8–20.
- 49a. Lobules of middle stem leaves linear or linear-lanceolate 65. *A. vulgaris*
- 49b. Lobules of middle stem leaves elliptic, oblong, or serrate 72. *A. phyllobotrys*
- 48b. Middle stem leaves petiolate; bisexual florets 4–8.
- 50a. Stem and branches glabrescent; middle stem leaves with petiole 1–1.5 cm, blade 4–5 cm 76. *A. divaricata*
- 50b. Stem and branches densely intermixed gray and yellowish long pubescent and tomentose; middle stem leaves with petiole 0.3–0.5 cm, blade 6–8 cm 91. *A. abaensis*
- 43b. Middle stem leaves with 1–3(or 4) pairs of segments, if 4 then phyllaries densely arachnoid pubescent.
- 51a. Subshrubs 10–20 cm tall; middle stem leaves 1–1.5 × 0.8–1 cm, 1-pinnatipartite with 1 or 2 pairs of segments 69. *A. nujianensis*
- 51b. Perennial herbs, less often subshrubs, 30–150 cm tall; middle stem leaves 2–18(–20) × 2–10 cm, 1- or 2-pinnatipartite or pinnatisect with 2 or 3(or 4) pairs of segments.
- 52a. Phyllaries glabrous or glabrescent.
- 53a. Leaf blade pinnatisect, segments 1- or 2-paired, or leaf entire; capitula not subtended by leaflike bracts 105. *A. selengensis*
- 53b. Leaf blade 1- or 2-pinnatipartite to subpinnatisect, segments 2–4-paired; capitula mostly subtended by leaflike bracts.
- 54a. Leaf blade (8–)10–18(–20) cm, abaxially pubescent, sparsely gray arachnoid tomentose or glabrescent.

- 55a. Capitula subglobose or ovoid, 1.5–2.5 mm in diam., in broad, much-branched panicles ... 108. *A. sylvatica*
- 55b. Capitula oblong or ellipsoid, (1.5–)2–3 mm in diam., in narrow or somewhat broad, rarely broad, panicles.
- 56a. Leaf blade ovate or elliptic-ovate, (7–)14–18(–20) cm; phyllaries not brown 80. *A. incisa*
- 56b. Leaf blade suborbicular or broadly ovate, 10–14 cm; phyllaries brown 109. *A. taibaishanensis*
- 54b. Leaf blade 5–10 cm, abaxially densely gray arachnoid tomentose.
- 57a. Middle stem leaves (1 or)2-pinnatisect, segments lanceolate, linear-lanceolate, or linear, 2–6(–10) mm wide; synflorescence branchlets densely spicate 75. *A. rubripes*
- 57b. Middle stem leaves 1- or 2-pinnatisect or -partite or -cleft, segments not as above; synflorescence branchlets laxer, more racemelike.
- 58a. Middle stem leaves with 3(or 4) pairs of segments, distal lobe larger than lateral lobes, lateral lobes 1- or 2-partite; capitula erect or ± nodding 77. *A. indica*
- 58b. Middle stem leaves with 2(or 3) pairs of segments, distal lobe larger than lateral lobes, basal lobes larger than lateral lobes, lobes entire or rarely 1- or 2-serrate; capitula nodding 78. *A. princeps*
- 52b. Phyllaries persistently arachnoid tomentose or pubescent.
- 59a. Branches more than 20 cm; phyllaries with brown centers 66. *A. yunnanensis*
- 59b. Branches less than 20 cm; phyllaries not with brown centers.
- 60a. Middle stem leaves elliptic or oblong, 1(or 2)-pinnatipartite, segments (2 or)3 or 4 pairs, elliptic, acuminate, 1- or 2-serrate, base attenuate; capitula in narrow panicles 85. *A. brachyphylla*
- 60b. Middle stem leaves not as above; capitula in broad or somewhat broad or narrow panicles.
- 61a. Middle stem leaves (1 or)2-pinnatisect, lobules linear, linear-lanceolate, or lanceolate, acute apically.
- 62a. Middle stem leaves with (2 or)3(or 4) pairs of segments; capitula 2–3 mm in diam., in broad panicles 67. *A. roxburghiana*
- 62b. Middle stem leaves with 2 or 3 pairs of segments; capitula 1.5–2 mm in diam., in narrow or somewhat broad panicles 73. *A. mongolica*
- 61b. Middle stem leaves 1- or 2-pinnatipartite or 1-pinnatisect, lobules elliptic or elliptic-lanceolate, rarely linear-lanceolate and then obtuse apically.
- 63a. Branches more than 20 cm; middle stem leaves with 2 or 3 pairs of segments, lobes and lobules obtuse apically, petiole tomentose at base; capitula in broad panicles; phyllaries densely arachnoid pubescent, brown at center 66. *A. yunnanensis*
- 63b. Branches less than 10 cm; middle stem leaves with 3(or 4) pairs of segments; petiole not tomentose at base; capitula in narrow or somewhat broad panicles; phyllaries puberulent, not brown at center.
- 64a. Leaves arachnoid tomentose, blades of lowermost stem leaves elliptic or ovate-elliptic, middle stem leaves 1-pinnatisect, with 2 or 3(or 4) pairs of segments; capitula in dense panicles 68. *A. leucophylla*
- 64b. Leaves arachnoid pubescent, glabrescent, blades of lowermost stem leaves ovate, suborbicular, or broadly ovate, middle stem leaves 2-pinnatipartite or -sect, with 3(or 4) pairs of segments; capitula in lax panicles 74. *A. verbenacea*

54. *Artemisia stolonifera* (Maximowicz) Komarov, Fl. Man-shur. 3: 676. 1907.

宽叶山蒿 kuan ye shan hao

Artemisia vulgaris Linnaeus var. *stolonifera* Maximowicz, Mém. Acad. Imp. Sci. St.-Petersbourg Divers Savans 9: 161. 1859; *A. integrifolia* Linnaeus var. *stolonifera* (Maximowicz) Pampanini; *A. koidzumii* Nakai var. *laciniata* (Nakai) Kitamura; *A. koidzumii* var. *manchurica* Pampanini, p.p.; *A. megalobotryx* Nakai; *A. migoana* Kitamura; *A. stolonifera* var. *laciniata* Nakai; *A. vulgaris* lusius *incana* Regel; *A. vulgaris* var. *kiusiana* Makino.

Herbs, perennial, 50–120 cm tall, sparsely gray arachnoid pubescent or glabrescent. Leaves ± sessile, gland-dotted adaxially. Basal and lowermost stem leaves entire, serrate. Middle stem leaves sessile; leaf blade obovate-elliptic, ovate-elliptic, or ovate, 6–12 × 4–7 cm, 2- or 3-cleft or -partite to coarsely

toothed, base cuneate with 1- or 2-lobed pseudostipules, apex acute. Uppermost leaves and leaflike bracts ovate to linear-lanceolate, serrate or entire. Synflorescence a narrow panicle, to 40 cm, branches to 8 cm, ascending, slender and flexuous, lowermost subtended by leaflike bracts. Involucre ovoid or oblong, 3–4 mm in diam.; phyllaries arachnoid pubescent, or glabrescent. Marginal female florets 10–12. Disk florets 12–15, bisexual. Achenes oblong or ellipsoid. Fl. and fr. Jul–Nov. 2n = 36.

Forest margins, roadsides, slopes, canyons, forest steppes; low elevations. Anhui, Hebei, Heilongjiang, Henan, Hubei, Jiangsu, Jiangxi, Jilin, Liaoning, Nei Mongol, Shandong, Shanxi, Xinjiang, Zhejiang [Japan, Korea, Russia (Far East)].

55. *Artemisia argyi* H. Léveillé & Vaniot, Repert. Spec. Nov. Regni Veg. 8: 138. 1910.

艾 ai

Artemisia argyi var. *incana* (Maximowicz) Pampanini; *A. chiarugii* Pampanini; *A. handel-mazzetii* Pampanini; *A. nutans* Nakai; *A. nutantiflora* Nakai; *A. princeps* Pampanini var. *candicans* Pampanini, p.p.; *A. vulgaris* Linnaeus var. *incana* Maximowicz; *A. vulgaris* var. *incanescens* Franchet.

Herbs, perennial, or subshrubs, 80–150(–250) cm tall, with many lateral roots, shortly branched apically, gray arachnoid pubescent, strongly aromatic. Middle stem leaves: petiole 2–3 mm; leaf blade ovate, triangular-ovate, or subrhombic, 5–8 × 4–7 cm, abaxially densely gray arachnoid tomentose, adaxially incanous pubescent and white gland-dotted, 1(or 2)-pinnatipartite or -cleft; segments 2 or 3 pairs, usually serrate, base attenuate; veins abaxially prominent. Uppermost leaves and leaflike bracts pinnatipartite to 3-partite, or entire; bracts elliptic, elliptic-lanceolate, or lanceolate. Synflorescence a narrow panicle with branches to 10 cm, ascending, lower ones subtended by leaflike bracts. Capitula secund, not touching, subsessile. Involucre ellipsoid, 2.5–3(–3.5) mm in diam.; phyllaries arachnoid pubescent, or glabrescent. Marginal female florets 6–10. Disk florets 8–12, bisexual. Achenes ovoid-oblong or oblong. Fl. and fr. Jul–Oct. $2n = 36$.

Waste places, roadsides, slopes, hills, steppes, forest steppes; low elevations to 1500 m. Anhui, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi, Sichuan, Yunnan, Zhejiang [Korea, Mongolia, Russia].

Artemisia argyi is used in making important anti-inflammatory, detoxifying, and hemostatic drugs. Leaf form is very variable: plants with slender, more deeply divided, pinnatipartite middle stem leaves have been placed in *A. argyi* var. *gracilis* Pampanini (朝鲜艾 chao xian ai), but, as such leaves are found throughout the range of the species, it does not seem worthwhile to formally separate them.

56. *Artemisia gilvescens* Miquel, Ann. Mus. Bot. Lugduno-Batavi 2: 175. 1866.

湘赣艾 xiang gan ai

Artemisia vulgaris Linnaeus var. *gilvescens* (Miquel) Nakai.

Herbs, perennial; stems erect, (30–)80–150 cm tall, densely lanate, shortly branched from upper nodes, branches sometimes nodding. Middle stem leaves ± sessile, papery; leaf blade 6–7 × 2.8–4.5(–6) cm, abaxially densely arachnoid tomentose, adaxially green, densely white punctuate, sparsely arachnoid tomentose or glabrescent, 3(–5)-lobed, base cuneate or attenuate into obscure petiole; terminal lobe oblong-acute, entire or with 1 or 2 distant serrations; lateral lobes smaller, oblong-lanceolate, acuminate. Upper leaves gradually smaller, sessile; leaf blade oblong, base cuneate, margin entire, slightly recurved, apex acute. Synflorescence a narrow panicle, also produced on lateral branches from upper leaf axils to form large panicles; lower branches to 2.5 cm, often much shorter than subtending bracts. Capitula shortly pedunculate. Involucre cylindrical, ca. 4 × (2–)2.5–3 mm; phyllaries in 3 series, densely arachnoid pubescent, outer phyllaries ovate, obtuse, rather short, median and inner phyllaries oblong, apex rounded. Marginal female florets 5–8; corolla ca. 1.5 mm. Disk florets 7–13, bisexual; corolla ca. 2.2 mm, tube ca. 1 mm. Achenes ellipsoid or obovoid, ca. 0.8 mm. Fl. and fr. Jul–Oct.

Roadsides, shrublands, forest margins; low elevations. Anhui, Hubei, Hunan, Jiangxi, Shaanxi, Sichuan [Japan].

Artemisia gilvescens is used medicinally.

57. *Artemisia austroyunnanensis* Y. Ling & Y. R. Ling, Bull. Bot. Res., Harbin 4(2): 20. 1984.

滇南艾 dian nan ai

Artemisia burmanica Pampanini f. *latifolia* Pampanini; *A. dubia* Wallich ex Besser f. *tonkinensis* Pampanini.

Subshrubs, 150–200 cm tall or more, densely gray or yellowish pubescent, or glabrescent. Lowermost leaves: leaf blade ovate, 7–12 × 5–6 cm, pinnatipartite or -cleft; segments 2(or 3) pairs, oblong or oblong-elliptic, rarely with 1 or 2 serrations. Middle stem leaves: petiole 4–10 mm; leaf blade 6–10 × 1.5–3 cm, 3(–5)-lobed, apical lobe elliptic, lateral lobes 15–25 × 5–8 mm, apically acuminate and mucronulate. Uppermost leaves and leaflike bracts entire. Synflorescence a broad panicle. Capitula many, nodding. Involucre oblong or ovoid-oblong, 1.5–2.5(–3) mm; phyllaries sparsely pubescent, sometimes glabrescent. Marginal female florets 5–7. Disk florets 12–16, bisexual. Achenes oblong. Fl. and fr. Sep–Dec or Mar.

Grasslands, slopes, shrublands, forest margins, canyons; 800–2300 m. S and SW Yunnan [Bhutan, N India, N Myanmar, N Thailand, N Vietnam].

58. *Artemisia lavandulifolia* Candolle, Prodr. 6: 110. 1838 [*“lavandulaefolia”*].

野艾蒿 ye ai hao

Artemisia araneosa Kitamura; *A. argyi* H. Léveillé & Vaniot f. *eximia* Pampanini; *A. clemensiana* Pampanini; *A. codonocephala* Diels; *A. codonocephala* var. *maireana* Pampanini; *A. grisea* Pampanini; *A. lavandulifolia* var. *pekinensis* Pampanini; *A. selengensis* Turczaninow ex Besser lus *umbrosa* (Turczaninow ex Besser) Regel; *A. selengensis* var. *umbrosa* (Turczaninow ex Besser) Ledebour; *A. tristis* Pampanini; *A. vulgaris* Linnaeus var. *umbrosa* Turczaninow ex Besser.

Herbs, perennial, or shrubs, 50–120(–200) cm tall; stems robust, erect, gray arachnoid pubescent, glabrous or nearly so below synflorescence. Basal and lowermost leaves withering before anthesis, long petiole; leaf blade ovate or suborbicular, 8–13 × 7–8 cm, 2-pinnatisect. Middle stem leaves: petiole 1–2(–3) cm, base with 1- or 2-lobed pseudostipules; leaf blade ovate, ovate-elliptic, or suborbicular, 6–8 × 5–7 cm, abaxially densely tomentose, adaxially white gland-dotted and sparsely arachnoid pubescent, (1 or)2-pinnatisect; segments 2 or 3 pairs, 30–50(–70) × 5–7(–9) mm; lobules 2 or 3 pairs, lanceolate or linear-lanceolate, serrate. Uppermost leaves and leaflike bracts pinnatisect or 3-lobed or entire; lobes or entire bracts linear-lanceolate or lanceolate. Synflorescence a narrow, leafy, conical panicle. Capitula many, pedunculate or ± sessile. Involucre ellipsoid or oblong, 3.5–4.5 × 2–2.5(–3) mm in diam.; phyllaries densely arachnoid tomentose. Marginal female florets 4–9; corolla ca. 1.5 mm, glabrous. Disk florets 10–20, bisexual; corolla purple, 2–2.8 mm. Achenes oblong or obovoid, ca. 1 mm, glabrous. Fl. and fr. Jul–Oct.

Roadsides, forest margins, slopes, steppes, canyons, riverbanks or lakesides, brushlands; 400–3000 m. Anhui, Gansu, N Guangdong, N Guangxi, Guizhou, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, Nei Mongol, Shaanxi, Shandong, Shanxi, Sichuan, Yunnan [Japan, Korea, Mongolia, Russia].

Artemisia lavandulifolia is used medicinally.

59. *Artemisia verlotorum* Lamotte, Mém. Assoc. Franç. Congr. Clermont Ferrand 1876: 511. 1876.

南艾蒿 nan ai hao

Artemisia dubia Wallich ex Besser subf. *intermedia* Pampanini; *A. dubia* subf. *macrostachya* Pampanini; *A. dubia* var. *orientalis* Pampanini, p.p.; *A. dubia* subf. *pauciflora* Pampanini; *A. dubia* f. *pseudolavandulifolia* Pampanini; *A. dubia* subf. *puberula* Pampanini; *A. verlotorum* f. *glabrescens* Pampanini; *A. verlotorum* var. *lobata* Pampanini; *A. verlotorum* var. *rigida* Pampanini.

Herbs, perennial, 50–100 cm tall, pubescent, later glabrescent. Leaves white gland-dotted adaxially and abaxially densely gray tomentose. Basal and lowermost leaves shortly petiolate; leaf blade ovate, 1- or 2-pinnatisect. Middle stem leaves ± sessile; leaf blade ovate or broadly ovate, 5–10(–13) × 3–8 cm, 1(or 2)-pinnatisect; segments 3 or 4 pairs, lanceolate or linear-lanceolate, 30–50 × 3–5 mm. Uppermost leaves 3- or 5-lobed; leaflike bracts lanceolate or elliptic-lanceolate. Capitula in somewhat broad panicles, ellipsoid or oblong-ellipsoid, 2–2.5 mm in diam., sessile. Phyllaries glabrescent. Marginal female florets 3–6. Disk florets 8–18, bisexual. Achenes obovoid or oblong. Fl. and fr. Jul–Oct.

Hills, roadsides, waste areas; sea level to 2000 m. Anhui, Fujian, S Gansu, Guangdong, Guangxi, Guizhou, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, S Nei Mongol, S Shaanxi, Shandong, Shanxi, Sichuan, Taiwan, Yunnan, Zhejiang [E, S, and SE Asia, C, E, and W Europe, North and South America, Oceania].

Artemisia verlotorum is used medicinally.

60. *Artemisia kanashiroi* Kitamura, Acta Phytotax. Geobot. 12: 147. 1943.

狭裂白蒿 xia lie bai hao

Herbs, perennial, 25–60 cm tall, densely arachnoid tomentose, or glabrescent or sparsely tomentose later. Lower and middle stem leaves: petiole 5–40 mm; leaf blade suborbicular or broadly ovate, 3–4 × 3–4 cm, abaxially densely arachnoid tomentose, adaxially white gland-dotted and sparsely pubescent, 1(or 2)-pinnatisect; segments (1 or)2 or 3 pairs, linear or linear-lanceolate, 10–20(–40) × 1–2(–4) mm. Uppermost leaves 3–5-lobed; bracts leaflike 3-lobed or entire. Synflorescence a narrow panicle. Involucre cylindrical or cylindrical-ovoid, 2–2.5(–3) mm in diam.; phyllaries densely gray arachnoid tomentose. Marginal female florets 3–6. Disk florets 6–10, bisexual. Achenes oblong or oblong-ovoid. Fl. and fr. Jul–Oct.

• Roadsides, slopes, waste areas; low elevations to 2300 m. E Gansu, W Hebei, S Nei Mongol, Ningxia, NE Qinghai, N Shaanxi, Shanxi.

61. *Artemisia zhongdianensis* Y. R. Ling, Bull. Bot. Res., Harbin 8(3): 1. 1988.

中甸艾 zhong dian ai

Herbs, perennial, 80–100 cm or more tall, pubescent. Leaves white gland-dotted and sparsely pubescent adaxially, densely gray arachnoid pubescent abaxially. Middle stem leaves: petiole 1.5–3 cm; leaf blade broadly ovate or ovate, 6–8 × 5–8 cm, 2(or 3)-pinnatisect; segments 4 or 5 pairs, subrhombic or ovate-elliptic, 3–4 × 1.5–2.5 cm, parted; lobules elliptic, linear-lanceolate, or lanceolate, 10–25 × 3–5 mm, obtuse apically; rachis winged. Upper leaves and leaflike bracts pinnatisect or 3–5-lobed. Capitula in broad panicles, many, subglobose or ovoid, 1–2 mm in diam., nodding. Phyllaries sparsely pubescent. Marginal female florets 5 or 6. Disk florets 6–8, bisexual. Achenes oblong or obovoid. Fl. and fr. Sep–Dec.

• Forest margins, slopes, scrub; ca. 2700 m. NW Yunnan.

62. *Artemisia calophylla* Pampanini, Nuovo Giorn. Bot. Ital., n.s., 36: 457. 1930.

美叶蒿 mei ye hao

Subshrubs, 50–200 cm tall, yellowish pubescent. Basal and lowermost leaves shortly petiolate; leaf blade ovate or broadly ovate, 1- or 2-pinnatisect. Middle stem leaves: leaf blade broadly ovate, 6–11 × 3–9 cm, abaxially densely gray tomentose with sparsely pubescent veins, adaxially gland-dotted and sparsely puberulent, pinnatipartite; segments (1 or)2 pairs, lanceolate or linear-lanceolate, 30–60 × 3–6(–10) mm. Uppermost leaves and leaflike bracts lanceolate or linear-lanceolate. Synflorescence a broad panicle. Involucre ovoid, 2–2.5 mm; phyllaries sparsely pubescent. Marginal female florets 5 or 6. Disk florets 10–13, bisexual. Achenes obovoid. Fl. and fr. Jul–Oct.

• Forest margins, riversides, waste areas, slopes; 1600–3000 m. W Guangxi, Guizhou, S Qinghai, Sichuan, E Xizang, Yunnan.

63. *Artemisia velutina* Pampanini, Nuovo Giorn. Bot. Ital., n.s., 36: 413. 1930.

黄毛蒿 huang mao hao

Artemisia velutina f. *foliosa* Pampanini.

Herbs, perennial, (25–)60–100 cm tall; stems often purplish; most parts pubescent. Lowermost leaves 1- or 2-pinnatipartite or -sect. Middle stem leaves: petiole 5–10(–15) mm; leaf blade ovate or elliptic-ovate, 4–6 × 2–3 cm, abaxially densely gray or yellowish tomentose, mixed pubescent on veins, adaxially dark green gland-dotted and sparsely pubescent, 1(or 2)-pinnatipartite or -left, rarely -sect; segments 2 or 3 pairs, various, lanceolate, oblong, or elliptic, 10–20 × 5–12 mm, serrate or entire. Uppermost leaves and leaflike bracts elliptic or lanceolate. Synflorescence a narrow panicle, ultimate branches short and dense, often less than 8 mm, with up to 7 capitula. Capitula closely spaced, ± nodding; peduncle to 1.5 mm. Involucre ellipsoid, 1.5–2 mm; phyllaries white with very faint greenish midrib, sparsely pubescent. Marginal female florets 8–10. Disk florets 10–15, bisexual. Achenes obovoid. Fl. and fr. Sep–Nov.

• Slopes, roadsides; low to middle elevations. Anhui, Fujian, Hebei, Henan, Hubei, Hunan, Jiangxi, S Shaanxi, Shandong, Shanxi, Sichuan, SE Xizang, Yunnan.

64. *Artemisia lancea* Vaniot, Bull. Acad. Int. Géogr. Bot. 12: 500. 1903.

矮蒿 ai hao

Artemisia feddei H. Léveillé & Vaniot; *A. lavandulifolia* Candolle subf. *angusta* Pampanini; *A. lavandulifolia* subf. *effusa* Pampanini; *A. lavandulifolia* var. *feddei* (H. Léveillé & Vaniot) Pampanini; *A. lavandulifolia* var. *lancea* (Vaniot) Pampanini; *A. lavandulifolia* subf. *minutiflora* Pampanini; *A. lavandulifolia* f. *stenocephala* Pampanini; *A. minutiflora* Nakai; *A. vulgaris* Linnaeus var. *maximowiczii* Nakai, p.p.

Herbs, perennial, 80–150 cm tall, rhizomatous, sparsely arachnoid pubescent, sometimes glabrescent. Basal and lowermost leaves withering before anthesis, shortly petiolate; leaf blade ovate, 3–5(–7) × 2.5–4(–6.5) cm, 2-pinnatisect; segments 3 or 4 pairs; lobules linear-lanceolate or linear, 3–6 × 2–3 mm. Middle stem leaves ± sessile; leaf blade ovate-elliptic, ovate-orbicular, or suborbicular, 1.5–2.5 × 0.1–0.2 mm, abaxially densely gray or yellowish arachnoid pubescent, adaxially gland-dotted and sparsely arachnoid puberulent, or glabrescent, margin revolute, apex acute. Uppermost leaves and leaflike bracts 3–5-lobed or entire; lobes or entire bracts lanceolate or linear-lanceolate. Synflorescence a dense, broad to narrow panicle. Capitula many. Involucre ovoid or ellipsoid-ovoid, 1–1.5 mm in diam.; phyllaries sparsely arachnoid pubescent, glabrescent. Marginal female florets 1–3; corolla ca. 0.8 mm. Disk florets 2–5, bisexual; corolla purplish, ca. 1.5 mm. Achenes oblong. Fl. and fr. Aug–Oct.

Forest margins, roadsides, slopes, dry fields, waste areas; 300–1700 m. Anhui, Fujian, S Gansu, Guangdong, Guangxi, Guizhou, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, S Nei Mongol, S Shaanxi, Shandong, Shanxi, Sichuan, Taiwan, Yunnan, Zhejiang [India, Japan, Korea, E Russia].

Artemisia lancea is used medicinally.

65. *Artemisia vulgaris* Linnaeus, Sp. Pl. 2: 848. 1753.

北艾 bei ai

Herbs, perennial, (45–)60–160 cm tall, sparsely pubescent. Lowermost leaves shortly petiolate; leaf blade 2-pinnatisect. Middle stem leaves ± sessile; leaf blade elliptic, ovate-elliptic, suborbicular, or ovate-orbicular, 3–10(–15) × 1.5–6(–10) cm, abaxially densely gray arachnoid tomentose, adaxially sparsely arachnoid puberulent or glabrescent, 1- or 2-pinnatisect or pinnatisect; segments (3 or) 4 or 5, elliptic-lanceolate or linear-lanceolate, 3–5 × 1–1.5 cm, rachis narrowly winged, few serrate or not. Uppermost leaves pinnatisect; leaflike bracts 3-lobed or entire; lobes or entire bracts lanceolate. Synflorescence an ill-defined panicle, lateral branches often shorter than subtending leaves. Involucre oblong, 2.5–3(–3.5) mm; phyllaries densely arachnoid pubescent. Marginal female florets 7–10. Disk florets 8–20, bisexual. Achenes obovoid or ovoid. Fl. and fr. Aug–Oct. 2n = 16, 16 + 1b, 18, 24, 36, 40, 45, 54.

Roadsides, slopes, canyons, forest margins, forest steppes, subalpine steppes; 1500–3800 m. W Gansu, Qinghai, Shaanxi, W Sichuan, Xinjiang, E Xizang [Afghanistan, Japan, Mongolia, Myanmar, Pakistan, Russia, N Thailand, N Vietnam; Africa, SW Asia (Iran), Europe, North America].

- 1a. Plants 100–160 cm tall; middle stem leaves elliptic or ovate-elliptic; capitula in narrow dense panicles 65a. var. *vulgaris*
 1b. Plants (45–)60–80 cm tall; middle stem leaves suborbicular or ovate-orbicular; capitula in broad panicles 65b. var. *xizangensis*

65a. *Artemisia vulgaris* var. *vulgaris*

北艾(原变种) bei ai (yuan bian zhong)

Artemisia samamistica Besser; *A. superba* Pampanini; *A. vulgaris* var. *coarctica* Forbes ex Besser, p.p.; *A. vulgaris* var. *latifolia* Fischer ex Besser; *A. vulgaris* var. *vulgatissima* Besser, p.p.

Plants usually 100–160 cm tall. Middle stem leaves elliptic or ovate-elliptic, 1- or 2-pinnatisect or -sect. Synflorescence a dense, narrow panicle.

Roadsides, slopes, canyons, forest margins, forest steppes, subalpine steppes; 1500–2100 m. W Gansu, Qinghai, Shaanxi (Qinling), W Sichuan, Xinjiang [Afghanistan, Japan, Mongolia, Myanmar, Pakistan, Russia, N Thailand, N Vietnam; Africa, SW Asia (Iran), Europe, North America].

65b. *Artemisia vulgaris* var. *xizangensis* Y. Ling & Y. R. Ling, Acta Phytotax. Sin. 18: 505. 1980.

藏北艾 zang bei ai

Plants usually 60–80 cm tall. Middle stem leaves suborbicular or ovate-orbicular. Synflorescence a broad panicle.

- 3500–3800 m. E Xizang.

66. *Artemisia yunnanensis* Jeffrey ex Diels, Notes Roy. Bot. Gard. Edinburgh 5: 187. 1912.

云南蒿 yun nan hao

Artemisia igniaria Maximowicz var. *yunnanensis* (Jeffrey ex Diels) Pampanini; *A. jeffreyana* H. Léveillé, nom. illeg. superfl.

Subshrubs, 50–90 cm tall, gray sericeous-pubescent, later sparsely pubescent, much branched. Lower stem leaves: petiole 3–5 cm, base tomentose; lowermost leaves ovate, 2-pinnatisect or pinnatisect; segments 2 or 3 pairs, oblong or ovate-elliptic, pinnatisect; lobules 2-paired, oblong, apex obtuse. Middle stem leaves: petiole 1–4 cm; leaf blade ovate or obovate-attenuate, 5–7 × 3–6 cm, abaxially densely gray arachnoid tomentose, adaxially white gland-dotted and incanous pubescent, 1- or 2-pinnatisect or partite; segments 2 or 3 pairs, ovate-elliptic or oblong, 2–4 × 1.5–3.5 cm, apex obtuse and mucronulate. Uppermost leaves and leaflike bracts 3–5-partite or entire; lobes or entire bracts oblong or ovate-oblong. Synflorescence a broad panicle. Capitula solitary or in groups of 2 or 3. Involucre oblong or ovoid-ellipsoid, 2–2.5(–3) mm in diam.; phyllaries brown at center, arachnoid pubescent. Marginal female florets 7–13. Disk florets 8–15, bisexual. Achenes ovoid or obovoid. Fl. and fr. Aug–Oct.

- Dry and hot canyons, shrublands and coniferous forest margins; low elevations to 3700 m. S Qinghai, W Sichuan, Xizang, NW Yunnan.

67. *Artemisia roxburghiana* Besser, Bull. Soc. Imp. Naturalistes Moscou 9: 57. 1836.

灰苞蒿 hui bao hao

Subshrubs, (20–)50–120 cm tall, arachnoid pubescent; rootstock horizontally creeping, ca. 1 cm thick. Leaves abaxially densely arachnoid tomentose, adaxially sparsely pubescent and gland-dotted, or glabrescent. Lowermost and middle stem leaves: petiole 1.5–2(–3) cm; leaf blade ovate or oblong-elliptic, 6–10(–18) × 4–6(–10) cm, 2-pinnatisect; segments (2 or)3 or 4 pairs, elliptic or oblong; lateral lobes with 1–3 pairs of lobules; lobules lanceolate or linear-lanceolate, 0.5–1.5 × 2–2.5 mm; rachis narrowly winged. Uppermost leaves and leaflike bracts pinnatisect or 3–5-lobed or entire; lobes or entire bracts linear-lanceolate or lanceolate. Synflorescence a narrow panicle to 25 × 3 cm, sometimes with extra panicles from upper nodes; branches simple, to 4 cm, erect, rather uniform in length; bracts linear, ca. as long as involucre. Capitula solitary or in dense glomerules of 2 or 3, subsessile, erect to ± patent. Involucre ovoid, subglobose or hemispheric, rarely oblong, 2–3 mm in diam.; outer phyllaries purplish tinged, purple or gray arachnoid pubescent, scarious margin broadly hyaline, apex obtuse. Florets 20–38, yellow or purple-brown tinged, all fertile. Marginal female florets 5–7; corolla filiform. Disk florets bisexual 10–20(–30); corolla limb yellow or purple. Achenes brown, obovoid or oblong, ca. 1.25 mm. Fl. and fr. Aug–Oct. $2n = 18, 36$.

Roadsides, slopes, dry canyons, grasslands, waste areas, terraces; 700–3900 m. S Gansu, Guizhou, W Hubei, Qinghai, S Shaanxi, W Sichuan, Xizang, Yunnan [Afghanistan, N India, Nepal, Pakistan, N Thailand].

- 1a. Phyllaries gray arachnoid pubescent 67a. var. *roxburghiana*
 1b. Phyllaries purple, sparsely arachnoid pubescent 67b. var. *purpurascens*

67a. *Artemisia roxburghiana* var. *roxburghiana*

灰苞蒿(原变种) hui bao hao (yuan bian zhong)

Artemisia dubia Wallich ex Besser var. *jacquemontiana* Pampanini; *A. eriocephala* Pampanini; *A. hypoleuca* Edgeworth; *A. indica* Willdenow var. *exilis* Pampanini; *A. revoluta* Edgeworth; *A. roxburghiana* var. *acutiloba* Pampanini; *A. roxburghiana* var. *kansuensis* Pampanini.

Phyllaries gray arachnoid pubescent.

Roadsides, slopes, dry canyons, grasslands, waste areas, terraces; 700–3900 m. S Gansu, Guizhou, W Hubei, Qinghai, S Shaanxi, W Sichuan, Xizang, Yunnan [Afghanistan, N India, Nepal, N Thailand].

67b. *Artemisia roxburghiana* var. *purpurascens* (Jacquemont ex Besser) J. D. Hooker, Fl. Brit. India 3: 326. 1881.

紫苞蒿 zi bao hao

Artemisia purpurascens Jacquemont ex Besser, Bull. Soc. Imp. Naturalistes Moscou 9: 60. 1836; *A. stronglycephala* Pampanini.

Phyllaries purple, sparsely arachnoid pubescent.

Dry canyons, grasslands; 2000–3800 m. W Sichuan, Xizang [N India, Nepal, Pakistan].

68. *Artemisia leucophylla* C. B. Clarke, Compos. Ind. 162. 1876.

白叶蒿 bai ye hao

Artemisia vulgaris Linnaeus var. *leucophylla* Turczaninow ex Ledebour, Fl. Ross. 2: 586. 1845, nom. illeg. superfl.; *A. leucophylla* f. *luxurians* Pampanini; *A. leucophylla* f. *minuta* Pampanini; *A. leucophylla* var. *pusilla* Pampanini; *A. leucophylla* f. *simplicifolia* Pampanini; *A. leucophylla* f. *tenuisecta* (Regel) Pampanini; *A. mongolica* (Fischer ex Besser) Nakai var. *krascheninnikovii* Pampanini, p.p.; *A. mongolica* var. *leucophylla* (C. B. Clarke) W. Wang & H. T. Ho; *A. obscura* Pampanini var. *rigida* Pampanini; *A. vulgaris* var. *kamtschatica* Besser; *A. vulgaris* var. *minor* Ledebour; *A. vulgaris* var. *tenuisecta* Regel.

Herbs, perennial, 35–70 cm tall, arachnoid pubescent; rhizome creeping, with short branches from upper parts. Leaves abaxially densely gray arachnoid tomentose, adaxially sparsely arachnoid pubescent and gland-dotted. Lower and middle stem leaves: petiole 1–2 cm; lowermost leaf blades elliptic or ovate-elliptic in outline, 5–8 × 4–7 cm, 1- or 2-pinnatipartite or pinnatisect; segments 3(or 4) pairs, variously rhombic, elliptic, or oblong; lobules minute, 5–10 × 4–5 mm. Middle and upper stem leaves smaller, less divided, blade pinnatisect; segments 2 or 3(or 4) pairs; lobes linear-lanceolate, linear, elliptic-lanceolate, or lanceolate, 10–15 × 2–3 mm. Leaflike bracts 3–5-sect or entire. Synflorescence a ± dense narrowly conical panicle. Involucre oblong or ovoid, (2–)2.5–3.5(–4) mm in diam.; phyllaries greenish or violet, arachnoid pubescent. Marginal female florets 5–8. Disk florets 6–13, bisexual. Achenes obovoid. Fl. and fr. Jul–Oct. $2n = 18$.

Slopes, roadsides, forest margins, grasslands, riverbanks, lake-shores; low elevations to 4000 m. Gansu, Guizhou, Hebei, Heilongjiang, Jilin, Liaoning, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shanxi, Sichuan, Xinjiang, Xizang, Yunnan [Korea, Mongolia, Russia (W Siberia)].

69. *Artemisia nujianensis* (Y. Ling & Y. R. Ling) Y. R. Ling, Bull. Bot. Res., Harbin 8(4): 26. 1988.

怒江蒿 nu jiang hao

Artemisia yunnanensis Jeffrey ex Diels var. *nujianensis* Y. Ling & Y. R. Ling, Acta Phytotax. Sin. 18: 505. 1980.

Subshrubs, 10–20 cm tall, gray pubescent. Leaves abaxially densely tomentose, adaxially incanous pubescent. Lower and middle stem leaves: petiole 0.7–1 cm; leaf blade ovate, oblong, or suborbicular, 1–1.5 × 0.8–1 cm, pinnatipartite; segments 1 or 2 pairs, elliptic or oblong, 3–4 × ca. 2 mm, 1- or 2-serrate, apex obtuse. Uppermost leaves and leaflike bracts 3-partite or -cleft, or entire; lobes or entire bracts oblong or elliptic. Synflorescence a lax, broad panicle; branches simple racemes to 10 cm, with sterile lower nodes, with leaflike bracts. Capitula up to 10, well spaced, long pedunculate. Involucre ovoid or subglobose, 2–2.5 mm in diam.; phyllaries densely arachnoid pubescent. Marginal female florets 7–9. Disk florets 10–14, bisexual. Achenes obovoid. Fl. and fr. Jul–Nov.

- River valleys, brushlands; 2200–2300 m. E Xizang, E Yunnan.

70. *Artemisia robusta* (Pampanini) Y. Ling & Y. R. Ling, Bull. Bot. Res., Harbin 8(4): 26. 1988.

粗茎蒿 cu jing hao

Artemisia strongylocephala Pampanini f. *robusta* Pampanini, Nuovo Giorn. Bot. Ital., n.s., 34: 178. 1927.

Subshrubs, 100–130(–200) cm tall, yellowish pubescent. Lower and middle stem leaves: petiole 1–3.5 cm; leaf blade ovate or broadly ovate, 6–22 × 5.5–18 cm, abaxially densely arachnoid pubescent, adaxially sparsely pubescent or glabrescent, gland-dotted, 1(or 2)-pinnatipartite; segments 2 or 3 pairs, elliptic or narrowly elliptic, rarely elliptic-lanceolate, 4–13 × 2–4 cm, rachis winged, 1–5-serrate. Uppermost leaves pinnatipartite; leaflike bracts 3–5-lobed or entire; lobes or entire bracts lanceolate or linear-lanceolate. Synflorescence a broad panicle. Involucre ovoid or ovoid-campanulate, 3.5–5 mm in diam.; phyllaries arachnoid pubescent, glabrescent. Marginal female florets 8–13. Disk florets 13–26, bisexual. Achenes oblong or oblong-ovoid. Fl. and fr. Aug–Oct.

• Slopes, roadsides, shrublands, canyons; 1600–3500 m. W Sichuan, Xizang, NW Yunnan.

71. *Artemisia qinlingensis* Y. Ling & Y. R. Ling, Bull. Bot. Res., Harbin 4(2): 18. 1984.

秦岭蒿 qin ling hao

Herbs, perennial, 80–150 cm tall, yellowish or gray arachnoid tomentose, later sparsely tomentose or glabrescent. Lower and middle stem leaves: petiole 0.5–1.5 cm; leaf blade elliptic, oblong, or ovate-elliptic, 6–8(–10) × 4–6 cm, abaxially densely arachnoid tomentose, adaxially sparsely arachnoid tomentose and gland-dotted, 2-pinnatisect; segments 4–6 pairs, 2.5–3.5 × 1.5–2.5 cm; lobules 3–5 pairs, rachis narrowly winged, deeply serrate, apex obtuse or rounded. Uppermost leaves ovate, 1- or 2-pinnatipartite, 3–5-partite, or entire; bracts minute, linear or linear-lanceolate. Synflorescence a lax, much-branched, broad panicle. Involucre oblong or subovoid, 3–3.5 mm in diam.; phyllaries arachnoid tomentose. Marginal female florets 10–15. Disk florets 15–25, bisexual. Achenes obovoid or ellipsoid-obovoid. Fl. and fr. Jul–Oct.

• Slopes, roadsides, forest margins; 1300–1500 m. E Gansu, SW Henan, S Shaanxi.

72. *Artemisia phyllobotrys* (Handel-Mazzetti) Y. Ling & Y. R. Ling, Bull. Bot. Res., Harbin 8(4): 27. 1988.

叶苞蒿 ye bao hao

Artemisia strongylocephala Pampanini var. *phyllobotrys* Handel-Mazzetti, Acta Horti Gothob. 12: 278. 1938.

Herbs, perennial or nearly subshrubs, 50–100(–150) cm tall, with thick stock, arachnoid pubescent or glabrescent. Lowermost and middle stem leaves ± sessile, sparsely gray arachnoid pubescent adaxially and densely arachnoid tomentose abaxially. Middle leaves oblong-ovate, 2–5.5 × 1–3.5 cm, 2-pinnatisect; segments 2 or 3(?–5) pairs, 10–20 × 5–15 mm; lobules 1 or 2 pairs, elliptic or elliptic-lanceolate, 3–10 × 1.5–3 mm, obtuse apically; rachis narrowly winged. Uppermost leaves

and leaflike bracts 1- or 2-pinnatisect. Synflorescence a narrow or somewhat broad panicle, sometimes quite lax. Involucre oblong or obovoid-oblong, 2–2.5(–3) mm in diam., with obvious leaflike bracts at base; phyllaries gray arachnoid pubescent. Marginal female florets 4–8. Disk florets 10–14, bisexual; corolla purplish or yellow. Achenes obovoid. Fl. and fr. Jul–Oct.

• Alpine steppes, shrublands, waste slopes; 3000–3900 m. S Qinghai, W Sichuan.

73. *Artemisia mongolica* (Fischer ex Besser) Nakai, Bot. Mag. (Tokyo) 31: 112. 1917.

蒙古蒿 meng gu hao

Artemisia vulgaris Linnaeus var. *mongolica* Fischer ex Besser, Tent. Abrot. 53. 1832; *A. mongolica* f. *debilis* Pampanini; *A. mongolica* var. *krascheninnikovii* Pampanini, p.p.; *A. mongolica* subsp. *orientalis* Kitagawa; *A. obscura* Pampanini; *A. obscura* var. *congesta* Pampanini, p.p.; *A. obscura* var. *regina* Pampanini; *A. rubripes* Nakai f. *gracilis* Kitagawa; *A. vulgaris* var. *coarctica* Forbes ex Besser, p.p.; *A. vulgaris* var. *tenuifolia* Turczaninow ex Ledebour, nom. illeg. superfl.

Herbs, perennial, 40–120 cm tall, sparsely arachnoid pubescent. Middle stem leaves: petiole 5–20 mm; leaf blade ovate, suborbicular, or elliptic-ovate, sparsely gray arachnoid pubescent adaxially, densely arachnoid tomentose abaxially, 2-pinnatisect; segments 2 or 3 pairs; lobules lanceolate, linear, or linear-lanceolate, acute apically. Uppermost leaves and leaflike bracts ovate or elliptic-ovate, pinnatisect or 3- or 5-sect. Capitula in ± narrow panicles, ellipsoid, 1.5–2 mm in diam. Phyllaries gray arachnoid pubescent. Marginal female florets 5–10. Disk florets 8–15, bisexual. Achenes obovoid-oblong. Fl. and fr. Aug–Oct. $2n = 16, 18$.

Slopes, shrublands, riverbanks, lakeshores, roadsides, steppes, forest steppes, dry valleys; low elevations to 2000 m. Anhui, N Fujian, Gansu, N Guangdong, Guizhou, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi, Sichuan, Taiwan, Xinjiang [Kazakhstan, Korea, Kyrgyzstan, Russia, Turkmenistan, Uzbekistan].

74. *Artemisia verbenacea* (Komarov) Kitagawa, Lin. Fl. Manshur. 434. 1939.

辽东蒿 liao dong hao

Artemisia vulgaris Linnaeus var. *verbenacea* Komarov, Fl. Manshur. 3: 673. 1907; *A. liaotungensis* Kitagawa; *A. mongolica* (Fischer ex Besser) Nakai var. *verbenacea* (Komarov) Pampanini; *A. obscura* Pampanini var. *congesta* Pampanini, p.p.; *A. princeps* Pampanini var. *candicans* Pampanini.

Herbs, perennial, 30–70 cm tall, with capitate branches, gray arachnoid tomentose, later loosely tomentose or glabrescent. Lowermost and middle stem leaves: petiole 1–2 cm; leaf blade ovate, suborbicular, or broadly ovate; lowermost blade (1.5–)2–4(–6) × 1.5–4 cm, 1- or 2-pinnatipartite, rarely -sect; segments 2 or 3(or 4) pairs; middle blade 2–5 × 2–4 cm, 2-pinnatisect; segments 3(or 4) pairs; lobules elliptic or elliptic-lanceolate, rarely linear-lanceolate, (3–)5–10 × 1.5–2.5 mm, obtuse apically. Uppermost leaves pinnatisect; segments 2 pairs; leaflike bracts 3–5-sect. Capitula dense initially, lax later along

branches in ± narrow panicles, oblong or oblong-ovoid, 2–2.5(–3) mm in diam. Marginal female florets 5–8. Disk florets 8–20, bisexual; corolla limb purple. Achenes oblong or obovoid-ellipsoid. Fl. and fr. Aug–Oct.

• Slopes, roadsides, riverbanks, lakeshores; 2200–3500 m. Gansu, Heilongjiang, Jilin, Liaoning, S Nei Mongol, Ningxia, Qinghai, Shaanxi, Shanxi, Sichuan.

Artemisia verbenacea is used medicinally.

75. *Artemisia rubripes* Nakai, Bot. Mag. (Tokyo) 31: 112. 1917.

红足蒿 hong zu hao

Artemisia mongolica (Fischer ex Besser) Nakai var. *parviflora* (Besser) Kitagawa; *A. mongolica* var. *pseudovulgaris* Pampanini; *A. nipponica* Pampanini var. *rubripes* (Nakai) Pampanini; *A. venusta* Pampanini; *A. vulgaris* Linnaeus var. *maximowiczii* Nakai, p.p.; *A. vulgaris* var. *parviflora* Besser.

Herbs, perennial, 75–180 cm tall, puberulent or glabrescent. Lowermost and middle stem leaves: petiole 5–10 mm or more; leaf blade abaxially densely gray arachnoid tomentose, adaxially ± glabrous. Lowermost leaves suborbicular, 2-pinnatisect. Middle stem leaves ovate, elliptic-ovate, or broadly ovate, 7–13 × 4–10 cm, (1 or)2-pinnatisect; segments 3 or 4 pairs, lanceolate, linear-lanceolate, or linear, 20–40 × 2–6(–10) cm; lobules 2 or 3 pairs, serrate. Uppermost leaves pinnatisect; leaflike bracts 3–5-sect. Capitula closely spaced along branches in ± broad panicles, ellipsoid-ovoid or oblong-ovoid, 1–1.5(–2) mm in diam. Phyllaries arachnoid puberulent or ± glabrescent. Marginal female florets 9–10. Disk florets 12–14, bisexual. Achenes narrowly ovoid. Fl. and fr. Aug–Oct.

Waste areas, grassy slopes, forest steppes, shrublands, roadsides, riverbanks, meadows, forests; low elevations to 1200 m. Anhui, N Fujian, Hebei, Heilongjiang, Jiangsu, N Jiangxi, Jilin, Liaoning, E Nei Mongol, Shandong, Shanxi, Sichuan, Zhejiang [Japan, Korea, Mongolia, Russia].

76. *Artemisia divaricata* (Pampanini) Pampanini, Nuovo Giorn. Bot. Ital., n.s., 46: 560. 1939.

叉枝蒿 cha zhi hao

Artemisia roxburghiana Besser var. *divaricata* Pampanini, Nuovo Giorn. Bot. Ital., n.s., 36: 431. 1930.

Herbs, perennial, 80–120(–150) cm tall, gray pubescent or glabrescent. Leaves pubescent and glabrescent adaxially, densely yellowish pubescent and gray arachnoid tomentose, persistent. Lowermost leaves long petiolate; leaf blade 2-pinnatisect; segments 4 pairs. Middle stem leaves: petiole 1–1.5 cm; leaf blade ovate or elliptic-ovate, 4–5 × 3.5–5 cm, 2-pinnatisect; segments 4(or) 5 pairs, ovate, 15–25 × 5–15 mm; lobules 3 or 4 pairs, elliptic-lanceolate or linear-lanceolate, 10–15(–2) × 1.5–2.5 mm. Uppermost leaves 1- or 2-pinnatisect; leaflike bracts pinnatisect. Capitula in broad, much-branched panicles, oblong or oblong-ovoid, 1.5–2 mm in diam. Marginal female florets 3–5. Disk florets 4–8, bisexual. Achenes oblong or ellipsoid. Fl. and fr. Aug–Oct.

• Hills, slopes, roadsides; 2000–3400 m. W Hubei, N and W Sichuan, W Yunnan.

77. *Artemisia indica* Willdenow, Sp. Pl. 3: 1846. 1803.

五月艾 wu yue ai

Herbs, perennial, or subshrubs, 80–150 cm tall, much branched, sparsely puberulent or glabrescent. Leaves shortly petiolate or ± sessile; leaf blade abaxially densely gray arachnoid tomentose, adaxially gray or yellowish tomentose or glabrescent. Lowermost leaves ovate or oblong-ovate, 6–12 × 3–8 cm, (1 or)2-pinnatipartite; distal lobes larger; segments 3 or 4 pairs, winged at midvein. Middle stem leaves ovate, oblong-ovate, or elliptic, 5–8 × 3–5 cm, (1 or)2-pinnatipartite; segments 3(or) 4 pairs; distal lobe larger; lobes elliptic-lanceolate, linear-lanceolate, or linear, 10–20 × 3–5 mm; lobules deeply serrate, acute or acuminate apically. Uppermost leaves pinnatipartite; leaflike bracts 3-lobed or entire. Capitula sessile or inconspicuously pedunculate, ± erect, remote in broadly conical, almost leafless panicle with obliquely spreading, up to 18 cm long branches. Involucre ovoid, oblong-ovoid, or broadly ovoid, 3–4 × ca. 2 mm; phyllaries puberulent to glabrous. Florets 15–20, yellowish, all fertile. Marginal female florets 4–10; corolla tubular, ± glandular, 2-toothed. Disk florets 8–12, bisexual, basally glandular. Achenes brown, oblong or obovoid, ca. 1.25 mm. Fl. and fr. Aug–Oct.

Roadsides, forest margins, slopes, shrublands; low elevations to 2000 m. Anhui, Fujian, S Gansu, Guangdong, Guangxi, Guizhou, Hainan, S Hebei, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, SE Nei Mongol, S Shaanxi, Shandong, Shanxi, Sichuan, Taiwan, SE Xizang, Yunnan, Zhejiang [India, Indonesia, Japan, Korea, Myanmar, Philippines, N Thailand, Vietnam; North and Central America, Oceania].

- 1a. Branches 10–15(–20) cm; leaves densely arachnoid tomentose, lobules acute apically, midvein narrowly winged 77a. var. *indica*
- 1b. Branches 15–25 cm; leaves sparsely arachnoid tomentose or glabrescent abaxially, lobules acuminate or mucronulate apically, midvein winged 77b. var. *elegantissima*

77a. *Artemisia indica* var. *indica*

五月艾(原变种) wu yue ai (yuan bian zhong)

Absinthium moxa Besser; *Artemisia asiatica* Nakai ex Pampanini; *A. dubia* Wallich ex Besser f. *communis* Pampanini; *A. dubia* var. *compacta* Pampanini; *A. dubia* f. *congesta* Pampanini; *A. dubia* var. *gracilis* Pampanini; *A. dubia* var. *grata* (Wallich ex Besser) Pampanini; *A. dubia* f. *leptostachya* (Candolle) Pampanini; *A. dubia* var. *multiflora* (Wallich ex Besser) Pampanini; *A. dubia* var. *orientalis* Pampanini, p.p.; *A. dubia* var. *septentrionalis* Pampanini; *A. grata* Wallich ex Besser; *A. indica* var. *heyneana* Wallich ex Besser; *A. indica* var. *multiflora* Wallich ex Besser; *A. indica* var. *nepalensis* Besser; *A. leptophylla* D. Don; *A. leptostachya* Candolle; *A. longiflora* Pampanini; *A. nilagirica* (C. B. Clarke) Pampanini f. *lobata* Pampanini; *A. pleiocephala* Pampanini var. *grandis* Pampanini; *A. princeps* Pampanini var. *orientalis* (Pampanini) H. Hara; *A. vulgaris* Linnaeus var. *indica* (Willdenow) Maximowicz; *A. vulgaris* var. *vulgatissima* Besser, p.p.; *A. wallichiana* Besser.

Branches 10–15(–20) cm. Leaves abaxially densely arach-

noid tomentose; lobules acute apically, narrowly winged at midvein. Capitula in broad or somewhat broad panicles.

Roadsides, forest margins, slopes, shrublands; low to middle elevations. Anhui, Fujian, S Gansu, Guangdong, Guangxi, Guizhou, Hainan, S Hebei, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, SE Nei Mongol, S Shaanxi, Shandong, Shanxi, Sichuan, Taiwan, SE Xizang, Yunnan, Zhejiang [India, Indonesia, Japan, Korea, Myanmar, Philippines, N Thailand, Vietnam; North and Central America, Oceania].

Material from SE Asia formerly included within *Artemisia dubia* belongs to *A. indica* var. *indica*.

Artemisia indica var. *indica* is used medicinally; in particular, the root is used for a tonic for the kidneys.

77b. *Artemisia indica* var. *elegantissima* (Pampanini) Y. R. Ling & Humphries, Bull. Bot. Res., Harbin 8(3): 29. 1988.

雅致艾 ya zhi ai

Artemisia elegantissima Pampanini, Nuovo Giorn. Bot. Ital., n.s., 33: 454. 1926.

Branches 15–25 cm. Leaves abaxially sparsely tomentose or glabrescent; lobules acuminate apically, winged at midvein. Capitula in broad panicles.

Slopes; middle to high elevations. SE Xizang [N India].

78. *Artemisia princeps* Pampanini, Nuovo Giorn. Bot. Ital., n.s., 36: 444. 1930.

魁蒿 kui hao

Artemisia montana (Nakai) Pampanini f. *occidentalis* Pampanini; *A. parvula* Pampanini; *A. vulgaris* Linnaeus var. *maximoviczii* Nakai, p.p.; *A. vulgaris* f. *nipponica* Nakai.

Herbs, perennial, 60–150 cm tall, sparsely arachnoid puberulent or glabrescent. Leaves densely arachnoid tomentose abaxially. Lowermost leaves long petiolate; leaf blade ovate or elliptic-ovate, 1- or 2-pinnatipartite; segments 2 pairs, oblong or oblong-elliptic. Middle stem leaves: petiole 1–2(–3) cm; leaf blade ovate or ovate-elliptic, 6–12 × 4–8 cm, pinnatipartite, rarely -sect; segments 2(or 3) pairs, elliptic-lanceolate or elliptic; distal lobe and lobules of lateral lobes larger, obtuse apically. Uppermost leaves pinnatipartite; leaflike bracts 3-lobed or entire. Capitula in somewhat broad panicles, oblong or oblong-ovoid, 1.5–2.5 mm in diam. Phyllaries sparsely arachnoid puberulent. Marginal female florets 5–7. Disk florets 4–9, bisexual. Fr. Jul–Nov. $2n = 34$.

Roadsides, slopes, shrublands, forest margins, valleys, riverbanks; below 100–1400 m. Anhui, S Gansu, Guangdong, Guangxi, Guizhou, S Hebei, Henan, Hubei, Hunan, Jiangsu, Jiangxi, S Liaoning, SE Nei Mongol, S Shaanxi, Shandong, S Shanxi, Sichuan, Taiwan, Yunnan [Japan, Korea].

Artemisia princeps is used medicinally.

79. *Artemisia occidentalisinensis* Y. R. Ling, Bull. Bot. Res., Harbin 8(3): 2. 1988 [*“occidentali-sinensis”*].

华西蒿 hua xi hao

Herbs, perennial, 100–150 cm tall; rhizome short, thick;

stem often solitary, branches many, 20–30 cm, subglabrous. Lower and middle stem leaves: petiole 2–10 mm; leaf blade elliptic-ovate, 4–9 × 2.5–4 cm, yellow or brown gland-dotted, 1–3-pinnatipartite or -sect; segments 4 or 5 pairs; lobes or lobules linear or linear-lanceolate or serrate, 5–25(–35) × 2.5–5 mm, base attenuate, margin revolute, acuminate apically; rachis narrowly winged. Uppermost leaves pinnatipartite or -sect; leaflike bracts pinnatipartite or entire. Synflorescence a broad panicle; ultimate branches with up to 8 capitula. Capitula solitary or in groups of 3 or 4, sessile. Involucre ellipsoid or oblong-campulate, 2–3 mm in diam.; phyllaries initially puberulent, glabrescent. Marginal female florets 6–8. Disk florets 10–20, bisexual. Achenes obovoid. Fl. and fr. Aug–Oct.

• Slopes, roadsides; middle to high elevations. W Sichuan, Xizang.

- 1a. Middle stem leaves 1- or 2-pinnatipartite, lobules 8–25(–35) × 2.5–3.5 mm, margin entire 79a. var. *occidentalisinensis*
 1b. Middle stem leaves 2- or 3-pinnatipartite, lobules 5–10 × 4–5 mm, margin serrate 79b. var. *denticulata*

79a. *Artemisia occidentalisinensis* var. *occidentalisinensis*

华西蒿(原变种) hua xi hao (yuan bian zhong)

Middle stem leaves 1- or 2-pinnatipartite; lobules linear or linear-lanceolate, 8–25(–35) × 2.5–3.5 mm, margin entire.

• Slopes, roadsides; middle to high elevations. Xizang.

79b. *Artemisia occidentalisinensis* var. *denticulata* Y. R. Ling, Bull. Bot. Res., Harbin 8(3): 3. 1988.

齿裂华西蒿 chi lie hua xi hao

Middle stem leaves 2- or 3-pinnatipartite; lobules lanceolate, 5–10 × 4–5 mm, margin serrate.

• Middle to high elevations. W Sichuan, E Xizang.

80. *Artemisia incisa* Pampanini, Nuovo Giorn. Bot. Ital., n.s., 33: 456. 1926.

尖裂叶蒿 jian lie ye hao

Artemisia nuristanica Kitamura.

Herbs, perennial, 100–150 cm tall, pubescent, sometimes glabrescent. Lower and middle stem leaves: petiole 3–10 mm; leaf blade ovate or elliptic-ovate, (7–)14–18(–20) × (5–)6–10 cm, abaxially densely to sparsely grayish green arachnoid pubescent, adaxially green with sparse T-shaped hairs, (1 or)2-pinnatipartite to pinnatisect; segments 3–5 pairs, elliptic or oblong, 4–6 × 2–3.5 cm, sharply acute; lobules 3 or 4 pairs, base attenuate, 2- or 3-serrate at margin; rachis winged. Uppermost leaves and leaflike bracts pinnatipartite or -cleft. Synflorescence a narrow to broad panicle, 10–25 × 5–10 cm; branches obliquely patent to ascending, up to 25 cm. Capitula ± remote to approximate near branch apices, shortly pedunculate to sessile. Involucre ellipsoid or ellipsoid-ovoid, 2–3 mm in diam. Marginal

female florets 3 or 4[–8]. Disk florets 7–9(–12), bisexual. Achenes obovoid. Fl. and fr. Aug–Oct. $2n = 16$.

Middle to high elevations. S Xizang [Afghanistan, India, Kashmir, Nepal, N Pakistan].

81. *Artemisia igniaria* Maximowicz, Mém. Acad. Imp. Sci. St.-Petersbourg Divers Savans 9: 161. 1859.

歧茎蒿 qi jing hao

Artemisia princeps Pampanini f. *dentata* Pampanini; *A. princeps* f. *dissecta* Pampanini; *A. princeps* subf. *purpurascens* Pampanini.

Subshrubs, 60–120(–150) cm tall, gray tomentose or later sparsely tomentose. Middle stem leaves: petiole 5–15 mm; leaf blade ovate or broadly ovate, 6–12 × 4–10 cm, abaxially densely tomentose, adaxially gray tomentose or glabrescent, 1- or 2-pinnatifid; segments 2 or 3 pairs, elliptic or oblong, 3–5(–6) × 2–3 cm; lobules (2 or)3(or 4) pairs, apex mucronulate. Uppermost leaves 3-partite or entire; leaflike bracts elliptic, entire. Synflorescence a ± broad panicle. Involucre ellipsoid or ovoid, 2.5–3.5 mm in diam.; phyllaries gray arachnoid tomentose. Marginal female florets 5–8. Disk florets 7–14, bisexual. Achenes oblong. Fl. and fr. Aug–Nov.

• Slopes, forest margins, steppes, shrublands, roadsides; below 100 m. Hebei, Heilongjiang, Henan, Jilin, Liaoning, E and S Nei Mongol, Ningxia, Shaanxi, Shandong, Shanxi.

82. *Artemisia nilagirica* (C. B. Clarke) Pampanini, Nuovo Giorn. Bot. Ital., n.s., 33: 452. 1926.

南亚蒿 nan ya hao

Artemisia vulgaris Linnaeus var. *nilagirica* C. B. Clarke, Compos. Ind. 162. 1876.

Herbs, perennial, 20–60 cm tall, puberulent or glabrescent. Middle stem leaves ± sessile; leaf blade ovate or elliptic-ovate, 5–6 × 3–5 cm abaxially densely gray tomentose, pinnatifid; segments 1–3 pairs, ovate or oblong-ovate, usually 1- or 2-serrate, acuminate apically. Uppermost leaves and leaflike bracts oblong-ovate, few serrate. Synflorescence a broad panicle. Involucre ovoid or ovoid-campanulate, 1–2 mm in diam.; phyllaries puberulent. Marginal female florets 3 or 4. Disk florets 4–8, bisexual. Achenes obovoid. Fl. and fr. Aug–Oct. $2n = 18, 54$.

Slopes; middle elevations. SW Sichuan, SE Xizang [N India, N Myanmar].

83. *Artemisia integrifolia* Linnaeus, Sp. Pl. 2: 848. 1753.

柳叶蒿 liu ye hao

Artemisia integrifolia f. *bothnhoifii* Pampanini; *A. integrifolia* f. *suzievii* Pampanini; *A. integrifolia* f. *transiens* Pampanini; *A. komarovii* Poljakov; *A. mongolica* (Fischer ex Besser) Nakai var. *interposita* Kitagawa; *A. quadriauriculata* F. H. Chen; *A. vulgaris* Linnaeus var. *integrifolia* (Linnaeus) Ledebour.

Herbs, perennial, 50–120 cm tall, arachnoid puberulent. Leaves abaxially densely tomentose, adaxially incanous puberulent or glabrescent, sessile. Lowermost leaves ovate or elliptic, rarely broadly ovate, margin few serrate. Middle stem leaves

elliptic, elliptic-lanceolate, or linear-lanceolate, 4–7 × 1.5–2.5(–3) cm, base attenuate, margin 1–3-serrate, apex acuminate. Uppermost leaves elliptic or lanceolate, entire, rarely few serrate. Synflorescence a narrow panicle. Involucre elliptic or oblong, (2.5–)3–4 mm in diam.; phyllaries sparsely puberulent. Marginal female florets 10–15. Disk florets 20–30, bisexual. Achenes obovoid or oblong. Fl. and fr. Aug–Oct. $2n = 18, 36$.

Forest margins, roadsides, riverbanks, steppes, meadows, forest steppes, shrublands; low to middle elevations. Hebei, Heilongjiang, Jilin, Liaoning, E Nei Mongol [Korea, Mongolia, Russia].

84. *Artemisia subulata* Nakai, Bot. Mag. (Tokyo) 29: 8. 1915.

线叶蒿 xian ye hao

Artemisia integrifolia Linnaeus var. *subulata* (Nakai) Pampanini; *A. stenophylla* Kitamura, p.p.

Herbs, perennial, 45–80 cm tall, arachnoid pubescent or glabrescent, with capitate branches. Leaves sessile. Lowermost leaves oblanceolate or oblanceolate-linear, 8–13 × 0.5–0.8 cm, entire or 1- or 2-serrate. Middle stem leaves: blade linear, linear-lanceolate, or falcate, 5–10 × 0.3–0.6 mm, abaxially densely arachnoid tomentose, margin entire or occasionally 1- or 2-serrate, apex obtuse. Uppermost leaves and leaflike bracts linear. Synflorescence a narrow, racemelike panicle. Involucre oblong or ovoid-oblong, 2–3 mm in diam. Marginal female florets 10 or 11. Disk florets 10–15, bisexual. Achenes oblong-ovoid or ellipsoid. Fl. and fr. Aug–Oct.

Humid and semihumid slopes, forest margins, riverbanks, meadows; low elevations. N Hebei, Heilongjiang, Jilin, Liaoning, E and SE Nei Mongol, N Shanxi [Japan, Korea, E Russia].

85. *Artemisia brachyphylla* Kitamura, Acta Phytotax. Geobot. 5: 97. 1936.

高岭蒿 gao ling hao

Artemisia koidzumii Nakai var. *manchurica* Pampanini, p.p.; *A. pronutans* Kitagawa.

Herbs, perennial, 30–70 cm tall, densely gray arachnoid pubescent. Leaves ± sessile. Lowermost leaves ovate-elliptic or ovate-oblong in outline, 2-pinnatifid. Middle stem leaves: leaf blade elliptic or oblong, 4.5–6.5 × 3.5–4.5 cm, abaxially densely gray tomentose, adaxially sparsely arachnoid pubescent, 1(or 2)-pinnatifid; segments (2 or)3 or 4 pairs, elliptic, 1–1.5 × 0.3–0.5 cm, base attenuate; lobules narrow, 0.5–2(–3) mm wide, occasionally 1- or 2-serrate, apex acuminate. Uppermost leaves and leaflike bracts 3- or 5-partite or entire. Synflorescence a narrow panicle. Involucre subglobose or broadly globose, 2.5–4 mm in diam.; phyllaries arachnoid pubescent. Marginal female florets 4–6. Disk florets 6–10, bisexual. Achenes obovoid or oblong-obovoid. Fl. and fr. Aug–Oct.

Subalpine meadows, forest steppes, rocky slopes, forest margins, roadsides, shrublands; ca. 1100 m. E Jilin [Korea].

86. *Artemisia viridisquama* Kitamura, Acta Phytotax. Geobot. 12: 148. 1943.

绿苞蒿 lu bao hao

Herbs, perennial, 80–200 cm tall, pubescent. Middle stem and upper leaves ± sessile; leaf blade elliptic-ovate or ovate, 6–12 × 4–10 cm, abaxially white tomentose, 1 (or 2)-pinnatipartite; segments 1 or 2 pairs, 3-partite or entire; lobules or lobes linear-lanceolate, 45–80 × 4–6 mm, acuminate apically. Leaf-like bracts linear-lanceolate. Synflorescence a broad panicle. Capitula shortly pedunculate. Involucre ovoid-campanulate, 1.5–2 mm in diam.; phyllaries sparsely arachnoid tomentose. Marginal female florets 3–8. Disk florets 8–15, bisexual. Achenes ellipsoid. Fl. and fr. Aug–Oct.

• Slopes, roadsides; low elevations. S Gansu, Hebei, Shanxi, Sichuan.

87. *Artemisia viridissima* (Komarov) Pampanini, *Nuovo Giorn. Bot. Ital.*, n.s., 36: 484. 1930.

林艾蒿 lin ai hao

Artemisia vulgaris Linnaeus var. *viridissima* Komarov, *Fl. Manshur.* 3: 673. 1907; *A. viridissima* var. *japonica* Pampanini.

Herbs, perennial, 80–140 cm tall, with capitate branches. Leaves puberulent or glabrescent, ± sessile. Lowermost and middle stem leaves elliptic-lanceolate or lanceolate, 8–13 × 2–3 cm, base attenuate, margin serrulate, apex acuminate. Uppermost leaves and leaflike bracts elliptic or linear-lanceolate. Synflorescence a narrow panicle. Involucre ovoid or ovoid-campanulate, 2–3 mm in diam. Marginal female florets 3–5. Disk florets 8–12, bisexual. Achenes obovoid or ovoid. Fl. and fr. Jul–Oct.

Forest margins, roadsides; 1400–1700 m. Jilin, Liaoning [Korea].

88. *Artemisia tafelii* Mattfeld, *Repert. Spec. Nov. Regni Veg.* 22: 244. 1926.

波密蒿 bo mi hao

Artemisia lagocephala (Fischer ex Besser) Candolle var. *tafelii* (Mattfeld) Pampanini.

Herbs, perennial, 40–60 cm tall, sericeous-puberulent, later ± glabrescent. Leaves ± sessile. Lowermost leaves obovate, pinnatipartite. Middle stem leaves obovate or obovate-triangular, 7–9 × 4–5 cm, obliquely 3–5-partite from apex to center; segments oblong or elliptic, 20–40 × 5–10 mm, base attenuate, margin 1- or 2-serrate. Uppermost leaves obovate-elliptic, obliquely 3-partite or entire; leaflike bracts obovate-lanceolate or lanceolate. Synflorescence a lax, broad panicle. Involucre hemispheric or campanulate, 4–5 mm in diam. Marginal female florets 5–10. Disk florets 10–25, bisexual. Achenes obovoid or ovoid. Fl. and fr. Jul–Oct.

• Shrublands; ca. 3600 m. E Xizang.

89. *Artemisia montana* (Nakai) Pampanini, *Nuovo Giorn. Bot. Ital.*, n.s., 36: 461. 1930.

山地蒿 shan di hao

Artemisia vulgaris Linnaeus f. *montana* Nakai, *Bot. Mag. (Tokyo)* 26: 104. 1912; *A. gigantea* Kitamura; *A. montana* var. *latiloba* Pampanini.

Herbs, perennial, 150–200 cm tall, from creeping rhi-

zomes, gray pubescent, glabrescent. Basal leaves withering before anthesis. Middle stem leaves: petiole 2.5–3 cm; leaf blade ovate, 13–19 × 4–12 cm, abaxially gray tomentose, adaxially thinly arachnoid, glabrescent; pinnatipartite, segments 2 or 3 pairs, oblong or oblong-lanceolate; distal lobes larger, base attenuate, entire or occasionally few serrate. Uppermost leaves and leaflike bracts lanceolate, 3-cleft or entire. Synflorescence a large, often rather narrow, panicle, main branches usually ascending; ultimate branches short, secund, without bracts. Involucre oblong, 2.5–3 mm in diam.; outer phyllaries arachnoid tomentose. Marginal female florets 4–6; corolla apex lacerate. Disk florets 8–14, bisexual. Achene obovoid, 1.5–2 mm. $2n = 51-54$.

Roadsides, shrublands, forest margins, wet meadows, riverside forests; 300–2800 m. Anhui, Hunan, Jiangxi [Japan, E Russia].

“*Artemisia montana* Schlechtendal” (Ledebour, *Fl. Ross.* 2: 591. 1845) is merely a herbarium name cited as a synonym and was therefore not validly published (*Vienna Code*, Art. 34.1(c)).

90. *Artemisia moorcroftiana* Wallich ex Candolle, *Prodr.* 6: 117. 1838.

小球花蒿 xiao qiu hua hao

Artemisia moorcroftiana var. *campanulata* Pampanini; *A. moorcroftiana* f. *tenuifolia* Pampanini.

Subshrubs, 50–70 cm tall; rootstock horizontally creeping, ca. 1 cm thick, woody; stems several, with capitate branches, most parts sparsely ± arachnoid gray or yellowish pubescent or glabrescent. Lower and middle stem leaves: petiole 1–3 cm; leaf blade oblong, ovate, or elliptic, 5–10 × 2–3(–4.5) cm, abaxially densely gray or yellowish tomentose, adaxially sparsely tomentose, 2- or 3-pinnatisect or partite; segments (4 or) 5 or 6 pairs, ovate or elliptic-ovate; lobules lanceolate or linear-lanceolate, margin few serrate, apex acuminate; rachis narrowly winged. Uppermost leaves pinnatipartite; leaflike bracts 3–5-partite or entire. Synflorescence a narrowly cylindrical interrupted, racemelike panicle, 15–20 × 1.5–2.5 cm; branches 2–3 cm, erect to somewhat appressed spicate. Capitula sessile. Involucre globose or hemispheric, 4–6 mm in diam.; outer phyllaries purplish, sparsely pubescent, margin not hyaline scarious, apex acute. Receptacle ± convex, glabrous. Florets purplish. Marginal female florets 15–20; corolla linear-tubular, glandular, 2-toothed. Disk florets bisexual 30–35; corolla clavate-tubular, base glandular, apex very sparsely hairy. Achene brown, ± cylindrical, ca. 1.75 mm. Fl. and fr. Jul–Oct. $2n = 18$.

Slopes, terraces, valleys, rocky hills, subalpine steppes, subalpine meadows; 2000–5300 m. Gansu, Ningxia, Qinghai, W Sichuan, Xizang, NW Yunnan [Bhutan, India, N Pakistan].

91. *Artemisia abaensis* Y. R. Ling & S. Y. Zhao, *Bull. Bot. Res.*, Harbin 5(2): 4. 1985.

阿坝蒿 a ba hao

Herbs, perennial, 100 cm tall or more, gray and yellowish villous and tomentose. Middle stem leaves: petiole 3–5 mm; leaf blade oblong-ovate or elliptic, 6–8 × 3.5–4.5 cm, sparsely arachnoid pubescent and gland-dotted adaxially, densely gray

arachnoid tomentose, 2-pinnatisect; segments (4 or)5 or 6 pairs, elliptic; lobules 2 or 3 pairs or deeply serrate; distal lobules longer, 5–12 × 2–4 mm; rachis narrowly winged. Uppermost leaves 1- or 2-pinnatifid; leaflike bracts pinnatifid, 3-partite, or entire. Capitula in broad, much-branched panicles, oblong or oblong-ovoid, 1.5–2 mm in diam. Phyllaries sparsely arachnoid pubescent. Marginal female florets 2–5. Disk florets 4–8, bisexual. Achene obovoid. Fl. and fr. Aug–Oct.

• Lakeshores, valleys, roadsides; middle to high elevations. SW Gansu, W Sichuan, E Qinghai.

92. *Artemisia tainingensis* Handel-Mazzetti, Acta Horti Gothob. 12: 277. 1938.

川藏蒿 chuan zang hao

Herbs, perennial, 15–30 cm tall, white tomentose or glabrous. Lowermost and middle stem leaves: petiole 1–2 cm; leaf blade elliptic, 1.5–3.5 × 1.2–1.8 cm, white tomentose or glabrous, 2-pinnatisect; segments 4 or 5(or 6) pairs, elliptic or elliptic-ovate, 10–15 × 5–10 mm; lobules elliptic or elliptic-lanceolate, (2–)5–8 × 0.5–1.3 mm; rachis narrowly winged. Uppermost leaves and leaflike bracts ovate, 1- or 2-pinnatisect or -partite. Capitula in narrow panicles, campanulate or ovoid-campanulate, 3–4(–4.5) mm in diam. Phyllaries brown, white tomentose. Marginal female florets 13–16. Disk florets 20, bisexual. Achene obovoid. Fl. and fr. Jul–Oct.

Rocky slopes, terraces; 3300–5300 m. Hubei, S Qinghai, W Sichuan, Xizang [N India].

- 1a. Stem, branches, leaves, and phyllaries white tomentose 92a. var. *tainingensis*
 1b. Stem, branches, and leaves glabrous, phyllaries sparsely tomentose 92b. var. *nitida*

92a. *Artemisia tainingensis* var. *tainingensis*

川藏蒿(原变种) chuan zang hao (yuan bian zhong)

Artemisia campbellii J. D. Hooker & Thomson ex C. B. Clarke var. *limprichtii* Pampanini.

Stem, branches, leaves, and phyllaries white tomentose.

• Rocky slopes; 3300–4000 m. Hubei, S Qinghai, W Sichuan, E Xizang.

92b. *Artemisia tainingensis* var. *nitida* (Pampanini) Y. R. Ling, Bull. Bot. Res., Harbin 8(4): 33. 1988.

无毛川藏蒿 wu mao chuan zang hao

Artemisia moorcroftiana Wallich ex Candolle f. *nitida* Pampanini, Nuovo Giorn. Bot. Ital., n.s., 34: 681. 1927; *A. moorcroftiana* var. *nitida* (Pampanini) Y. Ling & Y. R. Ling.

Stem, branches, and leaves glabrous. Phyllaries sparsely tomentose.

Terraces, rocky slopes; 4100–5300 m. C and W Xizang [N India].

93. *Artemisia orientalizangensis* Y. R. Ling & Humphries, Bull. Bot. Res., Harbin 10(1): 19. 1990 [*“orientali-xizangensis”*].

昌都蒿 chang du hao

Herbs, perennial, 30–40 cm tall, gray puberulent, later glabrescent. Lowermost leaves suborbicular or oblong, 1.5–2 × 1–1.5 cm, 2- or 3-pinnatisect. Lower and middle stem leaves: petiole 0.4–0.7 cm; leaf blade suborbicular or oblong-ovate, 2–2.5 × 0.5–1.5 cm, 2(or 3)-pinnatisect; segments 4 or 5 pairs, oblong-ovate or elliptic, 5–8 × 4–6 mm; lobules elliptic, 3–4 × 1.5–2 mm; rachis narrowly winged. Uppermost leaves and leaflike bracts sessile, 1- or 2-pinnatisect. Synflorescence a dense, narrow, spikelike panicle. Involucre ovoid or subglobose, 1.5–2.5 mm in diam.; phyllaries ± glabrous. Marginal female florets 3–5. Disk florets 5–10, bisexual. Achenes ovoid or obovoid. Fl. and fr. Aug–Oct.

• Slopes, roadsides; middle elevations. E and SE Xizang.

94. *Artemisia campbellii* J. D. Hooker & Thomson ex C. B. Clarke, Compos. Ind. 164. 1876.

绒毛蒿 rong mao hao

Subshrubs, 20–35 cm tall, densely yellowish or gray tomentose, foetid. Lower stem leaves: petiole 5–15 mm; leaf blade ovate, 2.5–4 × 1.5–2.5 cm, 2(or 3)-pinnatisect; segments 3–5 pairs, 5–15 × 3–5 mm; lobules lanceolate or linear-lanceolate, 3–5 × 0.5–1 mm. Middle stem and upper leaves sessile; leaf blade ovate, 2–3 × 1.5–2.5 cm, abaxially densely gray or yellowish tomentose, adaxially glabrescent, 1- or 2-pinnatisect; segments 3 or 4 pairs; lobules linear or linear-lanceolate. Leaflike bracts 3–5-sect or entire. Synflorescence a dense, narrow panicle. Involucre hemispheric, 3–4(–5) mm in diam.; phyllaries densely pubescent, margin brown. Marginal female florets 8–10. Disk florets 15–18, bisexual. Achenes oblong or obovoid. Fl. and fr. Jul–Nov.

Dry slopes, shrublands; 3800–5300 m. Qinghai, W Sichuan, E Xizang [Bhutan, India, N Pakistan].

95. *Artemisia youngii* Y. R. Ling, Bull. Bot. Res., Harbin 8(3): 4. 1988.

高原蒿 gao yuan hao

Herbs, perennial, 30–50 cm tall, gray puberulent, capitately branched. Lower and middle stem leaves: petiole 0.5–1.5 cm; leaf blade elliptic or oblong-elliptic, 3–4 × 1.5–2 cm, abaxially densely gray pubescent, 2- or 3-pinnatisect; segments 5 or 6(or 7) pairs, elliptic; lobules 2 or 3 pairs, elliptic-lanceolate or linear-lanceolate, 3–5 × ca. 1.5 mm, rachis narrowly winged, occasionally few serrate. Uppermost leaves and leaflike bracts elliptic-ovate, 1- or 2-pinnatisect. Synflorescence a dense, narrow panicle. Involucre hemispheric or ovoid, 3–4 mm in diam.; phyllaries puberulent. Marginal female florets 8–14. Disk florets 10–20, bisexual. Achenes oblong-ovoid or obovoid. Fl. and fr. Aug–Oct.

• Slopes, roadsides; middle to high elevations. SE Qinghai, E Xizang.

96. *Artemisia jilongensis* Y. R. Ling & Humphries, Bull. Bot. Res., Harbin 10(1): 18. 1990.

吉隆蒿 ji long hao

Herbs, perennial, 30–40 cm tall, sparsely gray or yellowish tomentose. Lowermost and middle stem leaves: petiole 1.5–2

cm; leaf blade oblong, 2–3 × 1.5–2.5 cm, 2-pinnatisect; segments 4 or 5 pairs; lobules linear-lanceolate, 5–8 × 1.5–2 mm. Uppermost leaves and leaflike bracts (1 or) 2-pinnatisect. Capitula in narrow panicles, ovoid, 2–3 mm in diam. Phyllaries sparsely yellowish tomentose. Marginal female florets 3–8. Disk florets 14–18, bisexual. Achene obovoid or oblong. Fl. and fr. Aug–Oct.

- Slopes; ca. 4200 m. S and SW Xizang.

97. *Artemisia comaiensis* Y. Ling & Y. R. Ling, Bull. Bot. Res., Harbin 8(3): 3. 1988.

高山矮蒿 gao shan ai hao

Herbs, perennial, dwarf, caespitose, 8–30 cm tall, gray or yellowish sericeous-pubescent. Lower and middle stem leaves: petiole 1–1.5 cm; leaf blade oblong, elliptic, or oblong-ovate, 1.5–3.5 × 0.5–2 cm, yellowish pubescent, 2- or 3-pinnatisect; segments 4 or 5 (or 6) pairs, elliptic or oblong-ovate, 5–15 × 3–10 mm, pinnatipartite or 3-lobed; lobules elliptic or elliptic-lanceolate; rachis narrowly winged. Uppermost leaves and leaflike bracts 1- or 2-pinnatisect. Synflorescence a narrow panicle. Capitula 2–4, sessile. Involucre hemispheric or subglobose, 3–4 mm in diam.; phyllaries densely brown-yellow tomentose. Marginal female florets 8–13. Disk florets 18–20, bisexual. Achenes obovoid. Fl. and fr. Aug–Oct.

- Alpine steppes, slopes, roadsides; 4000–5000 m. W Sichuan, E Xizang.

98. *Artemisia orientalihengduangensis* Y. Ling & Y. R. Ling, Bull. Bot. Res., Harbin 8(4): 34. 1988 [*“orientali-hengduangensis”*].

东方蒿 dong fang hao

Artemisia roxburghiana Besser var. *orientalis* Pampanini, Nuovo Giorn. Bot. Ital., n.s., 36: 430. 1930; *A. roxburghiana* f. *angustisecta* Pampanini.

Herbs, perennial, 30–70 cm tall, gray tomentose, later sparsely tomentose. Lowermost leaves: petiole 5–15(–20) mm; leaf blade oblong or ovate-elliptic, 2.5–5.5 × 2–3.5 cm, sparsely pubescent abaxially, densely yellowish tomentose and veins pubescent abaxially, 1- or 2-pinnatisect; segments 4 or 5 pairs, distal and upper lobes longer than basal lobes, upper lobes elliptic or oblong, 10–20 × 5–10 mm, lobulate or serrate; lobules 1 or 2 pairs, 3–5 × 1–3 mm. Middle stem leaves ± sessile; leaf blade oblong or obovate-oblong, 3–5.5 × 2–3 cm, pinnatipartite or -subsect; segments 4 or 5 pairs, elliptic or oblong, 5–15(–20) × 3–8 mm; rachis narrowly winged. Uppermost leaves and leaflike bracts 3–7-lobed; lobes lanceolate or linear-lanceolate. Capitula in narrow panicles, broadly ovoid or oblong, 3.5–4 mm in diam., sessile. Phyllaries gray or yellowish arachnoid tomentose. Marginal female florets 5–9. Disk florets 8–15, bisexual. Achene oblong or ovoid-oblong. Fl. and fr. Jul–Sep.

- Slopes, roadsides, grasslands; 2300–3200 m. Sichuan, Yunnan [N Myanmar].

Artemisia orientalihengduangensis is used medicinally.

99. *Artemisia imponens* Pampanini, Nuovo Giorn. Bot. Ital., n.s., 36: 424. 1930.

锈苞蒿 xiu bao hao

Herbs, perennial, 70–100 cm tall, sparsely yellowish or rust-colored pubescent or glabrescent. Lowermost leaves sessile; leaf blade ovate or broadly ovate, 2- or 3-pinnatisect. Middle stem leaves: leaf blade ovate or oblong, 5–7 × 4–6 cm, abaxially densely gray tomentose, adaxially sparsely sericeous-pubescent and white glandular punctuate, 2 (or 3)-pinnatisect; segments 4 or 5 pairs; lobules lanceolate or linear-lanceolate, 10–15 × 1.5–3 mm, rachis narrowly winged, margin revolute, apex acute and mucronulate. Uppermost leaves 1 (or 2)-pinnatisect; leaflike bracts pinnatisect, 5-lobed, or entire, latter lanceolate or linear-lanceolate. Synflorescence a somewhat long and broad panicle. Capitula sessile. Involucre hemispheric or subovoid, 3–4(–5) mm in diam.; phyllaries densely rust-colored tomentose. Marginal female florets 8–10. Disk florets 10–30, bisexual. Achenes oblong. Fl. and fr. Aug–Nov.

- Slopes, forest margins, grasslands; 3400–4700 m. W Hubei, Qinghai, W Sichuan, E Xizang, NW Yunnan.

100. *Artemisia smithii* Mattfeld, Repert. Spec. Nov. Regni Veg. 22: 246. 1926.

球花蒿 qiu hua hao

Herbs, perennial, 15–60 cm tall, rhizomatous, often not branched; most parts gray sericeous-pubescent. Basal leaves in dense rosette; petiole 6–7(–15) cm; leaf blade elliptic-ovate or oblong, 7–12 × 5–6 cm, 1- or 2-pinnatipartite; segments (3 or) 4–6 pairs; distal and lateral lobes obovate, 2–4 × 1–3 cm, divided; lobules lanceolate or elliptic-lanceolate, rarely ovate-lanceolate, 10–15 × 3–5 mm; basal lobes entire; rachis with 3–4 mm wide wing. Lower and middle stem leaves: petiole 1–3 cm; leaves few, oblong or oblong-elliptic, 2.5–5(–6) × 1.5–3.5(–4) cm, pinnatisect; segments 3 or 4 pairs; lobes lanceolate, linear-lanceolate, or oblanceolate, 10–30(–35) × 2–3 mm. Uppermost leaves and leaflike bracts lanceolate or oblanceolate, 30–50 × 2–4 mm. Synflorescence a simple erect raceme, to 35 cm. Capitula nodding; peduncles 3–10 mm. Involucre hemispheric, 6–10 mm in diam.; phyllaries densely yellowish pubescent. Marginal female florets 10–16. Disk florets 50–60, bisexual; corolla limb purple. Achene obovoid or oblong. Fl. and fr. Jul–Oct.

- Alpine steppes, alpine meadows, slopes; 3200–4600 m. S Gansu, E Qinghai, NW Sichuan.

101. *Artemisia speciosa* (Pampanini) Y. Ling & Y. R. Ling, Acta Phytotax. Sin. 18: 505. 1980.

西南大头蒿 xi nan da tou hao

Artemisia smithii Mattfeld var. *speciosa* Pampanini, Nuovo Giorn. Bot. Ital., n.s., 36: 423. 1930; *A. smithii* f. *paniculata* Pampanini.

Herbs, perennial, 60–80 cm tall, puberulent. Lower and middle stem leaves ± sessile; leaf blade ovate or broadly ovate, 7–9 × 4–6 cm, abaxially densely gray arachnoid tomentose, adaxially sericeous-pubescent, 2-pinnatisect; segments 4 or 5 pairs; lobules linear-lanceolate or falcate-lanceolate, 20–40 × 1.5–2.5 mm; rachis narrowly winged. Uppermost leaves pinnatisect or 3–5-lobed; leaflike bracts linear-lanceolate. Synflorescence a narrow panicle. Involucre hemispheric, 5–7 mm in

diam.; phyllaries rust-colored pubescent. Marginal female florets 10–20. Disk florets 30–45, bisexual. Achenes obovoid. Fl. and fr. Sep–Oct.

• Rocky slopes, grasslands, shrublands, terraces, roadsides; 3000–3800 m. W Sichuan, E Xizang, NW Yunnan.

102. *Artemisia sinensis* (Pampanini) Y. Ling & Y. R. Ling, *Acta Phytotax. Sin.* 18: 505. 1980.

西南圆头蒿 xi nan yuan tou hao

Artemisia stronglylocephala Pampanini var. *sinensis* Pampanini, *Nuovo Giorn. Bot. Ital.*, n.s., 34: 177. 1927; *A. stronglylocephala* f. *virgata* Pampanini.

Herbs, perennial, (40–)70–130(–150) cm tall, yellowish puberulent, sometimes glabrescent. Leaves ± sessile. Lowermost leaves oblong or ovate-oblong, 8–11 × 6–7 cm, 2-pinnatisect; segments 4 or 5 pairs, elliptic, 4–4.5 × 1.5–2.5 cm; lobules lanceolate or linear-lanceolate, (8–)10–15 × (3–)3.5–4 mm, abaxially densely arachnoid pubescent, adaxially sparsely pubescent, both surfaces glabrescent, rachis narrowly winged. Middle and upper stem leaves oblong, 6–11 × 4–8 cm, 1- or 2-pinnatipartite to subpinnatisect, segments 4 or 5 pairs. Leaflike bracts pinnatipartite or entire. Synflorescence a ± narrow panicle, to 18 cm; branches to 4 cm, ascending, capitula crowded toward tips. Capitula nodding. Involucre ovoid-campanulate, 3.5–4 mm in diam.; phyllaries yellowish puberulent. Marginal female florets 10–15. Disk florets 15–25(–30), bisexual. Achenes oblong or obovoid-oblong. Fl. and fr. Aug–Oct.

• Alpine or subalpine steppes, shrublands, forest margins, roadsides, often in dry stony situations; 2600–3900 m. SW Qinghai, W Sichuan, E Xizang, NW Yunnan.

103. *Artemisia kawakamii* Hayata, *Icon. Pl. Formosan.* 8: 65. 1919.

山艾 shan ai

Subshrubs, 8–25(–30) cm tall, sericeous-tomentose or glabrescent. Basal leaves forming rosettes, long petiolate. Lower and middle stem leaves: petiole 5–20 mm or more; leaf blade oblong or elliptic, 2–4 × 1–2 cm, abaxially densely white tomentose, adaxially sparsely sericeous-tomentose, (1 or)2-pinnatisect; segments 3(or 4) pairs, mostly 3-lobuled; lobules linear or linear-lanceolate, 5–20(–30) × 0.5–1(–2) mm. Uppermost leaves 3-lobed; leaflike bracts linear-lanceolate or linear. Synflorescence a lax racemelike panicle. Capitula few; peduncles 2–20 mm. Involucre hemispheric or broadly ovoid, 4–4.5 mm in diam.; phyllaries sparsely tomentose. Marginal female florets 8–12. Disk florets 18–25, bisexual. Achenes obovoid. Fl. and fr. Jul–Nov. $2n = 18^*$.

• Waste areas, rocky slopes; 2700–3900 m. Taiwan.

104. *Artemisia somae* Hayata, *Icon. Pl. Formosan.* 8: 64. 1919 [“*somai*”].

台湾狭叶艾 tai wan xia ye ai

Herbs, perennial, 60–120 cm tall, densely grayish white sericeous-puberulent, later glabrescent. Lower and middle stem leaves: petiole 1.5–2.5 cm; leaf blade oblong-obovate or ellip-

tic-obovoid, 10–12 × 3.5–4 cm, abaxially grayish white, persistently sericeous-puberulent, adaxially drying blackish, sparsely sericeous-puberulent, glabrescent, 2-pinnatisect; segments (3 or)4 or 5 pairs, distal lobes or terminals of lateral lobes (2 or)3(or 4)-lobulate; lobules lanceolate or linear-lanceolate, 5–8 × (2–)3–4 mm, acuminate apically. Uppermost leaves and leaflike bracts pinnatisect, 3-sect, or entire. Synflorescence a subterminal, ± narrowly conical panicle to 16 cm; branches few, ascending, to 4 cm; bracts minute. Capitula erect or spreading; peduncle to 5 mm, minutely bracteolate. Involucre broadly ovoid or hemispheric, 3.5–4 mm in diam.; phyllaries white pubescent. Marginal female florets 8–15. Disk florets 18–25, bisexual; corolla with lower part barbate or not. Achenes oblong-ovoid. Fl. and fr. Nov–Feb.

• Rocky slopes, mountain peaks, limestone crevices on dry ridges; 1500–2400 m. Taiwan.

1a. Lower part of corolla glabrous 104a. var. *somae*
1b. Lower part of corolla barbate 104b. var. *batakensis*

104a. *Artemisia somae* var. *somae*

台湾狭叶艾(原变种) tai wan xia ye ai (yuan bian zhong)

Lower part of corolla not barbate.

• Rocky slopes; 1500–2000 m. Taiwan.

104b. *Artemisia somae* var. *batakensis* (Hayata) Kitamura, *Acta Phytotax. Geobot.* 9: 32. 1940.

太鲁阁艾 tai lu ge ai

Artemisia batakensis Hayata, *Icon. Pl. Formosan.* 8: 64. 1919.

Lower part of corolla barbate.

• Mountain peaks in karst areas, limestone crevices on dry ridges; 1500–2300 m. Taiwan.

105. *Artemisia selengensis* Turczaninow ex Besser, *Tent. Abrot.* 50. 1832.

萎蒿 lou hao

Herbs, perennial, 60–150 cm tall, strongly aromatic; rhizome elongated, 7–8 mm thick; stem often unbranched. Lower stem leaves usually withered, 8–12 cm overall; petiole 0.5–2(–5) cm; leaf blade broadly ovate or ovate, abaxially densely gray arachnoid tomentose, palmately or ternately 3–5-sect or -partite, or mixed 7-sect or entire; lobes linear or linear-lanceolate, 5–7(–8) × 0.3–0.5 cm, serrate or not. Middle stem leaves ± sessile; leaf blade palmately or ternately 3–5-lobed or entire; lobes elliptic, elliptic-lanceolate, or linear-lanceolate, 30–50 × 2–4 mm, base attenuate, margin entire or remotely narrowly toothed, apex acuminate. Uppermost leaves and leaflike bracts ternately 2- or 3-lobed or entire. Synflorescence a long, narrow panicle; branches short, erect or only narrowly spreading. Capitula sessile or subsessile. Involucre oblong or broadly ovoid, 2–2.5 mm in diam.; phyllaries sparsely gray arachnoid pubescent, glabrescent. Marginal female florets 8–12. Disk florets 10–15, bisexual. Achenes ovoid, ca. 1.2 mm, brown. Fl. and fr. Jul–Oct. $2n = 16, 36$.

Riverbanks, lakeshores, humid areas, meadows, slopes, roadsides; low elevations to 2500 m. Anhui, S Gansu, N Guangdong, Guizhou, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, S Nei Mongol, S Shaanxi, Shandong, Shanxi, Sichuan, Yunnan [Korea, Mongolia, Russia (E Siberia)].

- 1a. Margins of leaves or lobes serrulate 105a. var. *selengensis*
 1b. Leaves or lobes not serrulate, rarely mixed few serrulate 105b. var. *shansiensis*

105a. *Artemisia selengensis* var. *selengensis*

萎蒿(原变种) lou hao (yuan bian zhong)

Artemisia cannabifolia H. Léveillé; *A. cannabifolia* var. *nigrescens* H. Léveillé; *A. selengensis* f. *amurensis* Pampanini; *A. selengensis* var. *cannabifolia* (H. Léveillé) Pampanini; *A. selengensis* f. *dielsii* Pampanini; *A. selengensis* f. *integerrima* (Komarov) Pampanini; *A. selengensis* var. *pannosa* Pampanini; *A. selengensis* f. *serratifolia* (Regel) Pampanini; *A. selengensis* f. *simplicifolia* Nakai ex Pampanini; *A. selengensis* f. *subintegra* Pampanini; *A. vulgaris* Linnaeus var. *integerrima* Komarov; *A. vulgaris* lusus *selengensis* (Turczaninow ex Besser) Regel; *A. vulgaris* var. *selengensis* (Turczaninow ex Besser) Maximowicz; *A. vulgaris* f. *serratifolia* (Regel) Komarov; *A. vulgaris* lusus *serratifolia* Regel.

Leaf margin serrulate.

Riverbanks, lakeshores, humid areas, meadows, sometimes cultivated; low elevations. Anhui, S Gansu, N Guangdong, Guizhou, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, S Nei Mongol, S Shaanxi, Shandong, Shanxi, Sichuan, Yunnan [Korea, Mongolia, Russia].

Artemisia selengensis var. *selengensis* is used for anti-inflammatory and anthelmintic medicines. The rhizome is edible.

105b. *Artemisia selengensis* var. *shansiensis* Y. R. Ling, Bull. Bot. Res., Harbin 8(3): 5. 1988.

山西萎蒿 shan xi lou hao

Leaves or lobes not serrulate, rarely mixed few serrulate.

• Slopes, roadsides; low elevations. Hebei, Henan, Hubei, Hunan, Shanxi.

106. *Artemisia keiskeana* Miquel, Ann. Mus. Bot. Lugduno-Batavi 2: 176. 1866.

无齿萎蒿 wu chi lou hao

Artemisia keiskeana f. *hirtella* Nakai; *A. keiskeana* subf. *rotundifolia* Pampanini; *A. vulgaris* Linnaeus lusus *glabrescens* Regel.

Subshrubs, 30–100(–120) cm tall, strongly rhizomatous, most parts sparsely puberulent or glabrescent. Lower stem leaves: petiole 3–8 mm; leaf blade obovate or broadly cuneate, 3–8 × 1.5–4.5 cm, base attenuate, margin few acutely serrate from middle to apex, apex rounded. Middle stem leaves ± sessile; leaf blade obovate, ovate-elliptic, or obovate-cuneate, 4.5–6.5(–8) × 1.5–4 cm, base attenuate, margin serrate upward, apex obtuse. Upper leaves and leaflike bracts ovate or elliptic, few serrate or entire. Synflorescence a lax conical

panicle; branches obliquely ascending, longer than subtending leaves. Capitula long pedunculate, pendent. Involucre subglobose, 3–3.5 mm in diam.; phyllaries glabrous. Marginal female florets 6–10; corolla 1.2–1.5 mm. Disk florets 13–18, bisexual; corolla ca. 2 mm. Achenes ovoid-ellipsoid, ca. 2 mm. Fl. and fr. Aug–Nov. $2n = 18, 27$.

Roadsides, dry slopes, shrublands, grasslands, forest margins; 100–900 m. Hebei, Heilongjiang, Jilin, Liaoning, Shandong [Japan, Korea, E Russia].

107. *Artemisia fulgens* Pampanini, Nuovo Giorn. Bot. Ital., n.s., 36: 427. 1930.

亮蒿 liang hao

Herbs, perennial, 100–150 cm tall. Middle stem leaves ± sessile; leaf blade oblong, 4–9 × 2.5–4 cm, sparsely gray pubescent or glabrescent, 1- or 2-pinnatipartite to subpinnatisect; segments 4 or 5 pairs; lobes or lobules linear or linear-lanceolate, 8–25(–35) × 2.5–3.5 mm, rachis narrowly winged, acuminate apically. Uppermost leaves pinnatipartite or pinnatisect; leaflike bracts lobed or entire, latter linear or linear-lanceolate. Synflorescence a conical panicle, relatively small. Capitula crowded at branch tips, subsessile. Involucre ellipsoid or oblong-ovoid, 2–3 mm in diam.; phyllaries pale, sometimes with narrow dark midrib, arachnoid puberulent or glabrescent. Marginal female florets 6–8. Disk florets 10–20, bisexual. Achenes oblong. Fl. and fr. Aug–Nov.

• River floodlands, waste areas, slopes; 3400–3600 m. S Qinghai, W Sichuan, E Xizang.

This species looks rather similar to *Artemisia flaccida*.

108. *Artemisia sylvatica* Maximowicz, Mém. Acad. Imp. Sci. St.-Petersbourg Divers Savans 9: 161. 1859.

阴地蒿 yin di hao

Herbs, perennial, 80–130 cm tall, puberulent or glabrescent. Lower and middle stem leaves: petiole 2–4(–5) cm; leaf blade ovate, broadly ovate, or oblong, 8–12(–15) × 7–11 cm, abaxially sparsely gray arachnoid tomentose or glabrescent, adaxially glabrescent, 1- or 2-pinnatipartite; segments 2 or 3 pairs, elliptic or oblong, 6–7(–9) × 1–1.5(–2) cm, 3–5-partite or -cleft, rarely entire; lobules elliptic, elliptic-lanceolate, or ovate-lanceolate, usually serrate. Uppermost leaves pinnatipartite; segments 1 or 2, lanceolate or elliptic-lanceolate, distal one longer, occasionally 1- or 2-serrate; leaflike bracts 3–5-partite or entire. Synflorescence a broad diffusely much-branched, conical panicle; ultimate branches slender and flexuous. Capitula shortly pedunculate, ± secund, most subtending bracts minute. Involucre subglobose or ovoid, 1.5–2.5 mm in diam.; phyllaries sparsely arachnoid puberulent, sometimes glabrescent, with distinct narrow midrib. Marginal female florets 4–7. Disk florets 8–14, bisexual. Achenes narrowly ovoid or narrowly obovoid. Fl. and fr. Aug–Oct. $2n = 16$.

Forest margins, shrublands, humid areas, slopes, roadsides; 100–1300 m. Anhui, SE Gansu, Guizhou, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, Nei Mongol, Qinghai, S Shaanxi, Shandong, Shanxi, Sichuan, Yunnan, Zhejiang [Korea, Mongolia, E Russia].

- 1a. Leaves thinly papery; phyllaries gray arachnoid tomentose, later glabrescent; capitula widely separated along branches 108a. var. *sylvatica*
- 1b. Leaves thickly papery; phyllaries tomentose; capitula closely spaced along branches 108b. var. *meridionalis*

108a. *Artemisia sylvatica* var. *sylvatica*

阴地蒿(原变种) yin di hao (yuan bian zhong)

Leaves thinly papery. Capitula spreading on branches. Phyllaries gray arachnoid tomentose, later glabrescent.

Forest margins, shrublands, humid areas; low elevations. Anhui, SE Gansu, Guizhou, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, Nei Mongol, Qinghai, S Shaanxi, Shandong, Shanxi, Sichuan, Yunnan, Zhejiang [Korea, Mongolia, E Russia].

108b. *Artemisia sylvatica* var. *meridionalis* Pampanini, Nuovo Giorn. Bot. Ital., n.s., 36: 444. 1930.

密序阴地蒿 mi xu yin di hao

Leaf blade thickly papery. Capitula closely spaced along branches. Phyllaries gray tomentose.

- Slopes, roadsides, shrublands. Henan, Jiangsu, Shanxi.

109. *Artemisia taibaishanensis* Y. R. Ling & Humphries, Bull. Bot. Res., Harbin 10(1): 17. 1990.

太白山蒿 tai bai shan hao

Subshrubs or perennial herbs, 80–100 cm tall, gray pubescent. Middle stem leaves: petiole 2–3 cm; leaf blade suborbicular or broadly ovate, 10–14 × 8–12 cm, 2-pinnatisect; segments 4 or 5 pairs, elliptic or oblong, 5–6 × 2–3 cm; lobules (2 or) 3 pairs, rachis narrowly winged, 1- or 2-serrate. Uppermost leaves and leaflike bracts 1- or 2-pinnatisect. Synflorescence a broad, much-branched panicle. Involucre ovoid-campanulate or broadly ovoid, 3–3.5(–4) mm in diam.; phyllaries puberulent, sometimes glabrescent. Marginal female florets 5–9. Disk florets 14–22, bisexual. Achenes obovoid. Fl. and fr. Aug–Nov.

- Slopes, forest margins, shrublands; middle to high elevations. S Shaanxi, NE Sichuan.

4. *Artemisia* sect. *Viscidipubes* Y. R. Ling, Acta Phytotax. Sin. 18: 506. 1980.

腺毛蒿组 xian mao hao zu

Herbs, perennial, rarely subshrubs; most parts usually finely arachnoid puberulent to tomentose, also with thick multicellular viscid hairs and/or gland-tipped hairs, and sessile glands. Leaves 1- or 2-pinnatipartite to pinnatisect; lobules 1–8 mm wide. Capitula ovoid or oblong-ovoid. Phyllary margins scarious, midvein green or sometimes brown. Receptacle glabrous. Marginal florets 2–15; corolla narrowly tubular or rarely narrowly conical, 2- or 3-toothed or without teeth. Disk florets 2–20(–50), bisexual; ovaries well developed; style ca. as long as or longer than corolla, branches divergent, recurved at apex.

Twenty-one species: mainly at middle and high elevations in NW and SW China, a few species in S and SE Asia; 20 species (16 endemic) in China.

Many species contain sesquiterpenoids and some monoterpenoids.

- 1a. Middle stem leaves with 2–4 pairs of main segments.
- 2a. Capitula 3–4 mm in diam., in groups of 3–6(–8) on branches of large broad panicles 116. *A. erlangshanensis*
- 2b. Capitula 1.5–3(–4) mm in diam., uniformly distributed along branches in narrow or broad panicles.
- 3a. Stem and branches with many sessile blunt multicellular hairs and scattered gland-tipped hairs; middle stem leaves sessile, lobes 3–6(–8) mm wide, revolute, adaxially glandular pubescent and sparsely arachnoid pubescent, abaxial veins with hairs obviously differently colored from those elsewhere 118. *A. chingii*
- 3b. Stem and branches sparsely pubescent and glandular pubescent or not; middle stem leaves shortly petiolate, lobes (3–)10 mm wide or more, flat, adaxially uniformly glandular pubescent or on veins only or mixed with non-glandular hairs, abaxial veins with hairs same or different colors as those elsewhere.
- 4a. Lobes of leaves linear or linear-lanceolate, (1–)1.5–2 × 0.3–1 cm; capitula in broad panicles.
- 5a. Lobes of leaves linear, 10–15(–30) × 3–6 mm 119. *A. simulans*
- 5b. Lobes of leaves linear-lanceolate or elliptic-lanceolate, 15–20 × 5–10 mm 125. *A. rosthornii*
- 4b. Lobes of leaves elliptic, oblong, or oblong-ovate, more than 2 × 1 cm; capitula in narrower panicles.
- 6a. Middle stem leaves 3- or ternately 5-partite, distal and lateral lobes subequal, not caudate, entire or few serrate at margin 126. *A. sichuanensis*
- 6b. Middle stem leaves 1- or 2-pinnatisect, or -partite, segments 2–4(or 5) pairs, distal ones longer, or not and then with broadly winged rachis, usually serrate.
- 7a. Distal lobes not caudate, 2- or 3-cleft, rachis broadly winged.
- 8a. Leaves papery; capitula oblong or oblong-ovoid, 2.5–3(–4) mm in diam. 124. *A. thellungiana*
- 8b. Leaves thickly papery; capitula ovoid, 1.5–2 mm in diam. 122. *A. orientaliyunnanensis*

- 7b. Distal lobes caudate, longer than other lobes, serrate, rachis not winged.
- 9a. Leaves gland-dotted, segments 2 or 3 pairs, 1- or 2-cleft; capitula oblong or ovoid, 1.5–2(–2.5) mm in diam. 117. *A. atrovirens*
- 9b. Leaves not gland-dotted, segments 3(or 4) pairs, 2- or 3-lobuled or serrate; capitula hemispheric or broadly ovoid, 2.5–3 mm in diam. 127. *A. zayuensis*
- 1b. Middle stem leaves with 4–6 pairs of main segments.
- 10a. Capitula (3–)4–5 mm in diam., disk florets 30–40(–50); phyllaries tomentose.
- 11a. Phyllary margins not barbate; perennial herbs, 40–120 cm tall; stems glandular pubescent 110. *A. viscida*
- 11b. Phyllary margins barbate; subshrubs, 25–50 cm tall; stems densely yellowish viscid tomentose 111. *A. vexans*
- 10b. Capitula 1.5–3(–4) mm in diam., disk florets 2–20(–25), if capitula 3–4 mm in diam. then phyllaries glabrous or sparsely puberulent.
- 12a. Middle stem leaves (2 or)3-pinnatisect or -partite, deeply serrate.
- 13a. Uppermost flowering branches short, forming narrow panicle; phyllaries barbate at apex; capitula 3–4 mm in diam. 113. *A. matfeldii*
- 13b. Flowering branches long, forming broad, much-branched panicles; phyllaries not barbate; capitula 1–2.5 mm in diam.
- 14a. Stem, branches, leaves, and phyllaries with prominently gland-tipped hairs; capitula ellipsoid or oblong, 2–2.5 mm in diam. 120. *A. gyitangensis*
- 14b. Stem, branches, and leaves viscid pubescent, phyllaries glandular pubescent and eglandular pubescent or not; capitula ovoid, 1–1.5 mm in diam. 128. *A. gongshanensis*
- 12b. Middle stem leaves 1- or 2-pinnatisect or -partite.
- 15a. Capitula 3–4 mm in diam.
- 16a. Stem and branches sparsely glandular pubescent and densely tomentose, sparsely so later; capitula in narrow panicles 112. *A. tangutica*
- 16b. Stem and branches densely glandular pubescent, not tomentose; capitula in somewhat broad panicles 115. *A. viscidissima*
- 15b. Capitula 1.5–2.5(–3) mm in diam.
- 17a. Stem and branches densely viscid pubescent; leaves sparsely pubescent adaxially and densely arachnoid tomentose and white gland-dotted abaxially and sparsely glandular pubescent on abaxial veins; capitula in somewhat broad panicles; phyllaries densely tomentose and sparsely glandular pubescent 129. *A. yadongensis*
- 17b. Stem and branches densely glandular pubescent and sparsely eglandular puberulent, adaxial surface of leaves and abaxial veins glandular pubescent or also tomentose adaxially; capitula in broad panicles; phyllaries arachnoid tomentose or glabrescent.
- 18a. Middle stem leaves 1-pinnatisect 123. *A. shemongjiaensis*
- 18b. Middle stem leaves 2-pinnatipartite or -pinnatisect.
- 19a. Middle stem leaves 2-pinnatisect, distances between segments long, distal lobule longer than laterals, linear or linear-lanceolate, 15–25 × 1.5–2.5 mm 114. *A. occidentalisichuanensis*
- 19b. Middle stem leaves 2-pinnatipartite or nearly -sect, distances between segments shorter, distal lobule subequal to laterals, elliptic-lanceolate or ovate-elliptic, 10–15 × 3–5 mm 121. *A. myriantha*

110. *Artemisia viscida* (Mattfeld) Pampanini, Nuovo Giorn. Bot. Ital., n.s., 36: 424. 1930.

腺毛蒿 xian mao hao

Artemisia moorcroftiana Wallich ex Candolle var. *viscida* Mattfeld, Repert. Spec. Nov. Regni Veg. 22: 247. 1926.

Herbs, perennial, 40–120 cm tall, densely glandular pubescent. Lower and middle stem leaves ± sessile; leaf blade elliptic or oblong, 3–4(–7) × 1–1.5(–2) cm, abaxially gray arachnoid tomentose except on veins, adaxially obviously glandular pubescent, 2-pinnatisect; segments 4 or 5 pairs, elliptic-ovate, 2- or 3-lobuled; lobules deeply serrate, 3–4 × 1–1.5(–2) mm, margin revolute, apex acute. Uppermost leaves 1- or 2-pinnatisect; leaflike bracts pinnatisect or 3–5-partite. Synflorescence

a dense, narrow panicle. Capitula dense. Involucre broadly ovoid or campanulate, (3–)4–5 mm in diam.; phyllaries densely tomentose. Marginal female florets 8–10. Disk florets 30–40(–50), bisexual. Achenes oblong or obovoid-oblong. Fl. and fr. Aug–Oct.

• Roadsides, slopes; 3000–5000 m. S Gansu, E Qinghai, W Sichuan, E Xizang, NW Yunnan.

111. *Artemisia vexans* Pampanini, Nuovo Giorn. Bot. Ital., n.s., 36: 427. 1930.

藏东蒿 zang dong hao

Subshrubs, 25–50 cm tall, strongly aromatic, densely gray or yellowish viscid tomentose, sparsely glandular pubescent, later laxly viscid tomentose. Lowermost and middle stem leaves

sessile; leaf blade elliptic or oblong, 3–4(–7) × 1–1.5(–2) cm, glandular pubescent on both surfaces, densely arachnoid tomentose abaxially, 2-pinnatisect; segments 4 or 5 pairs, elliptic-ovate; lobules 2 or 3 pairs, 3–4 × 1–1.5(–2) mm, margin revolute, acute apically. Uppermost leaves 1- or 2-pinnatisect; leaflike bracts pinnatisect or 3–5-partite. Capitula in narrow panicles, broadly ovoid or campanulate, (3–)4–5 mm in diam. Phyllaries densely yellowish tomentose, margin barbate. Marginal female florets 8–10. Disk florets 30–40(–50), bisexual. Achene oblong or obovoid-oblong. Fl. and fr. Aug–Oct.

Roadsides, slopes; 3000–5000 m. W Sichuan, E Xizang [Bhutan].

112. *Artemisia tangutica* Pampanini, *Nuovo Giorn. Bot. Ital.*, n.s., 36: 426. 1930.

甘青蒿 gan qing hao

Herbs, perennial, 50–90 cm tall, with capitate branches, densely arachnoid tomentose and sparsely glandular pubescent, later sparsely pubescent basally. Lower and middle stem leaves: petiole 5–20 mm; leaf blade elliptic-ovate or elliptic, 6–10 × 5–8 cm, abaxially glabrescent or densely tomentose, adaxially sparsely glandular pubescent, 2-pinnatisect; segments 4–6 pairs, oblong-ovate or oblong, 2.5–3.5 × 1–2 cm; lobules 2–4 pairs, ovate, elliptic-ovate, or elliptic, 5–10 × 2–4 mm, apex usually acute and mucronulate, sometimes ± rounded; rachis winged. Uppermost leaves pinnatifid; leaflike bracts 3- or 5-partite or entire. Synflorescence a slender ± conical panicle, lower branches subtended by leaflike bracts; ultimate branches ± erect, slender, lowermost to 10 cm. Capitula mostly widely, rather irregularly, spaced, sometimes in small clusters toward base of branch and/or closely spaced apically, nodding; peduncle to 5 mm. Involucre oblong or broadly ovoid, 3–4 mm in diam.; phyllaries ± glabrous or sparsely puberulent. Marginal female florets 3–8. Disk florets 5–15, bisexual. Achene obovoid or oblong-ovoid. Fl. and fr. Jul–Oct.

• Slopes, dunes along riverbanks, grasslands, roadsides; 2700–3800 m. C and SW Gansu, W Hubei, Qinghai, W Sichuan, E Xizang, Yunnan.

- 1a. Leaves abaxially glabrescent; phyllaries ± glabrous 112a. var. *tangutica*
 1b. Leaves abaxially densely arachnoid tomentose; phyllaries sparsely puberulent 112b. var. *tomentosa*

112a. *Artemisia tangutica* var. *tangutica*

甘青蒿(原变种) gan qing hao (yuan bian zhong)

Leaves abaxially glabrescent. Capitula ± widely spaced along branches. Phyllaries ± glabrous.

• Slopes, dunes along riverbanks; 3000–3800 m. C and SW Gansu, Qinghai, W Sichuan, E Xizang.

112b. *Artemisia tangutica* var. *tomentosa* Handel-Mazzetti, *Acta Horti Gothob.* 12: 277. 1938.

绒毛甘青蒿 rong mao gan qing hao

Leaves densely arachnoid tomentose abaxially. Capitula ± densely spaced along branches. Phyllaries sparsely puberulent.

• Grasslands, roadsides; ca. 3200 m. W Sichuan.

113. *Artemisia mattfeldii* Pampanini, *Nuovo Giorn. Bot. Ital.*, n.s., 36: 425. 1930.

粘毛蒿 nian mao hao

Herbs, perennial, 35–50 cm tall, capitately branched, densely glandular pubescent, strongly aromatic. Lowermost and middle stem leaves: petiole 2–3 cm or more; leaf blade oblong or oblong-ovate, 3.5–6 × 1.5–4 cm, abaxially gray or yellowish arachnoid tomentose or glabrous, adaxially and abaxially on veins glandular pubescent. Lowermost leaves (2 or)3-pinnatisect; middle leaves 2(or 3)-pinnatisect; segments 5 or 6 pairs, ovate or oblong-ovate, 1.5–2.5 × 1–1.5 cm; lobules lanceolate or deeply serrate, 3–7 × 1–1.5 mm, margin revolute, acute or obtuse apically; rachis winged. Uppermost leaves and leaflike bracts 1- or 2-pinnatisect. Synflorescence a narrow panicle. Involucre oblong or broadly ovoid, 3–4 mm in diam.; phyllaries sparsely glandular pubescent. Marginal female florets 5–7. Disk florets 8–15, bisexual. Achene obovoid or oblong. Fl. and fr. Jul–Oct.

• Forest margins, grasslands, slopes, roadsides; 2600–4800 m. SW Gansu, NW Guizhou, W Hubei, S Qinghai, W Sichuan, E Xizang, W Yunnan.

- 1a. Leaves abaxially densely white tomentose 113a. var. *mattfeldii*
 1b. Leaves abaxially glabrous 113b. var. *etomentosa*

113a. *Artemisia mattfeldii* var. *mattfeldii*

粘毛蒿(原变种) nian mao hao (yuan bian zhong)

Leaves abaxially densely white tomentose.

• Forest margins, grasslands, slopes, roadsides; 2600–4800 m. SW Gansu, S Qinghai, W Sichuan, E Xizang.

113b. *Artemisia mattfeldii* var. *etomentosa* Handel-Mazzetti, *Acta Horti Gothob.* 12: 276. 1938.

无绒粘毛蒿 wu rong nian mao hao

Leaves abaxially glabrous.

• Slopes; 3600–4200 m. SW Gansu, S Qinghai, W Sichuan, E Xizang.

114. *Artemisia occidentalisichuanensis* Y. R. Ling & S. Y. Zhao, *Bull. Bot. Res.*, Harbin 5(2): 6. 1985 [*“occidentali-sichuanensis”*].

川西腺毛蒿 chuan xi xian mao hao

Herbs, perennial, 150 cm tall or more, much branched, densely glandular pubescent. Lower and middle stem leaves: petiole 5–15 mm; leaf blade oblong or elliptic, 4–8(–9) × 3–4.5 cm, abaxially gray arachnoid pubescent, glandular pubescent on veins, adaxially glandular pubescent, 2-pinnatisect; segments 4 or 5 pairs; lobules 1 or 2 pairs, distal lobules longer, linear or linear-lanceolate, 15–25 × 1.5–2.5 mm; rachis winged. Uppermost leaves and leaflike bracts 1- or 2-pinnatisect, 3-lobed, or entire. Synflorescence a broad, much-branched panicle. Involucre oblong-ovoid or oblong-campanulate, 1.5–2.5 mm in diam.; phyllaries sparsely puberulent or ± glabrous. Marginal

female florets 3–5. Disk florets 4–8, bisexual. Achenes oblong. Fl. and fr. Aug–Oct.

- Slopes, roadsides; middle to high elevations. W Sichuan.

115. *Artemisia viscidissima* Y. Ling & Y. R. Ling, *Acta Phytotax. Sin.* 18: 508. 1980.

密腺毛蒿 mi xian mao hao

Subshrubs, 70–80 cm tall, yellowish or gray glandular pubescent. Middle stem leaves ± sessile; leaf blade elliptic-ovate or ovate, 7–8 × 6–7 cm, both surfaces gray pubescent, adaxially and veins abaxially glandular pubescent, 2-pinnatisect; segments 4 or 5 pairs, distal lobes longer than others, elliptic or ovate-elliptic; lobules elliptic or elliptic-lanceolate, 8–12 × 4–6 mm, rachis narrowly winged, apex acuminate. Uppermost leaves and leaflike bracts pinnatipartite or 3-lobed. Synflorescence a moderately broad, simple panicle, branches raceme-like, to ca. 5 cm. Capitula slightly irregularly spaced, sessile. Involucre broadly ovoid or ovoid-campanulate, often shorter than subtending bracteole, 3–3.5 mm; phyllaries brown pubescent. Marginal female florets 5–10. Disk florets 10–15, bisexual. Achenes oblong or ellipsoid. Fl. and fr. Aug–Oct.

- Forest margins. E Xizang.

116. *Artemisia erlangshanensis* Y. Ling & Y. R. Ling, *Bull. Bot. Res.*, Harbin 4(2): 23. 1984.

二郎山蒿 er lang shan hao

Subshrubs, 50–130(–150) cm tall, densely viscid tomentose and glandular pubescent. Lower and middle stem leaves: petiole 2–3 cm or more; leaf blade suborbicular, broadly ovate, or ovate, 6–12 × 4–10 cm, abaxially arachnoid tomentose, including veins, adaxially sparsely gland-dotted and puberulent, 1(or 2)-pinnatipartite; segments 2 or 3 pairs, elliptic or elliptic-lanceolate, 30–70 × 8–20 mm, margin usually 1- or 2-serrate. Uppermost leaves and leaflike bracts 3–5-lobed. Synflorescence a broad panicle. Capitula in clusters of 3–6(–8) along branchlets. Involucre hemispheric, subglobose, or broadly ovoid, 3–4 mm in diam.; phyllaries yellowish puberulent. Marginal female florets 8–15. Disk florets 15–25, bisexual. Achenes obovoid or oblong. Fl. and fr. Aug–Oct.

- Roadsides, slopes, ridges, canyons; 2300–3100 m. W Sichuan.

117. *Artemisia atrovirens* Handel-Mazzetti, *Acta Horti Gothob.* 12: 280. 1938.

暗绿蒿 an lü hao

Herbs, perennial, 60–100(–150) cm, apparently rhizomatous, glandular pubescent and deciduous puberulent. Lowermost leaves shortly petiolate; leaf blade ovate or broadly ovate, 5–10 × 4–10 cm, 1- or 2-pinnatipartite, segments 2 or 3 pairs, distal lobes longer than lateral lobes. Middle stem leaves: petiole 1–2 cm; leaf blade ovate or ovate-elliptic, (5–)5–8 × (3–)4–7 cm, abaxially densely grayish white tomentose, veins with sparser thick multicellular hairs, adaxially dark green, sericeous-puberulent, sometimes glabrescent, glandular punctuate, pinnatipartite; segments 2 or 3 pairs, elliptic or obovate-elliptic, 15–25 × (5–)10–15 mm, margin 1- or 2-toothed, apex acute and mucronulate. Uppermost leaves and leaflike bracts pinnatipar-

ite, 3-lobed, or entire. Synflorescence a conical panicle; lower branches ± cylindrical, ultimate branches secund; bracts linear, shorter than involucre. Capitula ± contiguous, subsessile, erect. Involucre oblong or ovoid, 1.5–2(–2.5) mm in diam.; phyllaries with green midrib, sparsely arachnoid pubescent. Marginal female florets 3–6. Disk florets 5–8, bisexual. Achenes obovoid. Fl. and fr. Aug–Oct.

Slopes, grasslands, roadsides; low elevations to 1200 m. Anhui, N Fujian, S Gansu, N Guangdong, N Guangxi, Guizhou, S Henan, Hubei, Hunan, Jiangxi, S Shaanxi, Sichuan, Yunnan, Zhejiang [N Thailand].

118. *Artemisia chingii* Pampanini, *Nuovo Giorn. Bot. Ital.*, n.s., 39: 24. 1932.

南毛蒿 nan mao hao

Herbs, perennial, 80–100(–140) cm tall, stems sparsely glandular but densely viscid, pubescent. Lower stem leaves: petiole 5–15 mm; leaf blade ovate or broadly ovate, 5–6 × 4–5 cm, 1(or 2)-pinnatipartite to nearly -sect; segments 2 or 3, elliptic, lobes 3–6(–8) mm wide, margin revolute, occasionally with 2 or 3 serrations. Middle stem leaves ± sessile; leaf blade ovate, ovate-elliptic, or broadly ovate, 3.5–5 × 2–4 cm, abaxially densely arachnoid tomentose with underlayer of sessile glands and coarser blunt hairs on veins, adaxially papillate-pubescent, sometimes glabrescent, glandular pubescent, pinnatipartite; segments 2 or 3 pairs, elliptic or elliptic-lanceolate, 10–20 × 3–6(–8) mm. Uppermost leaves and leaflike bracts 3–5-partite or entire, lobes ± linear. Synflorescence a narrowly conical panicle. Involucre ovoid or oblong, 1.5–2 mm in diam.; phyllaries with green midrib, densely arachnoid pubescent to glabrescent. Marginal female florets 3–5. Disk florets 8–12, bisexual. Achenes obovoid or ovoid. Fl. and fr. Aug–Oct.

- Slopes, grasslands, roadsides; low to middle elevations. Anhui, S Gansu, Guangdong, Guangxi, Guizhou, S Henan, Hubei, Hunan, Jiangxi, S Shaanxi, S Shanxi, Sichuan, Taiwan, Yunnan, W Zhejiang.

119. *Artemisia simulans* Pampanini, *Nuovo Giorn. Bot. Ital.*, n.s., 36: 434. 1930.

中南蒿 zhong nan hao

Herbs, perennial, 80–120 cm tall, sparsely glandular pubescent and puberulent. Lower and middle stem leaves: petiole 3–5 mm; leaf blade ovate or ovate-elliptic, 4–8 × 3–7 cm, abaxially arachnoid tomentose, adaxially sparsely glandular pubescent, 1(or 2)-pinnatisect; segments 2–4, linear, 10–15(–30) × 3–6 mm. Uppermost leaves and leaflike bracts 3–5-lobed or entire. Synflorescence a broad, much-branched panicle. Involucre ellipsoid, 1.5–2 mm in diam.; phyllaries sparsely arachnoid tomentose. Marginal female florets 3–5. Disk florets 8–15, bisexual. Achenes obovoid. Fl. and fr. Aug–Nov.

- Slopes, waste areas; low elevations to 2900 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangxi, Sichuan, Yunnan, Zhejiang.

120. *Artemisia gytangensis* Y. Ling & Y. R. Ling, *Acta Phytotax. Sin.* 18: 507. 1980.

吉塘蒿 ji tang hao

Herbs, perennial, ca. 120 cm tall, densely glandular pubes-

cent. Middle stem leaves ± sessile; leaf blade elliptic, 8–11 × 4–5 cm, abaxially gray tomentose, glandular pubescent on veins, adaxially densely glandular pubescent, (2 or)3-pinnatifid or -sect; segments 5 pairs, ovate or ovate-elliptic, 15–25 × 5–15 mm; lobules 1–3 pairs, ovate or ovate-lanceolate, 5–7 × 2–4 mm, margins occasionally serrate, rachis narrowly winged. Uppermost leaves and leaflike bracts pinnatifid or 3-partite. Synflorescence a broad, much-branched panicle. Involucre ellipsoid or oblong, 2–2.5 mm in diam.; phyllaries sparsely glandular pubescent. Marginal female florets 5–10. Disk florets 8–20, bisexual. Achenes obovoid. Fl. and fr. Jul–Oct.

• Dry shrublands, slopes, forest margins; 3100–3800 m. W Sichuan, E Xizang.

121. *Artemisia myriantha* Wallich ex Besser, Tent. Abrot. 51. 1832.

多花蒿 duo hua hao

Herbs, perennial, 70–120(–150) cm tall, glandular and eglandular pubescent. Lower and middle stem leaves: petiole 5–20 mm; leaf blade ovate or elliptic, (5–)7–12(–19) × 6–10 cm, abaxially gray arachnoid tomentose, sometimes glabrescent, glandular pubescent on veins, adaxially densely glandular pubescent, 1- or 2-pinnatifid or subpinnatifid; segments 4 or 5 (or 6) pairs, elliptic or ovate-elliptic, 2.5–5(–6) × (1–)1.5–2.5(–3) cm; lobules 2 or 3 pairs, elliptic-lanceolate or ovate-elliptic, 10–15(–20) × 3–5 mm, occasionally with 1 or 2 serrations, apex mucronulate; rachis winged. Uppermost leaves pinnatifid; segments 3 or 4 pairs; leaflike bracts 3–5-lobed or entire. Synflorescence a broad, much-branched panicle. Capitula many. Involucre oblong-ovoid or oblong, 1.5–2.5(–3) mm in diam.; phyllaries sparsely arachnoid puberulent or glabrescent. Marginal female florets 3–5. Disk florets 4–6, bisexual. Achenes obovoid or oblong. Fl. and fr. Aug–Nov.

Slopes, roadsides, shrublands, cultivated fields, thickets, forests, rocky riverbanks, ravines; 800–3500 m. S Gansu, Guangxi, Guizhou, Qinghai, S Shanxi, Sichuan, Xizang, Yunnan [Bhutan, N India, N Myanmar, Nepal, N Thailand].

- 1a. Leaf blades abaxially and phyllaries
glabrescent 121a. var. *myriantha*
1b. Leaf blades abaxially densely gray
arachnoid tomentose, phyllaries
sparsely arachnoid puberulent 121b. var. *pleiocephala*

121a. *Artemisia myriantha* var. *myriantha*

多花蒿(原变种) duo hua hao (yuan bian zhong)

Artemisia burmanica Pampanini; *A. dolichocephala* Pampanini; *A. dolichocephala* f. *yunnanensis* Pampanini; *A. dubia* Wallich ex Besser var. *longeracemulosa* Pampanini; *A. dubia* var. *myriantha* (Wallich ex Besser) Pampanini; *A. pleiocephala* Pampanini f. *yunnanensis* (Pampanini) Pampanini; *A. vulgaris* Linnaeus var. *myriantha* (Wallich ex Besser) C. B. Clarke; *A. yunnanensis* H. Léveillé (Nov 1912), not Jeffrey ex Diels (Jun 1912).

Leaf blades abaxially and phyllaries glabrescent.

Slopes, roadsides, shrublands; low elevations to 2800 m. S Gansu,

Guangxi, Guizhou, Qinghai, Sichuan, Yunnan [Bhutan, N India, N Myanmar, Nepal, N Thailand].

121b. *Artemisia myriantha* var. *pleiocephala* (Pampanini) Y. R. Ling, Kew Bull. 42: 446. 1987.

白毛多花蒿 bai mao duo hua hao

Artemisia pleiocephala Pampanini, Nuovo Giorn. Bot. Ital., n.s., 36: 446. 1930; *A. dubia* f. *meridionalis* Pampanini.

Leaves densely gray arachnoid tomentose abaxially. Phyllaries sparsely arachnoid puberulent.

Slopes, roadsides, cultivated fields, thickets, forests, rocky riverbanks; 800–2800 m. Guizhou, Qinghai, Sichuan, Xizang, Yunnan [Bhutan, N India, Nepal].

122. *Artemisia orientaliyunnanensis* Y. R. Ling, Bull. Bot. Res., Harbin 8(3): 5. 1988 [“*orientali-yunnanensis*”].

滇东蒿 dian dong hao

Herbs, perennial, 50–100 cm tall, sparsely gray glandular and eglandular pubescent. Lower and middle stem leaves: petiole 2–3 cm; leaf blade ovate or ovate-oblong, 4–6 × 4–5 cm, abaxially gray arachnoid tomentose, densely glandular pubescent on veins, 1(or 2)-pinnatifid; segments 3 pairs, elliptic or ovate-elliptic, 15–30 × 8–15 mm, margins serrate; rachis winged. Uppermost leaves and leaflike bracts 3–5-partite or entire. Synflorescence a lax panicle. Involucre ovoid, 1.5–2 mm in diam.; phyllaries puberulent. Marginal female florets 2–4. Disk florets 2–5, bisexual. Achenes obovoid. Fl. and fr. Aug–Oct.

• Slopes, roadsides; 1500–2700 m. E Yunnan.

123. *Artemisia shennongjiaensis* Y. Ling & Y. R. Ling, Bull. Bot. Res., Harbin 4(2): 24. 1984.

神农架蒿 shen nong jia hao

Herbs, perennial, 90 cm tall or more, yellowish pubescent and glandular pubescent. Lower and middle stem leaves ± sessile; leaf blade broadly ovate or suborbicular, 7–10 × 5–8 cm, abaxially gray arachnoid tomentose, glandular pubescent on veins, adaxially glandular pubescent, pinnatifid; segments (3 or)4 or 5 pairs, linear-lanceolate or linear, 35–55 × 4–6 mm, margin occasionally with 1 or 2 serrations, apex acuminate. Uppermost leaves and leaflike bracts 3–5-sect or entire. Synflorescence a broad, much-branched panicle. Involucre broadly ovoid or ovoid, 1.5–2 mm in diam.; phyllaries sparsely yellowish arachnoid pubescent. Marginal female florets 6–8. Disk florets 7–9, bisexual. Achenes oblong. Fl. and fr. Aug–Oct.

• Forest margins, roadsides; ca. 1600 m. W Hubei (Shennongjia).

124. *Artemisia thellungiana* Pampanini, Nuovo Giorn. Bot. Ital., n.s., 33: 457. 1926.

藏腺毛蒿 zang xian mao hao

Herbs, perennial, 50–80 cm tall, sparsely glandular pubescent. Lower and middle stem leaves ± sessile; leaf blade oblong-ovate, 8–11 × 6–10 cm, abaxially eglandular pubescent, adaxial surface and abaxial veins sparsely glandular pubescent, 1- or 2-pinnatifid; segments 3 or 4 pairs, elliptic or oblong-

ovate, margin with 2 or 3 serrations, apex mucronulate; rachis winged. Upper leaves and leaflike bracts pinnatipartite or entire. Synflorescence a ± broad panicle. Involucre oblong or oblong-ovoid, 2.5–3(–4) mm in diam.; phyllaries glabrescent. Marginal female florets 10–15. Disk florets 16–20, bisexual. Achenes obovoid or ovoid-ellipsoid. Fl. and fr. Aug–Oct.

Slopes, roadsides; 1200–3000 m. SE Xizang, Yunnan [Bhutan, N India].

125. *Artemisia rosthornii* Pampanini, *Nuovo Giorn. Bot. Ital.*, n.s., 36: 428. 1930.

川南蒿 *chuan nan hao*

Herbs, perennial, 50–80 cm tall, densely tomentose and sparsely glandular pubescent. Lower and middle stem leaves ± sessile; leaf blade ovate or elliptic-ovate, 5–6 × 3.5–4.5 cm, abaxially densely arachnoid tomentose and sparsely glandular pubescent, adaxial surface sparsely glandular pubescent and eglandular pubescent, pinnatisect; segments 3 or 4(or 5) pairs, linear-lanceolate or elliptic-lanceolate, 15–20 × 5–10 mm, apex acuminate and mucronulate. Uppermost leaves and leaflike bracts pinnatipartite, rarely 3-partite or entire. Synflorescence a broad and elongated panicle. Involucre ovoid-campanulate, 1.5–2 mm in diam.; phyllaries sparsely puberulent. Marginal female florets 3–5. Disk florets 4–7, bisexual. Achenes obovoid. Fl. and fr. Aug–Oct.

- Forest margins, roadsides; low to middle elevations. S Sichuan.

126. *Artemisia sichuanensis* Y. Ling & Y. R. Ling, *Bull. Bot. Res.*, Harbin 4(2): 21. 1984.

四川艾 *si chuan ai*

Herbs, perennial, 100–150 cm tall, sparsely glandular pubescent and eglandular pubescent. Lower and middle stem leaves: petiole 3–10 mm; leaf blade ovate or ovate-oblong, 5–6 × 3.5–4.5 cm, abaxially sparsely glandular pubescent and densely gray arachnoid tomentose, sometimes glabrescent, adaxially sparsely puberulent, densely glandular pubescent, pinnatisect; segments 3 or 4(–6) pairs, linear-lanceolate or elliptic-lanceolate, 15–20 × 5–10 mm, apex acuminate and mucronulate. Uppermost leaves and leaflike bracts pinnatipartite, 3-partite, or entire. Synflorescence a broad and elongated panicle. Capitula nodding. Involucre ovoid-campanulate, 1.5–2 mm in diam.; phyllaries sparsely puberulent. Marginal female florets 3–5. Disk florets 4–7, bisexual. Achenes obovoid. Fl. and fr. Aug–Oct.

- Slopes, grasslands, forest margins; 700–2500 m. C and W Sichuan.

- 1a. Leaves abaxially glabrescent 126a. var. *sichuanensis*
 1b. Leaves abaxially densely gray
 arachnoid tomentose 126b. var. *tomentosa*

126a. *Artemisia sichuanensis* var. *sichuanensis*

四川艾(原变种) *si chuan ai* (yuan bian zhong)

Leaf blade abaxially glabrescent.

- Slopes, grasslands, forest margins; ca. 2500 m. C Sichuan.

126b. *Artemisia sichuanensis* var. *tomentosa* Y. Ling & Y. R. Ling, *Bull. Bot. Res.*, Harbin 4(2): 22. 1984.

密毛四川艾 *mi mao si chuan ai*

Leaf blade abaxially densely gray arachnoid tomentose.

- W Sichuan.

127. *Artemisia zayuensis* Y. Ling & Y. R. Ling, *Acta Phytotax. Sin.* 18: 507. 1980 [*“Zayuensis”*].

察隅蒿 *cha yu hao*

Herbs, perennial, 90–200 cm tall, glandular pubescent. Lower and middle stem leaves ± sessile; leaf blade ovate, oblong-ovate, or elliptic-ovate, 11–14 × 8–10 cm, gray pubescent or glabrescent, adaxially and veins abaxially sparsely glandular pubescent, 1- or 2-pinnatipartite or partly -sect; segments 3(or 4) pairs, elliptic or elliptic-lanceolate, 50–55 × 20–25 mm, distal lobe longer than lateral lobes, 5.5–6.5 mm, margin prominently 2 or 3 toothed, apex acuminate; rachis serrately winged. Uppermost leaves and leaflike bracts 3–5-partite, distal lobes longer. Synflorescence a lax, leafy, conical panicle; branches slender, ca. as long as subtending bract. Capitula sessile to shortly pedunculate, secund. Involucre hemispheric or broadly ovoid, 2.5–3 mm in diam.; phyllaries glabrescent. Marginal female florets 7 or 8. Disk florets 15–17, bisexual. Achenes oblong or ovoid. Fl. and fr. Jul–Oct.

- Forest margins, slopes, roadsides; 2600–3300 m. Xizang, W Yunnan.

- 1a. Leaves 1- or 2-pinnatipartite, lobes
 2–2.5 cm wide, deeply serrate;
 corolla limb puberulent 127a. var. *zayuensis*
 1b. Leaves 2-pinnatipartite or leaves
 basally partly pinnatisect, lobes
 1–1.5 cm wide, cleft, lobules few
 serrate; corolla limb glabrous 127b. var. *pianmaensis*

127a. *Artemisia zayuensis* var. *zayuensis*

察隅蒿(原变种) *cha yu hao* (yuan bian zhong)

Leaf blade 1- or 2-pinnatipartite; lobes 2–2.5 cm wide, deeply serrate. Corolla limb puberulent.

- Forest margins; ca. 3100 m. Xizang (Zayü).

127b. *Artemisia zayuensis* var. *pianmaensis* Y. Ling & Y. R. Ling, *Bull. Bot. Res.*, Harbin 8(3): 6. 1988.

片马蒿 *pian ma hao*

Leaf blade 2-pinnatipartite to 2-pinnatisect, basal part more deeply divided; lobes 1–1.5 cm wide, irregularly deeply serrate to pinnatifid; lobules few serrate. Corolla limb glabrous.

- Slopes, forest margins, roadsides; 2600–3300 m. W Yunnan.

128. *Artemisia gongshanensis* Y. R. Ling & Humphries, *Bull. Bot. Res.*, Harbin 10(1): 20. 1990.

贡山蒿 *gong shan hao*

Herbs, perennial, 150–180 cm tall, sparsely pubescent and tomentose. Lower and middle stem leaves: petiole 3–4 cm; leaf

blade oblong or ovate, 14–17 × 8–11 cm, abaxially densely gray arachnoid tomentose, adaxially densely or sparsely glandular pubescent, 2(or 3)-pinnatisect; segments 5 or 6 pairs, elliptic or oblong, 4–7 × 3–6 cm; lobules 4–6 pairs, margin 5- or 6-toothed; rachis winged. Uppermost leaves and leaflike bracts 1- or 2-pinnatisect, serrate. Synflorescence a broad panicle. Involucre ovoid, 1–1.5 mm in diam.; phyllaries glandular pubescent and sparsely eglandular deciduous puberulent. Marginal female florets 2 or 3. Disk florets 3–5, bisexual. Achenes obovoid. Fl. and fr. Aug–Nov.

- Rocky slopes, ridges; 3500–3600 m. W Yunnan (Gongshan).

129. *Artemisia yadongensis* Y. Ling & Y. R. Ling, Acta Phytotax. Sin. 18: 506. 1980.

亚东蒿 ya dong hao

Herbs, perennial or nearly subshrubs, 50–70 cm tall, gray

or yellowish viscid tomentose. Middle stem leaves shortly petiolate to ± sessile; leaf blade oblong or oblong-ovate, 2–3.5 × 2–2.5 cm, abaxially and on adaxial veins densely arachnoid tomentose and glandular sometimes deciduous pubescent, adaxially sparsely gray pubescent and glandular punctuate, 2-pinnatisect; segments 4 or 5 pairs, elliptic or oblong, 2–3.5 × 2–2.5 cm; lobules 1 or 2 pairs, elliptic or narrowly elliptic, 5–10 × 3–8 mm, rachis winged, apex acute or obtuse. Uppermost leaves elliptic or ovate, 1(or 2)-pinnatipartite; segments 4 or 5 pairs; leaflike bracts pinnatipartite or entire. Synflorescence a moderately broad panicle. Involucre subglobose or broadly ovoid, 1.5–2.5 mm in diam.; phyllaries densely gray tomentose and sparsely glandular sometimes deciduous pubescent. Marginal female florets 3–8. Disk florets 5–10, bisexual; corolla limb puberulent. Achenes obovoid. Fl. and fr. Aug–Oct.

- Grasslands; ca. 2900 m. S Xizang (Yadong).

5. *Artemisia* sect. *Albibractea* Y. R. Ling, Acta Phytotax. Sin. 18: 506. 1980.

白苞蒿组 bai bao hao zu

Herbs, perennial, without glandular or viscid hairs (sessile glands often present). Leaves 1 or 2(or 3)-pinnatisect, rarely irregularly shallowly lobed or 3-cleft at apex. Capitula with bracts absent or minute and basal. Phyllaries ± uniformly membranous, white or yellowish, glabrous. Receptacle glabrous. Marginal florets 6–12. Disk florets 3–10(–23), bisexual; ovaries well developed; style ca. as long as or longer than corolla, branches divergent, recurved at apex.

Six species: E, S, and SE Asia; five species (four endemic) in China.

Many species contain sesquiterpenoids and some monoterpenoids.

- 1a. Leaf blade entire, rarely 2- or 3-cleft at apex, margin shallowly serrate 134. *A. anomala*
 1b. Leaf blade pinnately divided, margin more deeply serrate or lacerate.
 2a. Middle stem leaves pinnatipartite or -cleft, segments 2(or 3) pairs, uppermost leaves 3-partite, margin serrate 130. *A. deversa*
 2b. Middle stem leaves 1–3-pinnatipartite or pinnatisect, segments 3–5 pairs, uppermost leaves not 3-partite, margin irregularly serrate.
 3a. Middle stem leaves sessile, lobules lanceolate, elliptic-lanceolate, or linear-lanceolate, rarely falcate-lanceolate, entire or few serrate; involucre 2.5–3.5(–4) mm in diam., disk florets 10–23 133. *A. flaccida*
 3b. Middle stem leaves petiolate, 1–3-pinnatipartite or -sect, segments irregularly serrate or lacerate; involucre 1–2.5(–3) mm in diam., disk florets 3–10.
 4a. Middle stem leaves 1 or 2(or 3)-pinnatipartite or pinnatisect, segments 3 or 4(or 5) pairs, margin lacerate; involucre 1.5–2.5(–3) mm in diam.; marginal female florets 4–10 131. *A. lactiflora*
 4b. Middle stem leaves 2- or 3-pinnatisect, segments 4 or 5 pairs, margin regularly serrate; involucre 1–1.5 mm in diam.; marginal female florets 2–4 132. *A. emeiensis*

130. *Artemisia deversa* Diels, Bot. Jahrb. Syst. 29: 618. 1901.

侧蒿 ce hao

Herbs, perennial, 50–100 cm tall, branched apically; all parts glabrous. Middle stem leaves: petiole 2–4 cm; leaf blade ovate or broadly ovate, 8–14(–18) × 4–12 cm, pinnatipartite or -cleft; segments 2(or 3) pairs, ovate, ovate-elliptic, or ovate-lanceolate, 2.5–8 × 1–5 cm, margin lacerate and serrate, apex acuminate. Uppermost leaves dichotomously (2 or 3)-partite, or entire; entire leaves elliptic or elliptic-lanceolate; distal lobes 4–8 × 2–5 cm, base attenuate, margin serrate; leaflike bracts entire or occasionally 1- or 2-partite or cleft. Synflorescence a moderately broad panicle, branches ± divaricate; ultimate branches slender, lax, sometimes several per node; bracts mostly absent. Capitula widely spaced, sessile. Involucre oblong or ellipsoid, 1.5–2.5 mm in diam. Marginal female florets 3–5. Disk florets

4–9, bisexual. Achenes oblong or obovoid-oblong. Fl. and fr. Aug–Oct.

- Forest margins, canyons, slopes, riverbanks; 1000–2300 m. SE Gansu, W Hubei, S Shaanxi, NE Sichuan.

131. *Artemisia lactiflora* Wallich ex Candolle, Prodr. 6: 115. 1838.

白苞蒿 bai bao hao

Herbs, perennial, 50–150(–200) cm tall, all parts glabrous. Lower and middle stem leaves: petiole 2–5 cm or more; leaf blade ovate or ovate-elliptic, 5.5–12.5(–31) × 4.5–8.5(–15) cm, 1 or 2(or 3)-pinnatisect, rarely partite; segments 3 or 4(or 5) pairs, very variable, ovate, ovate-elliptic, obovate, or elliptic; basal and lateral lobes larger than distal lobes, 2–8 × 1–3 cm, margin irregularly serrate, apex rounded to acuminate. Upper-

most leaves and leaflike bracts 1- or 2-pinnatipartite or -sect, margin serrate. Synflorescence a ± narrow conical panicle, often with extra panicles from upper nodes to form broad, conical, compound panicle; branches obliquely ascending; ultimate branches to 4 cm; bracts mostly absent. Capitula closely spaced, sessile. Involucre oblong, 1.5–2.5(–3) mm in diam. Marginal female florets 4–10. Disk florets 4–10, bisexual. Achenes obovoid or obovoid-oblong. Fl. and fr. Aug–Oct. $2n = 16, 18$.

Forest margins, shrublands, canyons, slopes, roadsides, riverbanks, thickets; low elevations to 3000 m. Anhui, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hainan, S Henan, Hubei, Hunan, Jiangsu, Jiangxi, Shaanxi, Sichuan, Taiwan, Yunnan, Zhejiang [Cambodia, N India, Indonesia, Laos, Singapore, N Thailand].

- 1a. Leaves ca. 31×15 cm, pinnatisect; leaflike bracts triangular 131c. var. *taibaishanensis*
 1b. Leaves 5.5–12.5(–14.5) × 4.5–8.5(–12) cm, 1- or 2(or 3)-pinnatisect or -partite; leaflike bracts pinnatipartite or pinnatisect.
 2a. Middle stem leaves 1- or 2-pinnatisect or -partite, uppermost leaves pinnatipartite or pinnatisect 131a. var. *lactiflora*
 2b. Middle stem leaves 2(or 3)-pinnatisect, uppermost leaves 1- or 2-pinnatipartite or -pinnatisect 131b. var. *incisa*

131a. *Artemisia lactiflora* var. *lactiflora*

白苞蒿(原变种) bai bao hao (yuan bian zhong)

Artemisia lactiflora f. *henryana* Pampanini; *A. lactiflora* f. *septemlobata* (H. Léveillé & Vaniot) Pampanini; *A. septemlobata* H. Léveillé & Vaniot.

Middle stem leaf blades 1- or 2-pinnatisect or -partite. Uppermost leaf blades pinnatipartite or -sect.

Forest margins, shrublands, canyons; low elevations to 3000 m. Anhui, Fujian, S Gansu, Guangdong, Guangxi, Guizhou, S Henan, Hubei, Hunan, Jiangsu, Jiangxi, S Shaanxi, Sichuan, Taiwan, Yunnan, Zhejiang [Cambodia, N India, Indonesia, Laos, Singapore, N Thailand].

Artemisia lactiflora var. *lactiflora* is used in anti-inflammatory medicines and is also cultivated as a culinary herb.

131b. *Artemisia lactiflora* var. *incisa* (Pampanini) Y. Ling & Y. R. Ling, Bull. Bot. Res., Harbin 8(4): 42. 1988.

细裂叶白苞蒿 xi lie ye bai bao hao

Artemisia lactiflora f. *incisa* Pampanini, Nuovo Giorn. Bot. Ital., n.s., 34: 675. 1927.

Middle stem leaf blades 2(or 3)-pinnatisect or -partite. Uppermost leaf blades 1- or 2-pinnatipartite or -sect.

• Forest margins, canyons, grassy slopes, roadsides; below 1800 m. W Hubei, S Shaanxi, Sichuan.

131c. *Artemisia lactiflora* var. *taibaishanensis* X. D. Cui in K. T. Fu & Z. Ying Zhang, Fl. Tsinling. 1(5): 421. 1985.

太白山白苞蒿 tai bai shan bai bao hao

Leaves ca. 31×15 cm, blade pinnatisect. Leaflike bracts triangular.

• Slopes; 1200–1900 m. Gansu (Tianshui), Shaanxi (Meixian: Taibai Shan).

132. *Artemisia emeiensis* Y. R. Ling, Bull. Bot. Res., Harbin 8(4): 42. 1988.

峨眉蒿 e mei hao

Artemisia anthriscifolia C. C. Chang, Sunyatsenia 6: 24. 1941, not Presl ex Steudel (1840), nom. subnud.

Herbs, perennial, 50–120 cm tall, glabrescent. Lowermost and middle stem leaves: petiole 2–4 cm; leaf blade ovate-oblong or ovate, 7–15 × 5–10 cm. Lower leaves 3-pinnatisect; middle leaves 2- or 3-pinnatisect; segments 4 or 5 pairs, ovate-oblong or oblong, 3–6 × 2–3 cm; lobules 2 or 3 pairs, lacerate; rachis narrowly winged. Uppermost leaves and leaflike bracts 1- or 2-pinnatisect or -partite. Capitula in somewhat broad panicles. Involucre ovoid, 1–1.5 mm in diam. Marginal female florets 2–4. Disk florets 3–8, bisexual. Achene obovoid. Fl. and fr. Aug–Nov.

• Forest margins, forest shrublands; 2500–2800 m. C Sichuan.

133. *Artemisia flaccida* Handel-Mazzetti, Acta Horti Gothob. 12: 278. 1938.

垂叶蒿 chui ye hao

Herbs, perennial, 30–75 cm tall, puberulent or glabrescent. Lowermost and middle stem leaves shortly petiolate or ± sessile; leaf blade ovate, ovate-elliptic, or elliptic, 3–4(–10) × 3–6 cm, abaxially densely gray pubescent, adaxially puberulent or glabrescent, 2- or 3-pinnatisect; segments 3–5 pairs, ovate-elliptic or oblong; lobules elliptic-lanceolate, oblanceolate, or linear-ob lanceolate, occasionally falcate-lanceolate, 2–15 × 1–4 mm, margin entire or serrate; rachis narrowly winged. Uppermost leaves and leaflike bracts 1- or 2-pinnatisect, very reduced within racemes. Synflorescence a conical panicle, sometimes very lax; branches to 3 cm (to 6 cm in cultivation). Capitula rather few, somewhat clustered toward branch apex, mostly subsessile. Involucre broadly ovoid or nearly hemispheric, 2.5–3.5(–4) mm in diam. Marginal female florets 6–12. Disk florets 10–23, bisexual. Achenes oblong or ovoid-oblong. Fl. and fr. Aug–Nov.

• Grasslands, hills, roadsides, forest margins, forests; low elevations to 4100 m. W Guizhou, Sichuan, Yunnan.

- 1a. Middle stem leaf blades with 3 or 4(or 5) pairs of segments, lobules entire or 1- or 2-toothed, apices subacute 133a. var. *flaccida*
 1b. Middle stem leaf blades with (4 or) 5 pairs of segments, lobules deeply serrate, apices acuminate 133b. var. *meiguensis*

133a. *Artemisia flaccida* var. *flaccida*

垂叶蒿(原变种) chui ye hao (yuan bian zhong)

Segments of middle stem leaves 3 or 4(or 5) pairs; lobules

entire or 1- or 2-toothed, apices subacute. Synflorescence lax to very lax.

• Grasslands, hills, roadsides; 1000–4100 m. W Guizhou, Sichuan, Yunnan.

133b. *Artemisia flaccida* var. *meiguensis* Y. R. Ling, Bull. Bot. Res., Harbin 8(3): 6. 1988.

齿裂垂叶蒿 *chi lie chui ye hao*

Segments of middle stem leaves (4 or)5 pairs, lobules deeply serrate, apices acuminate. Synflorescence relatively dense.

• Roadsides, forest margins, forests; low to middle elevations. C and E Sichuan.

134. *Artemisia anomala* S. Moore, J. Bot. 13: 227. 1875.

奇蒿 *qi hao*

Herbs, perennial, 80–150 cm tall, puberulent or glabrescent. Lower and middle stem leaves thickly papery; petiole 2–5 mm; leaf blade ovate, ovate-elliptic, ovate-lanceolate, elliptic-lanceolate, or lanceolate, 9–22 × 2.5–4(–5.5) cm, abaxially gray tomentose or glabrescent, adaxially drying dark, glabrescent, entire, rarely irregularly shallowly lobed or 3-cleft at apex. Uppermost leaves and leaflike bracts sessile, elliptic or elliptic-lanceolate. Synflorescence a ± narrow panicle, sometimes with extra panicles from upper nodes to form broad conical compound panicle; branches to 4 cm, usually less. Capitula usually very closely spaced, sessile. Involucre oblong or obovoid, 2–2.5 mm in diam.; phyllaries glabrous Marginal female florets 4–6. Disk florets 6–8, bisexual. Achenes obovoid or obovoid-oblong. Fl. and fr. Jun–Nov. $2n = 18^*$.

• Forest margins, roadsides, canyons, riverbanks, shrublands, slopes; 200–1200 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, S Henan, Hubei, Hunan, Jiangsu, Jiangxi, E Sichuan, Taiwan, Zhejiang.

1a. Leaf blades abaxially glabrescent 134a. var. *anomala*
1b. Leaf blades abaxially gray or yellowish tomentose 134b. var. *tomentella*

134a. *Artemisia anomala* var. *anomala*

奇蒿(原变种) *qi hao (yuan bian zhong)*

Leaf blades ovate, ovate-elliptic, or ovate-lanceolate, 9–12(–15) cm, abaxially glabrescent.

• Forest margins, roadsides, canyons, riverbanks, shrublands, slopes; 200–1200 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, S Henan, Hubei, Hunan, Jiangsu, Jiangxi, E Sichuan, Taiwan.

Artemisia anomala var. *anomala* is used in anti-inflammatory medicines.

Artemisia anomala “var. *acuminatissima*” (Y. R. Ling, Guihaia 12: 104. 1992; 渐尖奇蒿 *jian jian qi hao*) was described from Jiangxi and Zhejiang, and also occurs in Anhui, growing on forest margins and roadsides at low elevations. It is said to differ from var. *anomala* in having leaf blades elliptic-lanceolate or lanceolate and 18–22 cm long. However, the name was not validly published because no type was indicated (*Vienna Code*, Art. 37).

134b. *Artemisia anomala* var. *tomentella* Handel-Mazzetti, Notizbl. Bot. Gart. Berlin-Dahlem 13: 633. 1937.

密毛奇蒿 *mi mao qi hao*

Leaf blades ovate, ovate-elliptic, or ovate-lanceolate, 9–12 cm, abaxially gray or yellowish tomentose.

• N Guangdong, Guangxi, Hubei, Hunan, Jiangxi, Zhejiang.

6. *Artemisia* sect. *Dracunculus* Besser, Bull. Soc. Imp. Naturalistes Moscou 8: 3, 8. 1835 [*“Dracunculi”*].

龙蒿组 *long hao zu*

Oligosporus Cassini, Bull. Sci. Soc. Philom. Paris 1817: 33. 1817.

Shrubs, subshrubs, or herbs, perennial, annual, or biennial, puberulent or pubescent, often glabrescent, rarely tomentose, without glandular or viscid hairs (sessile glands often present). Leaves 1- or 2-pinnatisect, less often subpalmately 5–7-partite or entire; lobules 0.3–1.5(–2.5) mm wide, or pectinate, less than 1.5 × 1.5 mm. Capitula globose to ovoid. Phyllary margins scarious. Receptacle glabrous. Marginal florets 2–20(–29); corolla tubular or narrowly conical, often slightly enlarged at base, 2- or 3-toothed. Disk florets 3–20(–35), male; ovaries minute, rarely absent; style shorter than corolla, 2-cleft, lobes usually not divergent, apex clavate or funnelform.

About 80 species: N Hemisphere, mainly in arid areas, a few species in N Africa, Central America, and N South America; 35 species (17 endemic) in China.

Many species contain aromatic compounds and some sesquiterpenoids and/or limited monoterpenoids.

- 1a. Leaves entire, linear, linear-lanceolate, elliptic-lanceolate, or lanceolate, occasionally some with 1(or 2) lateral lobes or apex 3-cleft 135. *A. dracunculus*
1b. Leaves 1–3(or 4)-pinnatisect, lobules narrowly linear.
2a. Capitula (2.5–)3–6 mm in diam., or if 2.5–3 mm in diam. then plants shrubs or subshrubs, middle stem leaf lobules stiff, 1.5–3 mm wide.
3a. Plants more than 60 cm tall; involucre (3–)4–6 mm in diam., if less than 4 mm then involucre ovoid, lobules of middle stem leaves filiform or linear, 20–30 × 1.5–2.5 mm, or lobules falcate.
4a. Subshrubs, shortly capitate branched; lowermost and middle stem leaves less than 1 cm wide, pinnatisect, segments 1 or 2 pairs; capitula in spicate-racemose or narrow panicles; capitula 5–6 mm in diam. 139. *A. kangmarensis*

- 4b. Shrubs, much branched; middle stem leaves (1 or)2-pinnatisect, segments 2 or 3 pairs, or 4 pairs and then leaves ovate or broadly ovate, more than 1 cm wide; capitula in broad or narrow panicles; capitula (2.5–)3–5 mm in diam.
- 5a. Capitula ovoid, erect, in broad and branched or somewhat broad panicles; stem purple; lower leaves with 3–5 pairs of segments, middle leaves with (2 or)3 or 4 pairs of segments 138. *A. halodendron*
- 5b. Capitula globose or subglobose, nodding, in broad or narrow panicles; stem gray, brown or yellowish; lower leaves with 2–4 pairs of segments, middle leaves with 2 or 3(or 4) pairs.
- 6a. Middle stem leaves (5–)6–8 × 3–4 cm, segments 2 or 3(or 4) pairs, lobules narrowly linear, straight; capitula in narrow or somewhat broad panicles; stem gray 137. *A. wudanica*
- 6b. Middle stem leaves 2–5(–8) × 1.5–3(–4) cm, segments (1 or)2 or 3 pairs, lobules linear or falcate; capitula in lax and broad panicles; stem yellowish 136. *A. sphaerocephala*
- 3b. Plants to 20–50(–60) cm tall; capitula (2.5–)3(–4) mm in diam., or if more than 4 mm then capitula globose and lobules in middle stem leaves linear to filiform, 5–10 × 0.5–1 mm, or leaves palmately 5–7-partite.
- 7a. Stem unbranched or few and shortly capitate branched, pubescent; leaves palmately 5–7-partite, sericeous-pubescent on both surfaces; capitula in narrow panicles; phyllaries pubescent 155. *A. kuschakewiczii*
- 7b. Stem branched, pubescent or glabrescent; leaves 1 or 2(or 3)-pinnatisect; capitula in broad or narrow panicles; phyllaries pubescent or glabrescent.
- 8a. Lowermost and middle stem leaves 2(or 3)-pinnatisect, lobules 0.5–0.8 mm wide; capitula hemispheric, pedunculate, in narrow racemelike panicles 165. *A. oligocarpa*
- 8b. Lowermost and middle stem leaves 1- or 2-pinnatisect, lobules 1–2.5 mm wide; capitula not hemispheric, if pedunculate then leaf lobes falcate; capitula in broad or narrow panicles.
- 9a. Stem less than 30 cm tall; leaflike bracts 2–3 × capitula and longer than fertile branches; synflorescence a narrow panicle.
- 10a. Middle stem leaves 1–2 × 0.5–1.5 cm, pinnatisect, midvein flat 150. *A. wellbyi*
- 10b. Middle stem leaves 3.5–4.5 × 2–3 cm, 2-pinnatisect, midvein abaxially prominent, white 152. *A. gyangzeensis*
- 9b. Stem 30–60 cm tall; leaflike bracts longer than capitula but shorter than fertile branches; synflorescence a broad panicle.
- 11a. Lateral lobes of middle stem leaves linear, linear-lanceolate, or falcate-lanceolate, 1.5–2.5 mm wide 151. *A. waltonii*
- 11b. Lateral lobes of middle stem leaves narrowly linear or filiform, straight, 1–1.5 mm wide 142. *A. prattii*
- 2b. Capitula 1–2.5(–3) in diam.; middle stem leaf lobules narrowly linear or filiform, 0.5–1.5(–2) mm wide; or if capitula 2–2.5(–3) mm in diam. then plants herbaceous, lobules of leaves thin, 0.5–1 mm wide.
- 12a. Shrubs or caespitose subshrubs, with strong woody stock; lobules of middle stem leaves narrowly linear or filiform, 0.5–1.5(–2) mm wide; growing in arid areas.
- 13a. Lower branches more than 12 cm, upper branches more than 5 cm; capitula in broad panicles.
- 14a. Petiole in middle stem leaves 2–3(–4.5) cm; capitula subglobose 143. *A. klementzae*
- 14b. Leaves sessile or petioles less than 1.5 cm in middle stem leaves; capitula ovoid or ovoid-ellipsoid.
- 15a. Middle stem leaves pinnatisect, lobes 0.5–1 mm, rarely mixed 1- or 2-lobuled at basal or middle lobes 141. *A. ordosica*
- 15b. Middle stem leaves (1 or)2-pinnatisect, 3-lobuled at basal and middle lobes, lobes or lobules 1.5–2 mm.
- 16a. Branches many, nearly horizontal; lobule apex obtuse, mucronulate 140. *A. songarica*
- 16b. Branches ascending; lobule apex acute.
- 17a. Bark usually deciduous; lobules 15–20 × 1.5–2 mm 146. *A. oxycephala*
- 17b. Bark persistent; lobules 4–10 × (0.5–)1–1.5 mm 147. *A. campestris*
- 13b. Lower branches 4–10 cm, upper branches 3–5 cm; capitula in narrow or somewhat broad panicles.
- 18a. Lower and middle stem leaves pinnatisect, segments of lowermost leaves 2 or 3 pairs, segments of middle leaves 1 or 2 pairs.
- 19a. Ultimate lobules of leaves 1.5–2.5 mm wide; involucre 2–2.5 mm in diam. 145. *A. xanthochroa*
- 19b. Ultimate lobules of leaves 0.5–1.5 mm; involucre 2–2.5(–3) mm in diam.

- 20a. Involucre semi-globose or subglobose, 2.5(–3) mm in diam.; disk florets 5–10 154. *A. nortonii*
- 20b. Involucre ovoid-oblong or ellipsoid, 2–2.5 mm in diam.; disk florets 4–6 149. *A. saposhnikovii*
- 18b. Lowermost and middle stem leaves 2(or 3)-pinnatisect, segments of lowermost leaves 4 or 5 pairs.
- 21a. Middle stem leaf segments 3 or 4(or 5) pairs; synflorescence a broad, conical panicle 148. *A. marschalliana*
- 21b. Middle stem leaf segments 2 or 3 pairs; synflorescence a narrow, cylindrical panicle.
- 22a. Lowermost and middle stem leaves 1.5–2.5 × 1–1.5 cm, lowermost 1- or 2-pinnatisect, segments 2–5 pairs; capitula 1.5–2.5 mm in diam., in narrow panicles 153. *A. xigazeensis*
- 22b. Lowermost and middle stem leaves less than 1 × 1 cm, 2-pinnatisect, segments 2 pairs; capitula 1–1.5 mm in diam., in somewhat broad or narrow panicles 144. *A. globosoides*
- 12b. Perennial, annual, or biennial herbs, root solitary, or nearly subshrubs but not caespitose and lobules of leaves thin and soft, other lobules narrowly linear, filiform, or linear-lanceolate, less than 1 mm wide; not growing in arid areas.
- 23a. Annual, biennial, or perennial herbs, root solitary, narrowly fusiform; lobules of middle stem leaves soft and thin, narrowly linear-filiform or narrowly linear-lanceolate, 0.2–0.5(–1) mm wide.
- 24a. Segments of middle stem leaves 5–8 pairs; phyllaries gray puberulent 169. *A. blepharolepis*
- 24b. Segments of middle stem leaves (1 or)2–4 pairs; phyllaries often glabrous or glabrescent.
- 25a. Middle stem leaves 2-pinnatisect, segments (3 or)4 pairs; capitula densely spicate on branches and in narrow or somewhat broad panicles 167. *A. stricta*
- 25b. Middle stem leaves 1- or 2-pinnatisect, segments (1 or)2 or 3 pairs; capitula spreading on branches and in broad paniculate or spicate-panicles.
- 26a. Plants less than 20 cm tall, branched from base of stem, and usually procumbent; middle stem leaves pinnatisect; capitula in spicate panicles 160. *A. demissa*
- 26b. Plants more than 20 cm tall, branched from middle or basally on stem; middle stem leaves 2-pinnatisect; capitula in broad panicles.
- 27a. Middle stem leaves gray or yellowish sericeous-pubescent, later glabrescent; capitula 1.5–2 mm in diam., sessile or shortly pedunculate, in broad panicles 166. *A. scoparia*
- 27b. Middle stem leaves persistent pubescent; capitula 1–1.5 mm in diam., shortly pedunculate, in much-branched panicles 168. *A. pewzowii*
- 23b. Perennial herbs, or nearly subshrubs, roots several, rarely solitary, but not narrowly fusiform; lobules in middle stem leaves narrowly linear, more than (0.5–)1 mm wide.
- 28a. Plants less and shorter branched; capitula in narrow panicles 161. *A. macilenta*
- 28b. Plants more and long branched; capitula in broad or somewhat broad, rarely narrow, panicles.
- 29a. Capitula 1–1.5(–2) mm in diam., spreading apically on branches or branchlets and in broad and elongated panicles.
- 30a. Basal and lowermost leaves 7–8 × 5–7.5 cm, 2- or 3-pinnatisect or -partite, lobules 10–20 × 2–4 mm; phyllaries revolute at apex 162. *A. chienshanica*
- 30b. Basal and lowermost leaves 2–4(–5) × 1.5–3.5 cm, 2(or 3)-pinnatisect, lobules 5–10 × 0.5–1.5(–2) mm; phyllaries erect at apex 163. *A. capillaris*
- 29b. Capitula 1.5–2 mm in diam., spreading on whole branches or branchlets.
- 31a. Middle stem leaves 1(or 2)-pinnatisect, segments 1 or 2(or 3) pairs, lobules narrowly linear; capitula several, in narrow or somewhat broad panicles.
- 32a. Middle stem leaves 3–3.5 × 3–4 cm, lobes (10–)20–30 × 1–2 mm; capitula in narrow panicles 164. *A. morrisonensis*
- 32b. Middle stem leaves 1.5–2.5 × 1.5–2.5 cm, lobes 3–5 × 0.5–1 mm; capitula in somewhat broad panicles 159. *A. gansuensis*
- 31b. Middle stem leaves 1-pinnatisect, or 2-pinnatisect and then lobes or lobules linear-lanceolate or nearly subulate, segments in middle stem leaves (2 or)3 pairs; capitula in broad or somewhat broad, rarely narrow, panicles.

- 33a. Branches and leaves gray pubescent, later glabrescent; lobules of leaves narrowly linear or narrowly linear-lanceolate 158. *A. pubescens*
 33b. Branches and leaves persistent gray or yellowish pubescent; lobules of leaves linear-lanceolate or narrowly linear-subulate or subulate.
 34a. Branches and leaves densely gray pubescent; lobules of leaves linear-lanceolate 156. *A. Forrestii*
 34b. Branches and leaves densely yellowish pubescent; lobules of leaves narrowly linear-lanceolate or subulate 157. *A. mairei*

135. *Artemisia dracunculus* Linnaeus, Sp. Pl. 2: 849. 1753.

龙蒿 long hao

Subshrubs, (20–)40–150(–200) cm tall, with branched, woody rhizome; all parts densely to sparsely puberulent or tomentose, sparser with age, sometimes glabrescent. Leaves sessile or subsessile; basal leaf blades entire or 2- or 3-lobed at tip. Middle stem leaves linear-lanceolate, elliptic-lanceolate, or linear, (1.5–)3–7(–10) × (0.1–)0.2–0.6(–1) cm, entire or with apex 3-partite or -cleft, or with 1(or 2) small lateral lobes. Uppermost leaves and leaflike bracts linear or lanceolate, 5–30 × 1–2 mm. Synflorescence a broad to racemelike leafy panicle; branches ascending to erect, sometimes appressed, to 10 cm. Capitula remote to approximate, nodding; peduncles curved, to 5 mm. Involucre subglobose, ovoid, or hemispheric, 2–5 mm in diam.; phyllaries glabrescent, scarious margin broad, outer phyllaries oblong or lanceolate, inner orbicular-oblong. Marginal female florets 6–10[–15]; corolla 0.5–1 mm, glandular, 2-fid. Disk florets 4–14, male; corolla campanulate, 2–2.5, 5-lobed. Achenes obovoid or obovoid-ellipsoid. Fl. and fr. Jul–Oct. 2n = 18, 36, 54, 72, 90.

Dry slopes, steppes, semidesert steppes, forest steppes, forest margins, waste areas, roadsides, terraces, subalpine meadows, meadow steppes, dry river valleys, rocky slopes, saline-alkaline soils; 500–3800 m. Gansu, Heilongjiang, Jilin, Liaoning, Nei Mongol, Ningxia, Qinghai, N Shaanxi, N Shanxi, Xinjiang, W Xizang [Afghanistan, N India, Kazakhstan, Mongolia, N and W Pakistan, Russia, Tajikistan; C and SW Asia, C, E, and W Europe, North America].

Artemisia dracunculus is cultivated as a culinary herb in Europe and used as a source of winter fodder for sheep in Xizang.

- 1a. Stem shortly capitate branched, stem, branches, leaves, and phyllaries densely tomentose, later sparsely tomentose; leaves entire 135e. var. *pamirica*
 1b. Stem much branched, stem, branches, leaves, and phyllaries glabrescent; leaves lobed or divided.
 2a. Leaves elliptic-lanceolate or lanceolate, 3–6 mm wide, entire or some leaves 3-partite or -cleft at apex 135b. var. *turkestanica*
 2b. Leaves linear or lanceolate, 1–2(–3) mm wide, entire or some leaves with 1(or 2) small linear lateral lobes.
 3a. Peduncles 2–5 mm; panicles lax and narrow 135d. var. *qinghaiensis*

3b. Peduncles ± absent.

- 4a. Involucre 2–2.5(–3) mm in diam.; capitula in ± broad panicles 135a. var. *dracunculus*
 4b. Involucre 3–4 mm in diam.; synflorescence racemelike 135c. var. *changaica*

135a. *Artemisia dracunculus* var. *dracunculus*

龙蒿(原变种) long hao (yuan bian zhong)

Artemisia desertorum Sprengel var. *macrocephala* Franchet; *A. dracunculus* var. *inodora* Besser, p.p.; *A. dracunculus* f. *minor* Komarov; *A. inodora* Willdenow (1809), not Miller (1768), nor M. Bieberstein (1808); *Oligosporus dracunculus* (Linnaeus) Poljakov.

Plants glabrescent. Leaf blade linear-lanceolate or linear, 1–2(–3) mm wide, entire or with 1(or 2) small lateral lobes. Synflorescence a ± broad panicle. Capitula sessile. Involucre globose or subglobose, 2–2.5(–3) mm in diam.

Dry slopes, steppes, semidesert steppes, forest steppes, forest margins, waste areas, roadsides, terraces, subalpine meadows, saline-alkaline soils; 500–3800 m. W Gansu, Heilongjiang, Jilin, Liaoning, Nei Mongol, Ningxia, Qinghai, N Shaanxi, N Shanxi, Xinjiang [Afghanistan, N India, Mongolia, N Pakistan, Russia; C and SW Asia, C, E, and W Europe, North America].

135b. *Artemisia dracunculus* var. *turkestanica* Krascheninnikov, Mater. Istorii Fl. Rastitel'n. S.S.S.R. 2: 177. 1946.

宽裂龙蒿 kuan lie long hao

Leaf blade elliptic-lanceolate to lanceolate, 3–6 mm wide, apex usually 3-partite to 3-fid. Capitula ± sessile or shortly pedunculate. Involucre 3–4 mm in diam.

Dry river valleys, terraces, steppes, roadsides, waste areas; 800–2500 m. Xinjiang [Kazakhstan].

135c. *Artemisia dracunculus* var. *changaica* (Krascheninnikov) Y. R. Ling, Bull. Bot. Res., Harbin 2(2): 36. 1982.

杭爱龙蒿 hang ai long hao

Artemisia changaica Krascheninnikov, Trudy Bot. Inst. Akad. Nauk S.S.S.R., Ser. 1, Fl. Sist. Vyssh. Rast. 3: 346. 1937; *Oligosporus changaicus* (Krascheninnikov) Poljakov.

Leaf blade linear-lanceolate or linear, entire or usually with 1(or 2) small linear lateral lobes. Synflorescence racemelike. Capitula ± sessile. Involucre 3–4 mm in diam.

Gansu, Ningxia, Qinghai, Xinjiang [Mongolia].

135d. *Artemisia dracunculus* var. *qinghaiensis* Y. R. Ling, Bull. Bot. Res., Harbin 8(4): 44. 1988.

青海龙蒿 qing hai long hao

Leaf blade linear-lanceolate or linear. Synflorescence a lax panicle. Capitula with 2–5 mm peduncles, nodding. Involucre 2–5 mm in diam.

- Waste areas, roadsides; 2500–3500 m. E and N Qinghai.

135e. *Artemisia dracunculus* var. *pamirica* (C. Winkler) Y. R. Ling & Humphries, Bull. Bot. Res., Harbin 8(4): 45. 1988.

帕米尔蒿 pa mi er hao

Artemisia pamirica C. Winkler, Trudy Imp. S.-Peterburgsk. Bot. Sada 11: 329. 1890; *A. pamirica* var. *aschurbazewii* C. Winkler; *A. pamirica* f. *trifida* C. Winkler; *A. simplicifolia* Pampanini; *Oligosporus pamiricus* (C. Winkler) Poljakov.

Fertile shoots many, 20–30(–40) cm tall. Stem, branches, and leaves densely tomentose, later sparsely so. Leaves closely spaced; leaf blade lanceolate, entire. Synflorescence a dense, narrow panicle. Capitula closely spaced along short lateral branches.

Rocky slopes, meadow steppes; 3000–3400 m. Qinghai, W Xinjiang, W Xizang [Afghanistan, W Pakistan, Tajikistan].

136. *Artemisia sphaerocephala* Krascheninnikov, Trudy Bot. Inst. Akad. Nauk S.S.S.R., Ser. 1, Fl. Sist. Vyssh. Rast. 3: 348. 1937.

圆头蒿 yuan tou hao

Artemisia salsoloides Willdenow var. *mongolica* Pampanini, p.p.; *Oligosporus sphaerocephalus* (Krascheninnikov) Poljakov.

Shrubs, 80–150 tall, with a strong woody stock, long and shortly branched, puberulent or glabrescent, incanous or yellowish, bark flaking off. Leaves ± succulent. Lower and middle stem leaves: petiole 0.3–0.8 cm; leaf blade broadly ovate or ovate, 2–5(–8) × 1.5–3(–4) cm, puberulent or glabrescent, 1- or 2-pinnatisect; segments (1 or)2 or 3 pairs, lateral middle lobes longer than other lobes, 3-sect; lobules linear or falcate, (5–)10–20(–30) × (1–)1.5–2 mm, apex mucronulate. Uppermost leaves pinnatisect or 3-lobed; leaflike bracts linear, entire. Synflorescence a broad, much-branched panicle. Capitula shortly pedunculate, nodding. Involucre globose or subglobose, 3–4 mm in diam.; phyllaries ± leathery. Marginal female florets 4–12. Disk florets 6–20, male. Achenes minute, obovoid. Fl. and fr. Jul–Oct.

Dunes of desert areas, desert steppes, dry slopes; 1000–2900 m. N and W Gansu, SW Nei Mongol, Ningxia, N Qinghai, N Shaanxi, N Shanxi, E Xinjiang [S Mongolia].

Artemisia sphaerocephala is used for windbreaks and sand stabilization, and it is used medicinally.

137. *Artemisia wudanica* Liou & W. Wang, Acta Phytotax. Sin. 17(4): 88. 1979.

乌丹蒿 wu dan hao

Shrubs, 100–200 cm tall or more, gray, with many long branches, branchlets, and short branches. Lower and middle stem leaves: petiole 5–6 cm; leaf blade broadly ovate, (5–)6–8 × 3–4 cm, 2-pinnatisect; segments 2 or 3(or 4) pairs, 2- or 3-lobed; lobules linear, 20–40 × 1.5–2.5 mm, apex mucronulate. Uppermost leaves and leaflike bracts pinnatisect or 3-lobed; lobes linear. Synflorescence a narrow or moderately broad panicle. Capitula shortly pedunculate, nodding. Involucre globose or subglobose, 4–5 mm in diam. Marginal female florets 7–9. Disk florets 14–22, male. Achenes oblong-obovoid. Fl. and fr. Jul–Oct.

- Dunes of desert areas; low to middle elevations. N Hebei, S Nei Mongol.

Artemisia wudanica is used for windbreaks and sand stabilization.

138. *Artemisia halodendron* Turczaninow ex Besser, Bull. Soc. Imp. Naturalistes Moscou 8: 19. 1835.

盐蒿 yan hao

Artemisia intramongolica H. C. Fu; *A. intramongolica* var. *microphylla* H. C. Fu; *Oligosporus halodendron* (Turczaninow ex Besser) Poljakov.

Shrubs, 50–80 tall, with many long branches and branchlets, glabrescent, purple. Leaves puberulent or glabrescent. Lower and middle stem leaves: petiole 1–4 cm; leaf blade broadly ovate or suborbicular, 1- or 2-pinnatisect; segments (2 or)3 or 4 pairs, basal lobes longer than others; lobules 1 or 2 pairs, linear, 10–15(–20) × 0.5–1 mm, apex mucronulate. Uppermost leaves and leaflike bracts 3–5-sect or entire. Synflorescence a broad, much-branched panicle. Capitula many, shortly pedunculate or ± sessile, erect. Involucre ovoid, (2.5–)3–4 mm in diam. Marginal female florets 4–8. Disk florets 8–15, male. Achenes ovoid-oblong or obovoid-ellipsoid. Fl. and fr. Jul–Oct.

Dunes of desert areas, desert steppes, steppes, forest steppes, rocky slopes. N Gansu, N Hebei, W Heilongjiang, W Jilin, W Liaoning, Nei Mongol, Ningxia, N Shaanxi, N Shanxi, E Xinjiang [Mongolia, Russia].

Artemisia halodendron is used for windbreaks and sand stabilization.

139. *Artemisia kangmarensis* Y. Ling & Y. R. Ling, Acta Phytotax. Sin. 18: 510. 1980.

康马蒿 kang ma hao

Subshrubs, 30–40 cm tall, with short capitate branches, puberulent or glabrescent. Lower and middle stem leaves ± sessile; leaf blade oblong or elliptic, 1–2.5 × 0.5–1 cm, abaxially puberulent or glabrescent, pinnatisect; segments 1 or 2 pairs; lobes linear, linear-lanceolate, or falcate, 3–6 × ca. 1 mm. Upper leaves and leaflike bracts 3-lobed or entire. Synflorescence a narrow, spikelike panicle. Capitula sessile or shortly pedunculate. Involucre globose or hemispheric, 5–6 mm in diam. Marginal female florets 8–15. Disk florets 20–35, male; corolla limb puberulent. Achenes obovoid or ovoid. Fl. and fr. Aug–Oct.

- Roadsides, slopes; 4300–4500 m. E Xizang.

140. *Artemisia songarica* Schrenk ex Fischer & C. A. Meyer, Enum. Pl. Nov. 1: 49. 1841.

准噶尔沙蒿 zhun ga er sha hao

Oligosporus songaricus (Schrenk ex Fischer & C. A. Meyer) Poljakov.

Shrubs, 30–80 cm tall, with a thick rootstock, branches many, nearly horizontal, puberulent or glabrescent. Lower and middle stem leaves sessile; leaf blade ovate-oblong, 2–4 × ca. 2 cm, 1- or 2-pinnatisect; segments 2 or 3 pairs, lateral and basal lobes usually 3-sect; lobules linear, 5–10(–12) × 1.5–2 mm, apex mucronulate. Uppermost leaves and leaflike bracts linear. Synflorescence a lax, broad panicle. Capitula sessile or shortly pedunculate, nodding. Involucre ovoid, 1.5–2 mm in diam. Marginal female florets 4 or 5. Disk florets 6–10, male. Achenes ovoid. Fl. and fr. Jun–Oct. $2n = 18$.

Dunes of desert areas, rocky slopes; low to middle elevations. N Xinjiang [Kazakhstan].

141. *Artemisia ordosica* Krascheninnikov, Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk S.S.S.R. 9: 173. 1946.

黑沙蒿 hei sha hao

Artemisia ordosica var. *furva* H. C. Fu; *A. ordosica* var. *montana* H. C. Fu; *A. salsoloides* Willdenow var. *mongolica* Pampanini, p.p.

Shrubs, 50–100 cm tall, with a strong woody stock, much branched, purple or later brown. Lowermost leaf blades 3–5(–7) × 2–4 cm, 1- or 2-pinnatisect, basal lobes 2- or 3-lobuled. Middle stem leaves ± sessile; leaf blade pinnatisect; segments 3 or 4 pairs, linear, 15–30 × 0.5–1 mm, straight or falcate. Uppermost leaves and leaflike bracts 3- or 5-sect or entire. Synflorescence a broad panicle, nodding or oblique. Involucre ovoid, 1.5–2.5 mm in diam. Marginal female florets 10–14. Disk florets 5–7, male. Achenes obovoid. Fl. and fr. Jul–Oct. $2n = 36^*$.

• Dunes, desert areas, dry slopes, desert steppes; low elevations to 1500 m. N Hebei, Nei Mongol, N Shanxi; cultivated in C and W Gansu, Ningxia, N Shaanxi, and Xinjiang.

Artemisia ordosica is used for windbreaks and sand stabilization. It is also used for making anti-inflammatory drugs.

142. *Artemisia prattii* (Pampanini) Y. Ling & Y. R. Ling, Acta Phytotax. Sin. 18: 511. 1980.

藏岩蒿 zang yan hao

Artemisia salsoloides Willdenow var. *prattii* Pampanini, Nuovo Giorn. Bot. Ital., n.s., 34: 698. 1927; *A. salsoloides* f. *halodendron* Pampanini; *A. salsoloides* f. *paniculata* (J. D. Hooker) Pampanini; *A. salsoloides* var. *paniculata* J. D. Hooker.

Subshrubs, 30–60 cm tall, branching from below middle, branches ascending, most parts adpressed pubescent, hairs medifixed, ± rapidly glabrescent. Lowermost leaves shortly petiolate. Middle stem leaves sessile; leaf blade oblong or suborbicular, 2–3 × 2–2.5 cm, pinnatisect [to palmatisect]; segments 2 or 3 pairs, linear, occasionally forked, 8–12 × 1–1.5 mm. Uppermost leaves 3- or 5-lobed; leaflike bracts linear.

Synflorescence a lax conical panicle, to 40 cm; branches elongated. Capitula solitary or in groups of 2 or 3, nodding, secund, sometimes peduncle longer than involucre, bracteolate. Involucre globose, ovoid, or broadly ovoid, 2.5–3 mm in diam.; phyllaries glabrous. Marginal female florets 5–8. Disk florets 6–15, male. Achenes obovoid or ovoid-ellipsoid. Fl. and fr. Jul–Sep.

• Dry hills, subalpine semidesert steppes; 2500–3600 m. SE Qinghai, W Sichuan, E Xizang.

143. *Artemisia klementzae* Krascheninnikov, Mater. Istorii Fl. Rastitel'n. S.S.S.R. 2: 163. 1946.

蒙古沙地蒿 meng gu sha di hao

Artemisia xylophiza Krascheninnikov ex Filatova.

Shrubs, 30–60 cm tall, with a thick rootstock, much branched. Lower and middle stem leaves: petiole 2–3(–4.5) cm; leaf blade broadly ovate or suborbicular, 2–3 × 2–3 cm, 1- or 2-pinnatisect; segments 2(or 3) pairs, lateral middle lobes 3-lobed; lobes or lobules linear, 10–15 × 0.5–1 mm. Uppermost leaves and leaflike bracts 3- or 5-lobed or entire. Synflorescence a broad panicle. Capitula nodding. Involucre subglobose, 2–2.5 mm in diam. Marginal female florets 3–5. Disk florets 5–10, male. Achenes obovoid. Fl. and fr. Jul–Oct.

Dunes of desert and semidesert areas, steppes; below 1500 m. E and SE Nei Mongol [Mongolia].

144. *Artemisia globosoides* Y. Ling & Y. R. Ling, Bull. Bot. Res., Harbin 5(2): 7. 1985.

假球蒿 jia qiu hao

Subshrubs, 30–35 cm tall, with a thick rootstock. Lower and middle stem leaves: petiole 1–1.5 cm; leaf blade suborbicular, oblong, or ovate, 0.5–0.8 × 0.5–0.8 cm, pubescent or glabrescent, 2-pinnatisect; segments 2 pairs, 2- or 3-sect; lobules linear or narrowly lanceolate, 2–3 × ca. 1 mm, apex mucronulate. Upper leaves and leaflike bracts 3- or 5-sect. Synflorescence a ± narrow panicle. Capitula nodding. Involucre ovoid, 1–1.5 mm in diam. Marginal female florets 2–4. Disk florets 3–5, male. Achenes obovoid. Fl. and fr. Aug–Oct.

• Sand dunes, dune margins, waste areas. Nei Mongol, Ningxia.

145. *Artemisia xanthochroa* Krascheninnikov, Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk S.S.S.R. 9: 174. 1946.

黄绿蒿 huang lü hao

Oligosporus xanthochrous (Krascheninnikov) Poljakov.

Subshrubs, 20–60 cm tall, pubescent or glabrescent. Lower and middle stem leaves: petiole 5–15 mm; leaf blade ovate, 1.5–2 × 1.5–2 cm, pinnatisect; segments of lower leaves 2 or 3 pairs, segments of middle leaves 1 or 2 pairs, linear or linear-lanceolate, 5–10 × 1.5–2.5 mm. Capitula in narrow or somewhat broad panicles. Involucre ovoid, 2–2.5 mm in diam. Marginal female florets 3–6. Disk florets 3–7, bisexual. Achene ovoid. Fl. and fr. Aug–Oct.

Dry slopes, steppes, Gobi Desert. N Nei Mongol [Mongolia].

146. *Artemisia oxycephala* Kitagawa, Rep. Exped. Manchoukuo Sect. IV, 4: 93. 1936.

光沙蒿 *guang sha hao*

Artemisia pubescens Ledebour var. *oxycephala* (Kitagawa) Kitagawa.

Subshrubs, 50–80 cm tall, with a thick rootstock. Lowermost leaves long petiolate; middle stem leaves \pm sessile; leaf blade broadly ovate or suborbicular, 2–5 \times 2–3 cm, puberulent or glabrescent, 2-pinnatisect; segments 2 or 3 pairs; lateral lobes 3-sect; lobules linear, 15–20 \times 1.5–2 mm. Uppermost leaves and leaflike bracts 3–5-sect or entire. Synflorescence a lax, \pm broad panicle. Involucre oblong, 1.5–2.5(–3.5) mm in diam. Marginal female florets 8–14. Disk florets 3–10, male. Achenes oblong. Fl. and fr. Aug–Oct.

• Steppes, dry hills, dunes, saline-alkaline soils, lakeshores, forest steppes; low elevations. N Hebei, W Heilongjiang, W Jilin, W Liaoning, Nei Mongol, N Shanxi.

147. *Artemisia campestris* Linnaeus, Sp. Pl. 2: 846. 1753.

荒野蒿 *huang ye hao*

Oligosporus campestris (Linnaeus) Cassini.

Shrubs, 30–60[–150] cm tall, with a strong woody stock, much branched, faintly aromatic, pubescent or glabrescent. Lowermost leaves: petiole 3–5 cm; leaf blade broadly ovate or ovate, (3–)4–5(–8) \times 2.5–5 cm, 2(or 3)-pinnatisect; segments 4 or 5 pairs, 3–5-sect; lobules narrowly linear or narrowly linear-lanceolate, 4–10 \times (0.5–)1–1.5[–2] mm, apex mucronulate. Middle stem leaves sessile, 1- or 2-pinnatisect; segments 3 or 4 pairs. Uppermost leaves and leaflike bracts 3–5-sect or entire. Synflorescence a lax, broad panicle. Involucre ovoid, 1.5–2.5 mm in diam. Marginal female florets 3–6[–20]. Disk florets 6–10[–30], bisexual. Achene obovoid. Fl. and fr. Jul–Oct. $2n = 18$, 36.

Steppes, waste areas, rocky slopes, dune margins; 300–3100 m. N Gansu, Taiwan, Xinjiang [Japan, Russia; C Asia, Europe, North America].

We have not seen material of *Artemisia campestris* var. *glomerata* Pampanini (Nuovo Giorn. Bot. Ital., n.s., 34: 642. 1927), described as an annual with \pm filiform leaf segments.

148. *Artemisia marschalliana* Sprengel, Syst. Veg. 3: 496. 1826.

中亚旱蒿 *zhong ya han hao*

Subshrubs or small shrubs, 30–70(–80) cm tall, with a thick rootstock, gray pubescent or sericeous-pubescent, persistent or glabrescent. Lower stem leaves: petiole 3–6 cm; leaf blade oblong-ovate or ovate, (3–)4–8(–10) \times 2–5(–6) cm, 2(or 3)-pinnatisect; segments 4–6 pairs, 3–5-lobuled. Middle and upper stem leaves petiolate; leaf blade 1- or 2-pinnatisect; segments 3 or 4(or 5) pairs; lobules linear or linear-lanceolate, 6–15 \times (0.5–)1–1.5 mm, apex mucronulate. Leaflike bracts 3–5-sect or entire. Synflorescence a broad to slender, erect or ascending, conical panicle, sometimes with lateral branches to form compound panicle; branches short, mostly less than 1 cm. Capitula contiguous along ultimate branches, \pm sessile, erect.

Involucre ovoid or broadly ovoid, 1.5–2.5(–3) mm in diam. Marginal female florets 3–8. Disk florets 5–15, male. Achenes ovoid. Fl. and fr. Jul–Oct.

Steppes, forest steppes, wastelands, rocky slopes, hills; 500–2200 m. N Xinjiang [Kazakhstan, Russia; Europe].

- 1a. Stem, branches, leaves, and phyllaries gray pubescent, later glabrescent; synflorescence an ascending, slender conical panicle 148a. var. *marschalliana*
- 1b. Stem, branches, leaves, and phyllaries persistently sericeous-pubescent; synflorescence a broad, compound panicle 148b. var. *sericophylla*

148a. *Artemisia marschalliana* var. *marschalliana*

中亚旱蒿(原变种) *zhong ya han hao (yuan bian zhong)*

Artemisia inodora M. Bieberstein, Fl. Taur.-Caucas. 2: 295. 1808, not Miller (1768), nor Willdenow (1809); *A. campestris* Linnaeus var. *gmeliniana* Besser; *A. campestris* var. *marschalliana* (Sprengel) Poljakov; *A. campestris* var. *steveniana* Besser; *A. tomentella* Trautvetter var. *subglabra* Krascheninnikov; *Oligosporus marschallianus* (Sprengel) Lessing.

Stems with few branches above base; vegetative parts and phyllaries gray pubescent, later glabrescent. Synflorescence a slender, ascending conical panicle.

Steppes, forest steppes, wastelands, rocky slopes, hills; 500–2200 m. N Xinjiang [Kazakhstan, Russia; Europe].

148b. *Artemisia marschalliana* var. *sericophylla* (Ruprecht) Y. R. Ling, Bull. Bot. Res., Harbin 8(4): 48. 1988.

绢毛旱蒿 *juan mao han hao*

Artemisia sericophylla Ruprecht, Beitr. Pflanzenk. Russ. Reiches 2: 41. 1845; *A. campestris* var. *sericophylla* (Ruprecht) Poljakov.

Stem, branches, leaves, and phyllaries persistently sericeous-pubescent. Stems branching to form a broad compound panicle.

Steppes, forest steppes, wastelands, rocky slopes, hills; 500–2200 m. N Xinjiang [Kazakhstan, Russia; Europe].

149. *Artemisia saposchnikovii* Krascheninnikov ex Poljakov, Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk S.S.S.R. 17: 412. 1955.

昆仑沙蒿 *kun lun sha hao*

Subshrubs, 30–40 cm tall, with a thick rootstock and capitate branches. Lower and middle stem leaves: petiole 3–15 mm; leaf blade ovate, 1–3 \times 0.5–2.5 cm, yellowish pubescent or glabrescent, 1(or 2)-pinnatisect; segments 2 pairs, linear, straight or falcate, 3–8(–15) \times 0.5–1 mm, margin deeply serrate, apex obtuse and mucronulate. Uppermost leaves and leaflike bracts pinnatisect, 3-sect, or entire. Synflorescence a narrow panicle. Capitula contiguous along ultimate branches, nodding. Involucre oblong-ovoid or ellipsoid, 2–2.5 mm in diam. Marginal female florets 4 or 5. Disk florets 4–6, male. Achenes oblong or oblong-obovoid. Fl. and fr. Aug–Oct. $2n = 36$.

Rocky terraces, canyons, dry valleys, roadsides; 1300–2500 m. SW Xinjiang [Kyrgyzstan].

150. *Artemisia wellbyi* Hemsley & H. Pearson, J. Linn. Soc., Bot. 35: 183. 1902.

藏沙蒿 zang sha hao

Artemisia salsoloides Willdenow var. *wellbyi* (Hemsley & H. Pearson) Ostenfeld & Paulsen; *Oligosporus wellbyi* (Hemsley & H. Pearson) Poljakov.

Subshrubs, 15–28 cm tall, with a thick stock, densely gray or yellowish and sericeous-pubescent. Lower and middle stem leaves: petiole 5–20 mm. Lower leaves ovate or elliptic-ovate, 1.5–2.5 × 0.8–1.8 cm, 2-pinnatisect; segments 3 or 4 pairs; lobules linear or linear-lanceolate, 4–5 × 0.5–2 mm. Middle stem leaves elliptic-ovate, 10–20 × 5–15 mm, 1(or 2)-pinnatisect; segments 3(or 4) pairs; lobules 4–10(–18) × 1–1.5 mm. Uppermost leaves and leaflike bracts 3- or 5-sect or entire. Synflorescence a lax, narrow panicle. Capitula initially dense, later lax. Involucre ovoid or subglobose, 2.5–3.5(–4) mm in diam.; phyllaries puberulent or glabrescent. Marginal female florets 5–15. Disk florets 8–16, bisexual. Achene obovoid. Fl. and fr. Jul–Nov.

Riverbanks, lakeshores, hills, rocky slopes, alpine steppes, alpine meadows; 3600–5300 m. Xizang [N India].

151. *Artemisia waltonii* J. R. Drummond ex Pampanini, Nuovo Giorn. Bot. Ital., n.s., 34: 707. 1927.

藏龙蒿 zang long hao

Shrubs, 30–60 cm tall, much branched, puberulent or glabrescent. Lower stem leaves: petiole 0.2–0.5 cm; leaf blade ovate-oblong or oblong, 2–2.5 × 1.5–1.8 cm, grayish puberulent, 2-pinnatisect or -partite; segments 3 pairs. Middle stem leaves sessile; leaf blade 1(or 2)-pinnatisect or -partite; lobules linear, linear-lanceolate, or falcate-lanceolate, 3–15 × 1.5–2.5 mm, margin nearly revolute, apex obtuse or acuminate, mucronulate; midrib convex abaxially, concave adaxially. Uppermost leaves 3–5-partite; leaflike bracts lanceolate or falcate. Synflorescence a broad panicle. Capitula ± sessile or shortly pedunculate, nodding. Involucre globose to broadly ovoid, 2.5–3(–3.5) mm in diam. Marginal female florets 18–29. Disk florets 20–30, male; corolla limb puberulent. Achenes oblong or obovoid. Fl. and fr. May–Sep.

• Roadsides, riverbanks, shrublands, slopes, steppes, dry valleys, waste areas; 3000–4300 m. S Qinghai, W Sichuan, Xizang, W Yunnan.

1a. Lobes of leaves linear or linear-lanceolate, 3–8 mm, obtuse; capitula sessile 151a. var. *waltonii*

1b. Lobes of leaves falcate-lanceolate, 8–15 mm, acuminate; capitula shortly pedunculate 151b. var. *yushuensis*

151a. *Artemisia waltonii* var. *waltonii*

藏龙蒿(原变种) zang long hao (yuan bian zhong)

Lobes of middle stem leaves linear or linear-lanceolate, 3–8 mm, apex obtuse. Capitula sessile.

• Roadsides, riverbanks, shrublands, slopes, steppes, dry valleys; 3000–4300 m. S Qinghai, W Sichuan, Xizang, W Yunnan.

151b. *Artemisia waltonii* var. *yushuensis* Y. R. Ling, Bull. Bot. Res., Harbin 8(4): 49. 1988.

玉树龙蒿 yu shu long hao

Lobes of middle stem leaves falcate-lanceolate, 8–15 mm, apex acuminate. Capitula shortly pedunculate.

• Slopes, waste areas; middle to high elevations. S Qinghai, N Xizang.

152. *Artemisia gyangzeensis* Y. Ling & Y. R. Ling, Acta Phytotax. Sin. 18: 510. 1980.

江孜蒿 jiang zi hao

Subshrubs, 20–30 cm tall; branches capitate, 4–5 cm, puberulent, glabrescent. Lower and middle stem leaves: petiole 1–2 cm; leaf blade ovate or oblong, 3.5–4.5 × 2–3 cm, 2-pinnatisect; segments 3 pairs, 8–12 × ca. 5 mm; lobules 1 or 2 pairs, linear-lanceolate or linear, 5–10 × 1.5–2 mm, base attenuate, margin revolute, midvein white, prominent abaxially. Uppermost leaves pinnatisect; leaflike bracts 3-sect or entire. Synflorescence a narrow panicle. Involucre globose or ovoid-globose, 2.5–3.5 mm in diam. Marginal female florets 3–8. Disk florets 10–20, male. Achenes obovoid or ovoid-elliptic. Fl. and fr. Jul–Sep.

• Slopes; ca. 3900 m. S Gansu, Qinghai, E Xizang.

153. *Artemisia xigazeensis* Y. R. Ling & M. G. Gilbert, sp. nov.

日喀则蒿 ri ka ze hao

Type: China. Xizang: N of Phari, 1882, *Dr. King's Collector 54* (holotype, K).

Paratypes: China. Xizang: near Phari, 14,500 ft., Sep 1838, *B. J. Gould 1621* (K); Dochen Lake Camp, ca. 15,000 ft., 24 Jun 1939, *B. J. Gould 2194* (K); Valley ca. 10 km NNE of Lhasa, 4,150 m, 2 Aug 1989, *B. Dickore 3628* (K). Qinghai: E shore of Kokonor (Qinghai Hu), 10,700 ft., Sep 1925, *J. F. Rock 13385* (K).

Plantae suffruticosae; caules multi erecti vel ascendentes, ramis ascendentibus brevibus angustis; indumentum ex trichomatibus medifixis adpressis constans. Folia 1(ad 2)-pinnatisecta, segmentis 3- ad 5-jugatis asymmetricice 3(ad 5)-lobatis, lobulis ultimis oblanceolatis usque anguste oblongis interdum falcatis 4-7(-10) × 0.9-1.5 mm. Synflorescentia paniculata anguste cylindrica, ramis erectis brevibus. Involucrum ovoideum usque ovoideo-campanulatum 2.5-4 × 1.5-2.5 mm, phyllariis glabris, exterioribus costa crassiuscula. Flosculi marginales 5 ad 8, ei disci 5 ad 12 ovario vestigiali.

Plant subshrubby, 7–22 cm tall; rootstock a deep woody taproot to ca. 1 cm thick; stems becoming very many with age, erect or ascending, basally medifixed appressed pubescent, upper parts glabrescent; branches ascending, short, narrow. Basal and lower stem leaves usually withered by anthesis; pseudostipules absent; petiole 1–2.5 cm; leaf blade ± oblong to oblanceolate in outline, 1–2.5 × 0.6–1.5 cm, 1(–2)-pinnatisect, abaxially adpressed pubescent, adaxially glabrous or glabrescent; segments 3–5-paired, asymmetrically 3(–5)-lobed; ultimate lobules oblanceolate to narrowly oblong, sometimes falcate, 4–

7(–10) × 0.9–1.5 mm, apex acute to slightly cuspidate. Middle and upper stem leaves similar but smaller and often pseudo-stipulate, these with 2 or 3 pairs of lobes. Synflorescence an erect or ascending narrowly cylindrical panicle; branches erect, closely appressed to main axis, short, to 3.5 cm, lower bracts sessile, pinnatisect to subpalmatisect, uppermost bracts linear. Capitula separated, mostly erect; peduncle 1–6 mm, sparsely pubescent, usually bracteolate. Involucre ovoid to ovoid-campanulate, 2.5–4 × 1.5–2.5 mm; phyllaries ca. 3-seriate, glabrous, inner zone sometimes tinged purplish, scarious margin broad, hyaline; outer phyllaries broadly ovate, short, with slightly thickened midrib, apex rounded to subacute; inner phyllaries oblong-ovoid, apex acute, sometimes slightly recurved. Marginal florets 5–8; style long exserted. Disk florets 5–12; corolla ca. 2 mm, glabrous; ovary vestigial. Achenes dark brown, cylindrical-ellipsoid, obscurely pale ribbed.

• Rocky slopes, steppes, roadsides; 2700–4600 m. ?Gansu, Qinghai, E Xizang.

Y. Ling & Y. R. Ling (Acta Phytotax. Sin. 18: 511. 1980) published *Artemisia xigazeensis* as a “nom. nov.” for *A. salsoloides* sensu J. D. Hooker (Fl. Brit. India 3: 321. 1881), not Willdenow (Sp. Pl. 3: 1832. 1803), explicitly including in synonymy both *A. salsoloides* var. *salsoloides* (as misapplied by Hooker, loc. cit.), *A. salsoloides* var. *paniculata* J. D. Hooker (loc. cit.), and *A. salsoloides* f. *halodendron* Pampanini (Nuovo Giorn. Bot. Ital., n.s., 34: 697. 1927). This multiplicity of elements means that the replaced synonym was not clearly indicated, as is required by Art. 33.4 of the *Vienna Code* for valid publication of a replacement name. *Artemisia xigazeensis* was not instead validly published as the name of a new taxon because no type was indicated (Art. 37.1).

The name *Artemisia xigazeensis* has been consistently applied to a distinctive small caespitose plant branching mostly very near ground level and with erect racemelike panicles. The present treatment excludes the syntypes of *A. salsoloides* var. *paniculata*, all of which have 1 to few stems branching mostly well above ground level and have relatively broad panicles, matching *A. prattii* rather well. In these circumstances, *A. xigazeensis* is here described as a new species.

154. *Artemisia nortonii* Pampanini, Nuovo Giorn. Bot. Ital., n.s., 34: 683. 1927.

藏旱蒿 zang han hao

Herbs, perennial, 15–25 cm tall, branched apically, gray pubescent. Lower and middle stem leaves ± sessile; leaf blade oblong or oblong-ovate, 1.5–2(–2.5) × 0.5–1.5 cm, pinnatisect; segments 2 or 3 pairs in lowermost leaves and 1 or 2 pairs in middle leaves, linear or linear-lanceolate, 3–5(–8) × 0.5–1.5 mm. Uppermost leaves and leaflike bracts 3-sect or entire. Synflorescence a narrow panicle. Involucre semi-globose or subglobose, 2.5(–3) mm in diam. Marginal female florets 3–7. Disk florets 5–10, male. Achenes obovoid. Fl. and fr. Jun–Oct.

• Slopes; ca. 4200 m. E and S Xizang.

155. *Artemisia kuschakewiczii* C. Winkler, Trudy Imp. S.-Peterburgsk. Bot. Sada 11: 330. 1890 [*“kuschakewiczi”*].

掌裂蒿 zhang lie hao

Oligosporus kuschakewiczii (C. Winkler) Poljakov.

Herbs, perennial, 5–12(–15) cm tall, with a thick root-

stock, white sericeous-pubescent or glabrescent. Lower and middle stem leaves: leaf blade suborbicular or ovate, 5–25 × 5–25 mm, subpalmately 5–7-partite; lobes not or rarely (2 or) 3–5-lobed; lobes or lobules linear-lanceolate, 2–5 × 1–2 mm. Uppermost leaves 3–5-partite; leaflike bracts linear. Synflorescence a spikelike or racemelike panicle. Involucre ovoid, 2.5–3 mm in diam.; phyllaries white or yellowish sericeous-puberulent. Marginal female florets 5 or 6. Disk florets 9–12, male. Achenes obovoid. Fl. and fr. Aug–Oct.

Lakeshores, riverbanks, slopes; 3500–4000 m. Xinjiang, W Xizang [Tajikistan].

156. *Artemisia forrestii* W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 12: 195. 1920.

亮苞蒿 liang bao hao

Subshrubs, 50–75 cm tall, rhizomatous, densely gray pubescent. Lower and middle stem leaves ± sessile; leaf blade ovate, 2–4 × 1.5–3 cm, pinnatisect; segments 2 pairs, linear-lanceolate, 15–20 × 1–1.5(–2) mm. Uppermost leaves 3–5-sect; leaflike bracts 3-sect or entire. Synflorescence a narrow panicle, branches very short, to 5 mm, sometimes branching from lower nodes to form large panicle. Involucre subglobose, 2–2.5 mm in diam. Marginal female florets 2 or 3. Disk florets 4–8, male. Achenes minute. Fl. and fr. Sep–Nov.

• Slopes, waste areas; 2200–3800 m. Yunnan.

157. *Artemisia mairei* H. Léveillé, Repert. Spec. Nov. Regni Veg. 11: 303. 1912.

小亮苞蒿 xiao liang bao hao

Artemisia mairei f. *latifolia* Pampanini.

Herbs, perennial, 40–60 cm tall, erect, yellowish pubescent. Lower and middle stem leaves sessile; leaf blade ovate, 1.5–3 × 1–2 cm, pinnatisect; segments 2 pairs, subulate or linear-subulate, 10–15 × ca. 1 mm. Uppermost leaves and leaflike bracts 3-sect or entire. Synflorescence a narrow to broad panicle, branches ascending, sometimes reduced to simple racemes, sometimes producing secondary panicles and broad synflorescence. Capitula spreading, subsessile. Involucre subglobose, (1.5–)2 mm in diam.; phyllaries glabrous. Marginal female florets 2 or 3(?–7). Disk florets 3–7, male. Achenes minute. Fl. and fr. Aug–Nov.

• Slopes, roadsides; 2100–3600 m. Yunnan.

158. *Artemisia pubescens* Ledebour, Mém. Acad. Imp. Sci. St. Pétersbourg Hist. Acad. 5: 568. 1815.

柔毛蒿 rou mao hao

Herbs, perennial, or subshrub 25–60(–70) cm tall, with a thick rootstock, lower parts yellow-brown tomentose, upper parts gray pubescent, glabrescent. Basal and lower stem leaves long petiolate; leaf blade 4–8(–12) × 1.5–2 cm, 2-pinnatisect. Middle stem leaves: petiole (0–)2–5 cm; leaf blade ovate, rather densely pubescent to glabrous, (1 or)2(or 3)-pinnatisect; segments (2 or)3 or 4 pairs, basal and middle lobes lobulate; lobules linear or linear-lanceolate, 10–30 × 0.5–1.5(–2) mm. Uppermost leaves pinnatisect; leaflike bracts 3-sect or entire. Syn-

florescence a narrow or broad panicle. Capitula many, erect, oblique, or nodding. Involucre subglobose or ovoid, 1.5–3 mm in diam. Marginal female florets 8–15. Disk florets 10–15, male. Achenes oblong or oblong-ovoid. Fl. and fr. Aug–Oct.

Steppes, forest steppes, meadows, forest margins, hills, waste areas, rocky slopes, roadsides, stable dunes of desert margins; low to middle elevations. Gansu, Heilongjiang, Jilin, Liaoning, Nei Mongol, Qinghai, N Shaanxi, N Shanxi, NW Sichuan, Xinjiang [Mongolia, Russia].

Three varieties are recognized in China; Russian authors recognize three further varieties from outside of China.

- 1a. Involucre broadly ovoid, 2.5–3 mm in diam.; capitula erect or oblique, in narrow panicles 158b. var. *gebleriana*
 1b. Involucre subglobose or ovoid, 1.5–2 mm in diam.; capitula in broad or somewhat broad panicles.
 2a. Herbs; leaf blades abaxially persistently puberulent 158a. var. *pubescens*
 2b. Subshrubs; leaf blades abaxially glabrescent 158c. var. *coracina*

158a. *Artemisia pubescens* var. *pubescens*

柔毛蒿(原变种) rou mao hao (yuan bian zhong)

Artemisia campestris Linnaeus var. *pubescens* (Ledebour) Trautvetter; *A. capillaris* Thunberg var. *simplex* Maximowicz; *A. commutata* Besser; *A. commutata* var. *helmiana* Besser; *A. commutata* var. *pallasiana* Besser; *A. commutata* var. *pubescens* (Ledebour) Poljakov; *A. desertorum* Sprengel f. *helmiana* (Besser) Pampanini; *A. desertorum* var. *pallasiana* (Besser) Pampanini; *Oligosporus adfinis* Lessing; *O. commutatus* (Besser) Poljakov.

Herbs, perennial. Leaves persistently pubescent. Synflorescence a moderately broad panicle. Capitula oblique or nodding. Involucre subglobose or ovoid, 1.5–2 mm in diam.

• Steppes, forest steppes, meadows, forest margins, hills, waste areas, rocky slopes, roadsides; low to middle elevations. Gansu, Heilongjiang, Jilin, Liaoning, Nei Mongol, Qinghai, N Shaanxi, N Shanxi, NW Sichuan, Xinjiang.

158b. *Artemisia pubescens* var. *gebleriana* (Besser) Y. R. Ling, Bull. Bot. Res., Harbin 8(4): 51. 1988.

大头柔毛蒿 da tou rou mao hao

Artemisia commutata var. *gebleriana* Besser, Bull. Soc. Imp. Naturalistes Moscou 8: 72. 1835; *A. desertorum* f. *gebleriana* (Besser) Pampanini.

Herbs, perennial. Leaves glabrescent. Synflorescence a narrow panicle. Capitula erect or oblique. Involucre broadly ovoid, 2.5–3 mm in diam.

Heilongjiang, Jilin, Liaoning, Nei Mongol [Mongolia, Russia].

158c. *Artemisia pubescens* var. *coracina* (W. Wang) Y. Ling & Y. R. Ling, Bull. Bot. Res., Harbin 8(4): 51. 1988.

黑柔毛蒿 hei rou mao hao

Artemisia coracina W. Wang, Acta Phytotax. Sin. 17(4): 89. 1979.

Subshrubs. Leaves glabrescent. Synflorescence a broad panicle. Capitula oblique or nodding. Involucre subglobose or ovoid, 1.5–2 mm in diam.

• Stable dunes of desert margins. W Jilin.

159. *Artemisia gansuensis* Y. Ling & Y. R. Ling, Bull. Bot. Res., Harbin 5(2): 9. 1985.

甘肃蒿 gan su hao

Subshrubs, 18–30(–40) cm tall, with a thick rootstock, gray puberulent or glabrescent. Lowermost leaves shortly petiolate; leaf blade broadly ovate or suborbicular, 2–3(–3.5) × 2–3 cm, 2-pinnatisect; segments (2 or)3(or 4) pairs, 3-sect. Middle stem leaves ± sessile; leaf blade 1.5–2.5 × 1.5–2.5 cm; lobules linear, 5–8 × 0.5–1 mm, apex mucronulate. Uppermost leaves and leaf-like bracts 3- or 5-lobed. Synflorescence a conical panicle, lower branches to 4 cm, very slender, often also on well-developed spreading lateral branches forming large, lax panicle. Capitula peduncle 0–5 mm. Involucre ovoid-campanulate or narrowly ovoid, 1–2 mm wide. Marginal female florets 3–6. Disk florets 4–8, male. Achenes obovoid. Fl. and fr. Aug–Oct.

• Dry slopes, roadsides, Gobi Desert margins. Gansu, N Hebei, Nei Mongol, Ningxia, Qinghai, Shaanxi, N Shanxi.

- 1a. Involucre 1.5–2 mm in diam.; peduncles 0–2 mm 159a. var. *gansuensis*
 1b. Involucre ca. 1(–1.5) mm in diam.; peduncles 3–5 mm 159b. var. *oligantha*

159a. *Artemisia gansuensis* var. *gansuensis*

甘肃蒿(原变种) gan su hao (yuan bian zhong)

Capitula: peduncle 0–2 mm. Involucre 1.5–2 mm in diam.

• Dry slopes, roadsides. Gansu, N Hebei, Nei Mongol, Ningxia, Qinghai, Shaanxi, N Shanxi.

159b. *Artemisia gansuensis* var. *oligantha* Y. Ling & Y. R. Ling, Bull. Bot. Res., Harbin 5(2): 10. 1985.

小甘肃蒿 xiao gan su hao

Capitula: peduncle 3–5 mm. Involucre 1(–1.5) mm in diam.

• Gobi Desert margins. S Nei Mongol.

160. *Artemisia demissa* Krascheninnikov, Trudy Bot. Inst. Akad. Nauk S.S.S.R., Ser. 1, Fl. Sist. Vyssh. Rast. 3: 348. 1937.

纤秆蒿 xian gan hao

Oligosporus demissus (Krascheninnikov) Poljakov.

Herbs, annual or biennial, 5–20 cm, much branched; lower branches procumbent, yellowish pubescent or glabrescent. Lower stem leaves: petiole 0.5–1 cm; leaf blade oblong or ovate, 1–1.5 × 0.8–1.3 cm, 2-pinnatisect; segments 2 or 3; lobules narrowly linear-lanceolate or elliptic-lanceolate, 3–5 × ca. 1 mm, apex mucronulate. Middle and upper stem leaves

pinnatisect. Leaflike bracts linear, entire. Synflorescence a narrow, spikelike panicle. Involucre ovoid, 1.5–2 mm in diam.; phyllaries puberulent, sometimes glabrescent. Marginal female florets 10–19. Disk florets 3–8, male. Achenes obovoid. Fl. and fr. Jul–Sep. $2n = 18$.

Valleys, slopes, roadsides, grasslands, rocky hills; 2600–4800 m. Gansu, Nei Mongol, Qinghai, W Sichuan, Xinjiang, Xizang [Afghanistan, India, Tajikistan].

161. *Artemisia macilenta* (Maximowicz) Krascheninnikov, Mater. Istorii Fl. Rastitel'n. S.S.S.R. 2: 156. 1946.

细杆沙蒿 xi gan sha hao

Artemisia campestris Linnaeus var. *macilenta* Maximowicz, Mém. Acad. Imp. Sci. St.-Petersbourg Divers Savans 9: 158. 1859; *A. desertorum* Sprengel var. *macilenta* (Maximowicz) Pampanini; *Oligosporus macilentus* (Maximowicz) Poljakov.

Herbs, perennial, or nearly subshrubs, 40–70 cm tall, puberulent, often glabrescent. Lower stem leaves: petiole 1–3 cm; leaf blade ovate or broadly ovate, 2–4 × 2–4 cm, 2-pinnatisect; segments 2 or 3 pairs. Middle and upper stem leaves ± sessile; leaf blade pinnatisect; segments 2 pairs; lobules 7–12(–15) × 0.3–0.5(–1) mm. Leaflike bracts linear, entire. Synflorescence a narrow panicle. Involucre ovoid or subglobose, 1–1.5(–2) mm in diam. Marginal female florets 3–6. Disk florets 4–8, male. Achenes obovoid. Fl. and fr. Aug–Oct.

Dry slopes, valleys, roadsides, forest margins, steppes, forest steppes; low to middle elevations. N Hebei, Nei Mongol, N Shanxi [E Russia].

162. *Artemisia chienshanica* Y. Ling & W. Wang, Acta Phytotax. Sin. 17(4): 89. 1979.

千山蒿 qian shan hao

Subshrubs, 25 cm tall or more, brown or yellowish tomentose or glabrescent. Lowermost leaves: petiole 1–3 cm; leaf blade ovate or obovate, 7–8 × 5–7.5 cm, 2- or 3-pinnatisect or -partite; segments 4(or 5) pairs; lobules (1 or 2) pairs, lanceolate, linear, or linear-lanceolate. Middle stem leaves: petiole 0.5–1 cm; leaf blade ovate or broadly ovate, 2-pinnatisect; segments 2 or 3(or 4) pairs; lobules narrowly linear or linear-lanceolate, 5–15 × 1–1.5 mm. Uppermost leaves and leaflike bracts pinnatisect or 3-sect. Synflorescence a broad, much-branched panicle. Involucre oblong, 1–1.5 mm in diam.; phyllaries revolute apically. Marginal female florets 5–7. Disk florets 5 or 6, male. Achenes oblong. Fl. and fr. Aug–Oct.

• Hills, slopes. Liaoning (Anshan, Qian Shan).

163. *Artemisia capillaris* Thunberg, Nova Acta Regiae Soc. Sci. Upsal. 3: 209. 1780.

茵陈蒿 yin chen hao

Artemisia capillaris var. *acaulis* Pampanini, p.p.; *A. capillaris* var. *arbuscula* Miquel; *A. capillaris* f. *glabra* Pampanini; *A. capillaris* var. *sacchalinensis* (Tilesius ex Besser) Pampanini; *A. capillaris* f. *sericea* (Nakai) Pampanini; *A. capillaris* var. *sericea* Nakai; *A. hallaisanensis* Nakai var. *formosana* Pampa-

nini; *A. hallaisanensis* f. *parvula* Pampanini; *A. hallaisanensis* var. *philippinensis* Pampanini; *A. hallaisanensis* f. *swatowiana* Pampanini; *A. sacchalinensis* Tilesius ex Besser; *Oligosporus capillaris* (Thunberg) Poljakov.

Herbs, biennial or perennial, 30–80(–100) cm tall; rootstock vertical, woody; stems usually 1 to few, slender, erect, pale purplish or reddish brown, glabrous. Basal leaves silky hairy, shortly petiolate. Middle stem leaves almost sessile; leaf blade oblong-ovate, 2–4 × 1–2.5 cm, 1- or 2-pinnatisect; segments filiform, 8–12 × 0.3–0.5 mm, ± acute. Uppermost leaves and leaflike bracts simple, filiform with 1 or 2 basal auricles. Synflorescence a narrow to wide panicle, 10–30 × 5–15 cm; primary branches 8–20 cm, ascending, bearing 3–8 cm, ± patent secondary branches. Capitula many, shortly pedunculate to sessile, secund, approximate, nodding. Involucre ovoid, ca. 1.75–2.25 × 1–1.5 mm; phyllaries 3- or 4-seriate, laxly imbricate, glabrous; outermost ovate, ca. 0.75 mm, green with narrow membranous margin, ± acute; inner ones elliptic, ca. 1.25 mm, with broad membranous margin, obtuse. Receptacle conical, glabrous. Florets 8–12, yellow. Marginal female florets 3–5; corolla narrowly tubular, ca. 0.75 mm, 2-toothed. Disk florets 5–7, male; corolla narrowly conical, ca. 1.25 mm, 5-toothed, glandular. Achenes brown, oblong-ovate, ca. 0.8 mm.

Humid slopes, hills, terraces, roadsides, riverbanks; 100–2700 m. Anhui, Fujian, Guangdong, Guangxi, Hebei, E Henan, Hubei, Hunan, Jiangsu, Jiangxi, Liaoning, E and S Shaanxi, Shandong, Sichuan, Taiwan, Yunnan, Zhejiang [Cambodia, Indonesia, Japan, Korea, Malaysia, Nepal, Philippines, E Russia, Vietnam].

Artemisia capillaris is well known as a source of diuretic and detoxifying medicines.

164. *Artemisia morrisonensis* Hayata, Icon. Pl. Formosan. 8: 63. 1919.

细叶山艾 xi ye shan ai

Subshrubs, 50–60 cm tall, puberulent, glabrescent. Lower stem leaf blades suborbicular or ovate-triangular, 3–4 × ca. 4 cm, 2(or 3)-pinnatisect. Middle stem leaves: petiole 1–2 cm; leaf blade 3–3.5 × 3–4 cm, 1(or 2)-pinnatisect; segments 2(or 3) pairs, 3-lobuled; lobules (10–)20–30 × 1–2 mm. Uppermost leaves and leaflike bracts 3–5-lobed. Synflorescence a narrow, racemelike panicle. Capitula shortly pedunculate or ± sessile. Involucre subglobose, 1.5–2 mm. Marginal female florets 11–15. Disk florets 4–16, male. Achenes ellipsoid. Fl. and fr. Jun–Nov. $2n = 34^*$.

• Forest margins, roadsides, slopes; 300–2500 m. Taiwan.

165. *Artemisia oligocarpa* Hayata, J. Coll. Sci. Imp. Univ. Tokyo 25(19): 137. 1908.

高山艾 gao shan ai

Artemisia borealis Pallas var. *oligocarpa* (Hayata) Kitamura.

Subshrubs, 15–35 cm tall, sericeous-pubescent or glabrescent. Leaves sericeous-pubescent or glabrescent. Lower and middle stem leaves: petiole 0.5–1 cm; leaf blade broadly ovate, 2.5–4.5 × 2.5–4.5 cm, 2(or 3)-pinnatisect; segments 2 or 3(or 4) pairs; lobules 3 or 5, linear or filiform, 4–10 × 0.5–1 mm. Up-

permost leaves and leaflike bracts 3- or 5-lobed. Synflorescence a racemelike panicle. Involucre hemispheric, 3(–4) mm in diam. Marginal female florets 10–15. Disk florets 11–18, male; corolla limb purple. Achenes obovoid. Fl. and fr. Jul–Nov. $2n = 18^*$.

- Grasslands, high mountaintops; 2500–3800 m. Taiwan.

166. *Artemisia scoparia* Waldstein & Kitaibel, Descr. Icon. Pl. Hung. 1: 66. 1802.

猪毛蒿 zhu mao hao

Artemisia capillaris Thunberg subf. *angustisecta* Pampanini; *A. capillaris* f. *elegans* (Roxburgh) Pampanini; *A. capillaris* f. *kohatica* (Klatt) Pampanini; *A. capillaris* f. *myriocephala* Pampanini; *A. capillaris* var. *scoparia* (Waldstein & Kitaibel) Pampanini; *A. capillaris* subf. *tenuifolia* Pampanini; *A. capillaris* f. *villosa* Pampanini; *A. capillaris* f. *williamsonii* Pampanini; *A. elegans* Roxburgh; *A. kohatica* Klatt; *A. scoparia* var. *heteromorpha* Kitagawa; *A. scoparia* f. *sericea* Komarov; *A. scopariiformis* Popov; *Oligosporus scoparius* (Waldstein & Kitaibel) Poljakov.

Herbs, perennial, biennial, or annual, 40–90(–130) cm tall, much branched from lower on stem; branches and leaves gray or yellowish sericeous-pubescent, later glabrescent, strongly aromatic. Lower stem leaves: petiole 2–4 cm; leaf blade ovate-oblong or elliptic, 1.5–3.5 × 1–3 cm, 2- or 3-pinnatisect; segments 3 or 4 pairs; lobules 1 or 2 pairs, 3–5 × 0.2–1 mm. Middle stem leaves sessile; leaf blade oblong or ovate-oblong, 1–2 × 0.5–1.5 cm, 1- or 2-pinnatisect; segments 2 or 3 pairs; lobules filiform, usually curved, 4–8 × 0.2–0.3(–0.5) mm. Uppermost leaves and leaflike bracts 3–5-sect. Synflorescence a broad panicle. Capitula many, shortly pedunculate or sessile. Involucre subglobose, rarely ovoid, 1–1.5(–2) mm in diam. Marginal female florets 5–7. Disk florets 4–10, male. Achenes obovoid or oblong. Fl. and fr. Jul–Oct. $2n = 16, 18, 36$.

Slopes, forest margins, roadsides, steppes, terraces, desert margins, dry riverbeds; low elevations to 3200 m. Anhui, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi, Sichuan, Xinjiang, Xizang, Yunnan, Zhejiang [Afghanistan, India, Japan, Korea, Pakistan, Russia, Thailand; C and SW Asia, Europe].

Artemisia scoparia is well known as an ingredient of diuretic and detoxifying medicines.

167. *Artemisia stricta* Edgeworth, Trans. Linn. Soc. London 20: 73. 1846.

直茎蒿 zhi jing hao

Herbs, annual or biennial, 10–40(–90) cm tall; branches ascending or diffuse, gray pubescent or glabrescent. Lowermost leaves: petiole 2–2.8 cm; leaf blade ovate or ovate-oblong, (1–)1.5–2.5(–3) × 1–2(–2.5) cm, 2- or 3-pinnatisect; middle stem leaves: petiole 0.5–1(–2) cm; leaf blade 1–2 × 0.5–0.8 cm, 2-pinnatisect; segments (3 or)4 pairs, 10–15 × 4–8 mm, 3-lobuled; lobules narrowly linear or narrowly linear-lanceolate, 2–3(–5) × (0.5–)1–1.5 mm. Uppermost leaves and leaflike bracts 1- or 2-pinnatisect, sessile. Synflorescence a very narrowly conical panicle, usually erect but sometimes with more spreading

lateral panicles from lower nodes; branches up to 4 cm, erect or ascending, little branched; capitula remote or congested toward apices, mostly shorter than subtending bract. Capitula erect, sessile or shortly pedunculate. Involucre subglobose or ovoid, 1.5–2.5 mm in diam.; outermost phyllaries glabrescent, margin narrowly hyaline-scarious, apex acute. Florets 20–25, yellow. Marginal female florets 10–20, with narrowly urceolate-tubular, 2-toothed corolla. Disk florets 3–5, functionally male. Achenes brown, oblong to obovoid, 0.6–0.8 mm. Fl. and fr. Jul–Sep.

Dry slopes, roadsides, forest margins, valleys, waste areas, shrublands; 2200–4700 m. C Gansu, Qinghai, Sichuan, S Xinjiang, Xizang, Yunnan [Bhutan, N India, Nepal].

- 1a. Stem 20–40(–90) cm tall, erect; branches not diffuse 167a. var. *stricta*
- 1b. Stem 10–20 cm tall, spreading; lower branches diffuse 167b. var. *diffusa*

167a. *Artemisia stricta* var. *stricta*

直茎蒿(原变种) zhi jing hao (yuan bian zhong)

Artemisia edgeworthii Balakrishnan, nom. illeg. superfl.

Stem 20–40(–90) cm tall, erect; branches not diffuse.

Dry slopes, roadsides, forest margins, valleys, waste areas, shrublands; 2200–4700 m. C Gansu, Qinghai, Sichuan, S Xinjiang, Xizang, Yunnan [Bhutan, N India, Nepal].

“*Artemisia stricta* B. Heyne” (Candolle, Prodr. 5: 374. 1836) was merely cited as a synonym of *Cyathocline stricta* Candolle and was therefore not validly published (*Vienna Code*, Art. 34.1(c)).

167b. *Artemisia stricta* var. *diffusa* (Pampanini) Y. R. Ling & M. G. Gilbert, **comb. in stat. nov.**

披散直茎蒿 pi san zhi jing hao

Basionym: *Artemisia stricta* f. *diffusa* Pampanini, Nuovo Giorn. Bot. Ital., n.s., 34: 705. 1927; *A. edgeworthii* var. *diffusa* (Pampanini) Y. Ling & Y. R. Ling.

Stem 10–20 cm tall; lower branches diffuse and prostrate.

W Sichuan, E Xizang, W Yunnan [N India, Nepal].

168. *Artemisia pewzowii* C. Winkler, Trudy Imp. S.-Peterburgsk. Bot. Sada 13: 3. 1893.

纤梗蒿 xian geng hao

Herbs, annual, biennial, or perennial, (15–)40–50 cm tall, branching from most nodes, branches ascending, gray pubescent or glabrescent. Lower stem leaves: petiole 1.5–3.5 cm; leaf blade ovate, 2–3 × 1–1.5 cm, pubescent, 2-pinnatisect; segments 2 or 3 pairs, 3-lobuled; lobules linear-lanceolate to elliptic-lanceolate, 3–5 × 0.5–1 mm. Middle stem leaves sessile; leaf blade 1- or 2-pinnatisect; segments (1 or)2 or 3 pairs, 3–5-lobuled; lobules filiform, 5–10 × 0.3–0.5 mm. Uppermost leaves and leaflike bracts 3–5-sect. Synflorescence a narrow panicle; branches from all but lowest node, ascending; ultimate branches to ca. 1 cm, erect. Capitula almost contiguous; peduncle to 3 mm. Involucre ovoid, 1–1.5 mm in diam.; phyllaries glabrous. Marginal female florets ca. 15. Disk florets 3–8, male. Achenes small. Fl. and fr. Aug–Nov.

• Desert steppes, rocky and grassy slopes; 1000–3900 m. Qinghai, Xinjiang, Xizang.

169. *Artemisia blepharolepis* Bunge, Beitr. Fl. Russl. 164. 1852.

白莎蒿 bai suo hao

Herbs, annual, 20–60 cm tall, many branched, gray pubescent, fetid. Lower and middle stem leaves: petiole 0.5–3 cm; leaf blade ovate-oblong or oblong, 1.5–4 × 0.3–0.8 cm, densely gray pubescent, (1 or 2)-pinnatisect; segments 5–8 pairs, ovate-

oblong or subobovate, 3–5 × 2–3 mm, serrate to pinnatipartite; teeth 5–8 pairs, 0.3–0.8(–1.5) × 0.3–0.8 mm. Uppermost leaves and leaflike bracts pinnatipartite or entire, latter elliptic-lanceolate or lanceolate, few serrate. Synflorescence a broad, diffuse panicle. Capitula shortly pedunculate. Involucre ellipsoid or oblong-ellipsoid, 1.5–2 mm in diam.; phyllaries gray puberulent. Female florets 2 or 3. Disk florets 3–6, male. Achenes ellipsoid. Fl. and fr. Jul–Oct.

Dry slopes, grasslands, steppes, waste areas, roadsides, dunes near riverbanks; low elevations. Nei Mongol, Ningxia, N Shaanxi [Mongolia].

7. *Artemisia* sect. *Latilobus* Y. R. Ling, Acta Phytotax. Sin. 18: 512. 1980.

牡蒿组 mu hao zu

Herbs, perennial, or subshrubs, puberulent or pubescent, often glabrescent, without glandular or viscid hairs (sessile glands often present). Leaves 1- or 2-pinnatisect to -pinnatipartite or 3–7-subpalmatisect or -partite; lobules linear, lanceolate, elliptic, linear-lanceolate, or serrate, 1.5–4(–12) mm wide. Capitula globose to ovoid. Phyllary margins scarious. Receptacle glabrous. Marginal florets 2–15(–21); corolla tubular or narrowly conical, often slightly enlarged at base, 2- or 3-toothed. Disk florets 2–20(–30), male; ovaries usually absent, rarely minute; style shorter than corolla, 2-cleft, lobes usually not divergent, with apex clavate or funnelliform.

Twenty-three species: Asia, Europe; 17 species (seven endemic) in China.

Many species contain aromatic compounds and sesquiterpenoids and/or limited monoterpenoids.

- 1a. Involucre 3–4 mm in diam.; marginal florets 10–15, disk florets 10–30.
- 2a. Lower stem leaf petioles 5–7 cm; blades 10–15 cm; disk florets 25–30 171. *A. bargusinensis*
- 2b. Lower stem leaf petioles to 3 cm; blades 2–5 cm; disk florets 10–20.
- 3a. Middle stem leaves spatulate or obovate-spatulate 181. *A. nanschanica*
- 3b. Middle stem leaves ovate, ovate-oblong, or elliptic.
- 4a. Leaf blade pinnatisect; lower and middle leaves with petiole 1–3 cm; florets 21–30 170. *A. depauperata*
- 4b. Leaf blade ternately 3-partite (or -cleft); lower and middle leaves ± sessile; florets 33–40 184. *A. tridactyla*
- 1b. Involucre 1–2.5(–3.5) mm in diam.; marginal florets 2–9, disk florets 2–15.
- 5a. Lower and middle stem leaf blades widest above middle, spatulate or subspatulate, often with attenuate base, serrate at apex, entire or 3–5-cleft with much broader middle lobe.
- 6a. Middle stem leaves 2–6 cm wide.
- 7a. Middle stem leaves 5.5–8 × 4–6 cm; involucre 2–3 mm in diam. 176. *A. littoricola*
- 7b. Middle stem leaves 2.5–4 × 2–4 cm; involucre 1.5–2(–3) mm in diam.
- 8a. Synflorescence a narrow, ± cylindrical panicle 177. *A. manshurica*
- 8b. Synflorescence a broad, ± conical panicle 174. *A. eriopoda*
- 6b. Middle stem leaves 0.5–1.2(–2) cm wide.
- 9a. Basal leaves entire 178. *A. japonica*
- 9b. Basal leaves 1- or 2-pinnatipartite or -pinnatisect.
- 10a. Middle stem leaves 2–3 cm, lobes 1–2 mm wide 179. *A. parviflora*
- 10b. Middle stem leaves 1–1.5, lobes 3–4 mm wide 180. *A. hancei*
- 5b. Lower and middle stem leaves widest at or below middle.
- 11a. Middle stem leaves 3–5(–7)-partite.
- 12a. Branches 15–35 cm or more, usually flexuous and horizontal; middle stem leaves 3–7 cm wide 183. *A. dubia*
- 12b. Branches 8–14 cm, ascending; middle stem leaves 0.8–1.5 cm wide.
- 13a. Middle stem leaves with lobes 10–20 mm; leaflike bracts 3-partite; corolla limb glabrous 185. *A. giraldii*
- 13b. Middle stem leaves with lobes 5–8(–10) mm; leaflike bracts linear or linear-lanceolate; corolla limb puberulent 186. *A. conaensis*
- 11b. Middle stem leaves 1- or 2-pinnatisect or pinnatipartite.
- 14a. Rhizomes not shortly terete; middle stem leaves spatulate or attenuate, entire or obliquely 3–5-cleft, -partite, or -sect from apex to base, or leaves heteromorphic, spatulate or attenuate in sterile branches and 1(or 2)-pinnatisect or -partite 175. *A. angustissima*
- 14b. Rhizomes shortly terete; sterile and middle stem leaves not spatulate or attenuate, middle leaves 1- or 2-pinnatisect.
- 15a. Stem, branches, leaves, and phyllaries densely gray and yellowish sericeous-pubescent, later sparsely pubescent; middle stem leaves with 2 or 3 pairs of lobes 173. *A. duthreuil-de-rhinsi*

- 15b. Stem, branches, and leaves pubescent or glabrescent; middle stem leaves with 2 or 3 pairs of lobes.
 16a. Middle stem leaves shortly petiolate, 1-pinnatipartite, or 2-pinnatipartite and then lobulate from mid-lateral lobes; capitula sparse 172. *A. desertorum*
 16b. Middle stem leaves sessile, 1- or 2-pinnatisect, segments 2 or 3 pairs, basal lobes lobulate or not; capitula many, dense 182. *A. pengchuoensis*

170. *Artemisia depauperata* Krascheninnikov, Sist. Zаметki Mater. Gerb. Krylova Tomsk. Gosud. Univ. Kuybysheva 1949 (1-2): 3. 1949.

中亚草原蒿 zhong ya cao yuan hao

Artemisia pycnorhiza Ledebour var. *depauperata* (Krascheninnikov) Poljakov.

Herbs, perennial, 8–18 cm tall, with a short, strong rhizome; upper parts sericeous-pubescent. Lower stem leaves: petiole 1–3 cm; leaf blade ovate or elliptic-ovate, 2–3(–4) × 1–2 cm, incanous pubescent, glabrescent, 1- or 2-pinnatisect; segments 3 or 4 pairs, elliptic or oblong-ovate, pinnately or 3-lobuled; lobules linear-lanceolate, lanceolate, or falcate, 3–6 × (0.5–)1–1.5 mm. Middle and upper stem leaves ± sessile; leaf blade ovate or ovate-oblong, pinnatisect; segments 2 or 3 pairs; lobes lanceolate. Leaflike bracts 3–5-sect or entire. Synflorescence a racemelike panicle. Capitula 2 or 3 per branch, shortly pedunculate. Involucre broadly ovoid, 3–4 mm in diam.; phyllaries glabrescent. Marginal female florets 11–15. Disk florets 10–15, male; corolla limb puberulent. Achenes ovoid. Fl. and fr. Jul–Oct. $2n = 36$.

Slopes, steppes; 2300–2600 m. N Xinjiang [Kazakhstan, Mongolia, Russia].

171. *Artemisia bargusinensis* Sprengel, Syst. Veg. 3: 493. 1826.

巴尔古津蒿 ba er gu jin hao

Artemisia borealis Pallas var. *willdenovii* Besser; *Oligosporus bargusinensis* (Sprengel) Poljakov.

Herbs, perennial, 20–50 cm tall, with thick rhizomes. Lower leaves ovate-oblong or oblong, 10–15 × 2–3 cm, 2-pinnatisect; segments 3 or 4 pairs; lobules linear-lanceolate, linear, or falcate, 10–15 × 1–2 mm. Middle stem leaves: petiole 5–7 cm; leaf blade oblong-ovate, 1- or 2-pinnatisect; segments 3(or 4) pairs. Uppermost leaves and leaflike bracts pinnatisect, 3-sect, or entire. Synflorescence a long, narrow panicle. Capitula sessile to shortly pedunculate toward base. Involucre broadly ovoid, 3–4 mm in diam. Marginal female florets 10–15. Disk florets 25–30, male. Achenes obovoid. Fl. and fr. Aug–Oct. $2n = 36$.

Slopes, grasslands, forest margins; middle elevations. Heilongjiang [Russia; Europe].

172. *Artemisia desertorum* Sprengel, Syst. Veg. 3: 490. 1826.

沙蒿 sha hao

Herbs, perennial, 10–70(–90) cm tall, with thick, woody, ± oblique rhizome, branched above, puberulent or glabrous. Basal and lower leaves: petiole 1–3 cm; leaf blade ovate, elliptic, oblong, or oblong-ovate, 2–5(–10) × 1.5–4.5 cm, 2(or 3)-pinnatisect or -partite; segments 2 or 3 pairs, elliptic or oblong, 10–

15(–20) × 3–6 mm; lobules 3–5 pairs, linear, linear-lanceolate, or elliptic, 5–15(–20) × 1–1.5(–2) mm, apex acute. Middle stem leaves: petiole 1–3 cm, basally auriculate; leaf blade oblong or ovate, 1- or 2-pinnatipartite. Uppermost leaves 3–5-pinnatipartite; leaflike bracts 3-lobed or entire. Synflorescence a racemelike panicle, 15–20 × 5–6 cm; primary branches 6–10 cm, ± erect, secondary branches 1–1.5 cm, ascending. Capitula many, nodding. Involucre ovoid or subglobose, 1.5–3 mm in diam., shortly pedunculate or not; phyllaries glabrous, outer ovate, margin narrowly hyaline membranous. Receptacle convex, glabrous. Florets 12–16(–20). Marginal female florets 4–8. Disk florets 5–10(–12). Achene dark brown, obovoid or oblong, ca. 1 mm, finely striate. Fl. and fr. Aug and Oct. $2n = 36$.

Steppes, meadows, forest steppes, alpine and subalpine steppes, waste areas, rocky slopes, dry valleys, riverbanks, forest margins, roadsides, grasslands, in shrubs; low elevations to 4600 m. Gansu, Guizhou, Hebei, Heilongjiang, Jilin, Liaoning, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shanxi, Sichuan, Xinjiang, Xizang, Yunnan [N India, Japan, Korea, Mongolia, Nepal, N Pakistan, E Russia].

- 1a. Plants 50–70(–90) cm tall; lobules elliptic or ovate-elliptic 172a. var. *desertorum*
 1b. Plants 10–20 cm tall; lobules linear or linear-lanceolate.
 2a. Involucre 1.5–2 mm in diam. ... 172b. var. *tongolensis*
 2b. Involucre (2–)2.5–3 mm in diam. ... 172c. var. *foetida*

172a. *Artemisia desertorum* var. *desertorum*

沙蒿(原变种) sha hao (yuan bian zhong)

Artemisia desertorum f. *latifolia* Pampanini, p.p.; *A. desertorum* var. *sprengeliana* Besser; *A. desertorum* var. *willdenowiana* Mattfeld; *A. japonica* Thunberg var. *desertorum* (Sprengel) Maximowicz; *Oligosporus desertorum* (Sprengel) Poljakov.

Plants 50–70(–90) cm tall. Basal leaves ovate, 2–3 cm, 2-pinnatipartite; lobules elliptic or ovate-elliptic. Involucre 2.5–3 mm in diam.

Steppes, meadows, forest steppes, alpine steppes, waste areas, rocky slopes, dry valleys, riverbanks, forest margins, roadsides; low elevations to 4000 m. Gansu, Guizhou, Hebei, Heilongjiang, Jilin, Liaoning, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shanxi, Sichuan, Xinjiang, Xizang, Yunnan [N India, Japan, Korea, Mongolia, N Pakistan, E Russia].

172b. *Artemisia desertorum* var. *tongolensis* Pampanini, Nuovo Giorn. Bot. Ital., n.s., 34: 651. 1927.

东俄洛沙蒿 dong e luo sha hao

Artemisia desertorum f. *glabra* Pampanini.

Stem 10–15 cm tall. Basal leaves elliptic, 3 cm or more, 2-pinnatisect; lobules linear or linear lanceolate. Involucre 1.5–2 mm in diam.

• Alpine or subalpine steppes, meadows, rocky slopes; 3500–4600 m. SW Gansu, W Sichuan, Xizang.

172c. *Artemisia desertorum* var. *foetida* (Jacquemont ex Candolle) Y. Ling & Y. R. Ling, Bull. Bot. Res., Harbin 8(4): 55. 1988.

矮沙蒿 ai sha hao

Artemisia foetida Jacquemont ex Candolle, Prodr. 6: 98. 1838.

Stems clustered, less than 20 cm tall, shortly branched or not; most parts gray or yellowish pubescent. Middle stem leaves 1(or 2)-pinnatisect or -partite; segments linear. Synflorescence a racemelike panicle. Involucre (2–)2.5–3 mm in diam.; phyllaries brown, very thin.

• Alpine meadows, grasslands, gravelly slopes, in shrubs; 3500–4200 m. Qinghai, W Sichuan, Xizang.

173. *Artemisia duthreuil-de-rhinsi* Krascheninnikov, Bot. Mater. Gerb. Glavn. Bot. Sada R.S.F.S.R. 3: 22. 1922.

青藏蒿 qing zang hao

Oligosporus duthreuil-de-rhinsi (Krascheninnikov) Poljakov.

Herbs, perennial, 10–20(–30) cm tall, with a short thick rootstock, gray or yellowish pubescent, later sparsely pubescent. Lower stem leaves: petiole 1–2 cm; leaf blade ovate or oblong, 2–3 × 1.5–2 cm, 2-pinnatisect; segments 3 or 4 pairs, elliptic; lobules 3–5 pairs, lanceolate, 3–5 × 1–1.5 cm, apex obtuse. Middle and upper stem leaves: leaf blade ovate or oblong, pinnatisect; segments 2 or 3 pairs; lobes linear-lanceolate, 5–15 × 2–3 mm; leaflike bracts linear-lanceolate or falcate. Synflorescence a narrow panicle. Capitula dense, sessile. Involucre 2.5–3.5 mm in diam.; phyllaries densely pubescent or glabrescent. Marginal female florets 6–9. Disk florets 8–14, male. Achenes oblong or broadly ovoid. Fl. and fr. Jul–Oct.

• Alpine or subalpine steppes, meadows, rocky slopes; 3700–4600 m. Qinghai, W Sichuan, E Xizang.

174. *Artemisia eriopoda* Bunge, Enum. Pl. China Bor. 37. 1833.

南牡蒿 nan mu hao

Herbs, perennial, (30–)40–80 cm tall, much branched, with a short thick terete rootstock. Basal and lower stem leaves: petiole 1.5–3 cm; leaf blade suborbicular, broadly ovate, or obovate, 4–6(–8) × 2.5–6 cm, 1- or 2-pinnatisect to almost entire; segments 2 or 3(or 4) pairs, obovate or subspatulate, cleft or serrate at margin or leaves entire or few serrate, base attenuate. Middle stem leaves: blade suborbicular or broadly ovate, 2–4 × 2–4 cm, 1- or 2-pinnatisect or partite; lobes 2 or 3 pairs, elliptic or subspatulate, 3-partite or -cleft, serrate or entire apically. Uppermost leaves pinnatisect; lobes elliptic or lobules narrowly linear or narrowly lanceolate; leaflike bracts 3-lobed or entire. Synflorescence a broad panicle, main branches many, with short lateral branches. Capitula many, pedunculate. Involucre broadly ovoid or subglobose, 1.5–2.5 mm in diam. Marginal female florets 4–8. Disk florets 6–10, male. Achenes oblong. Fl. and fr. Jun–Nov.

Forest margins, roadsides, grasslands, shrublands, canyons, forest steppes, steppes, seashore dunes, waste areas, slopes, mountains; near sea level to 2100 m. Anhui, S and SW Gansu, Hebei, Henan, Hubei, Hunan, Jiangsu, Liaoning, Nei Mongol, S Shaanxi, Shandong, Shanxi, Sichuan, N Yunnan [Japan, Korea, E Mongolia].

- 1a. Stem more than (40–)50 cm tall; basal leaves broadly ovate, obovate, suborbicular, or obovate-attenuate, pinnatifid, distal lobe larger than laterals, or leaves entire, but serrate at apex, middle stem leaves pinnatisect, lobes serrate; capitula in broad, much-branched panicles.
 - 2a. Basal leaves broadly ovate or obovate, 1- or 2-pinnatisect 174a. var. *eriopoda*
 - 2b. Basal leaves suborbicular or obovate-attenuate, entire, partite, or cleft at apex 174c. var. *rotundifolia*
- 1b. Stem 30–40 cm tall; basal leaves divided, distal lobes not larger than other lobes; capitula in ± narrow panicles.
 - 3a. Leaves nearly succulent, lower leaves pinnatisect, segments regularly 3-cleft apically 174b. var. *maritima*
 - 3b. Leaves papery, lower leaves pinnatisect, irregularly cleft, serrate, or entire.
 - 4a. Middle stem leaves pinnatisect, segments 2- or 3-cleft 174d. var. *gansuensis*
 - 4b. Middle stem leaves 1- or 2-pinnatisect, lobules narrowly linear or narrowly linear-lanceolate 174e. var. *shanxiensis*

174a. *Artemisia eriopoda* var. *eriopoda*

南牡蒿(原变种) nan mu hao (yuan bian zhong)

Artemisia capillaris Thunberg f. *grandiflora* Pampanini; *A. capillaris* var. *grandiflora* (Pampanini) Pampanini; *A. desertorum* Sprengel f. *latifolia* Pampanini, p.p.; *A. japonica* Thunberg f. *eriopoda* (Bunge) Pampanini; *A. japonica* var. *eriopoda* (Bunge) Komarov; *A. pubescens* Ledebour subsp. *eriopoda* (Bunge) Kitamura.

Stem more than (40–)50 cm tall. Leaves papery, basal leaves broadly ovate to obovate, 1- or 2-pinnatisect, distal lobe larger than laterals, lobes serrate. Synflorescence a broad, much-branched panicle.

Forest margins, roadsides, grasslands, shrublands, canyons, forest steppes, steppes; low elevations to 1500 m. Anhui, Hebei, Henan, Hubei, Hunan, Jiangsu, Liaoning, Nei Mongol, S Shaanxi, Shandong, Shanxi, Sichuan, N Yunnan [Japan, Korea, E Mongolia].

174b. *Artemisia eriopoda* var. *maritima* Y. Ling & Y. R. Ling, Bull. Bot. Res., Harbin 8(3): 6. 1988.

渤海滨南牡蒿 bo hai bin nan mu hao

Stem 30–40 cm tall. Leaves nearly succulent; lower leaves pinnatisect, distal lobes not larger than other lobes, segments regularly 3-cleft apically. Synflorescence a somewhat broad panicle.

- Seashore dunes; near sea level. E Shandong.

174c. *Artemisia eriopoda* var. *rotundifolia* (Debeaux) Y. R. Ling, Bull. Bot. Res., Harbin 8(4): 56. 1988.

圆叶南牡蒿 *yuan ye nan mu hao*

Artemisia japonica var. *rotundifolia* Debeaux, Actes Soc. Linn. Bordeaux 31: 220. 1877; *A. japonica* subf. *elata* Pampanini; *A. japonica* f. *rotundifolia* (Debeaux) Franchet; *A. rotundifolia* (Debeaux) Krascheninnikov.

Stem 50–80 cm tall. Leaves papery, basal leaves suborbicular or obovate-attenuate, entire, cleft, or partite apically. Synflorescence a broad, much-branched panicle.

- Waste areas, roadsides, slopes. Hebei, N Jiangsu, Shandong.

174d. *Artemisia eriopoda* var. *gansuensis* Y. Ling & Y. R. Ling, Bull. Bot. Res., Harbin 8(3): 7. 1988.

甘肃南牡蒿 *gan su nan mu hao*

Stem 30–40 cm tall. Leaves papery; basal and middle leaves pinnatisect, distal lobes not larger than other lobes; lobes of basal leaves irregularly serrate or entire; those of middle leaves 2- or 3-cleft. Synflorescence a somewhat broad panicle.

- Roadsides, waste areas, slopes; low elevations to 2100 m. S and SW Gansu.

174e. *Artemisia eriopoda* var. *shanxiensis* Y. R. Ling, Bull. Bot. Res., Harbin 8(3): 7. 1988.

山西南牡蒿 *shan xi nan mu hao*

Stem 30–40 cm tall. Leaves papery; lower leaves pinnatisect, irregularly cleft, serrate, or entire. Middle stem leaves 1- or 2-pinnatisect, distal lobes not larger than other lobes, lobules linear or narrowly linear-lanceolate, 15–30 × 1–1.5 mm. Synflorescence a narrow panicle.

- Mountains. C Shanxi.

175. *Artemisia angustissima* Nakai, Bot. Mag. (Tokyo) 29: 8. 1915.

狭叶牡蒿 *xia ye mu hao*

Artemisia japonica Thunberg subf. *angustissima* (Nakai) Pampanini; *A. japonica* var. *angustissima* (Nakai) Kitamura.

Herbs, perennial, 20–60 cm tall, stems few, slender and erect, branching from upper nodes, sparsely arachnoid pilose, ± glabrescent. Lower and middle stem leaves ± sessile; leaf blade ovate or suborbicular in outline, 1.5–2.2 × 1.5–2.2 cm, (1 or) 2-pinnatisect; segments 2(or) 3 pairs, 5–10 × 3–5 mm, partite or few serrate. Middle stem leaves pinnatisect; lobes linear or narrowly linear-lanceolate, 5–8(–10) × 0.8–3 mm, entire or few serrate. Uppermost leaves and leaflike bracts 3-sect or entire. Synflorescence a narrow panicle. Capitula shortly pedunculate or sessile, nodding. Involucre ovoid or subglobose, 1–1.5 mm in diam. Marginal female florets 2 or 3. Disk florets 2–5, male. Achenes obovoid. Fl. and fr. Aug–Oct.

- Slopes, roadsides; low elevations to 500 m. S Gansu, Hebei, SE Heilongjiang, Henan, Jiangsu, Jilin, Liaoning, S Shaanxi, Shandong, Shanxi [Korea].

176. *Artemisia littorcola* Kitamura, Acta Phytotax. Geobot. 5: 94. 1936.

滨海牡蒿 *bin hai mu hao*

Artemisia japonica Thunberg subsp. *littorcola* (Kitamura) Kitamura; *A. japonica* f. *resedifolia* Takeda; *A. japonica* f. *sachalinensis* Pampanini; *Oligosporus littorcola* (Kitamura) Poljakov.

Herbs, perennial, 30–100 cm tall, gray pubescent or glabrescent. Basal leaves forming a rosette; those of sterile shoots obovate, 5–10 × 3–5 cm, palmately to pinnately lobed. Lowest stem leaves ± sessile; leaf blade broadly ovate, suborbicular, or obovate, 3–5 × 3–5 cm, gray arachnoid pubescent, later glabrescent, deeply palmately lobed or 1(or) 2-pinnatipartite to -sect; segments 2(or) 3 pairs, linear, 1.5–4 mm wide, base attenuate. Middle stem leaves oblong-attenuate or elliptic-spatulate, 5.5–8 × 4–6 cm, 1- or 2-pinnati- or subpalmatipartite or 3-partite; segments 1 or 2 pairs, serrate or cleft, base attenuate. Uppermost leaves and leaflike bracts elliptic-lanceolate or linear-lanceolate. Synflorescence a broad, conical panicle. Capitula shortly pedunculate. Involucre subglobose or broadly ovoid, 2–2.5(–3) mm in diam. Marginal female florets 4–8(–12); corolla 1–1.5 mm. Disk florets bisexual 5–7; corolla 2–2.5 mm, glabrous. Achenes ellipsoid-ovoid. Fl. and fr. Aug–Oct. $2n = 36$.

- Riverbanks, saline-alkaline soils, in marsh grass. W Heilongjiang, E Nei Mongol [Japan, Korea, E Russia].

177. *Artemisia manshurica* (Komarov) Komarov in Komarov & Alissova-Klobukova, Key Pl. Far East. Reg. USSR 2: 1053. 1932.

东北牡蒿 *dong bei mu hao*

Artemisia japonica Thunberg var. *manshurica* Komarov, Fl. Manshur. 3: 625. 1907.

Herbs, perennial, 40–80(–100) cm tall, puberulent or glabrescent. Leaves on sterile branches spatulate or attenuate, 3–7 × 0.5–1.5 cm, apex obtuse, few cleft, or serrate. Lower leaves on fertile stems sessile; leaf blade obovate or obovate-spatulate, 5-partite, or serrate. Middle stem leaves sessile; leaf blade obovate or obovate-elliptic, 2.5–3.5 × 2–3 cm, pubescent or glabrescent, 1(or) 2-pinnati- or subpalmatisect or -partite; segments 1 or 2 pairs, narrowly spatulate or oblanceolate, 10–20 × 2–3 mm, 3-cleft or not. Uppermost leaves broadly attenuate or elliptic-obovate; leaflike bracts lanceolate or elliptic-lanceolate. Synflorescence a narrow panicle. Capitula shortly pedunculate. Involucre subglobose or broadly ovoid, 1.5–2 mm in diam. Marginal female florets 4–8. Disk florets 6–10, male. Achenes obovoid or ovoid. Fl. and fr. Aug–Oct. $2n = 36^*$.

- Slopes, forest margins, steppes, forest steppes, shrublands, roadsides, canyons; low elevations. N Hebei, S Heilongjiang, Jilin, Liaoning, Nei Mongol.

178. *Artemisia japonica* Thunberg, Nova Acta Regiae Soc. Sci. Upsal. 3: 209. 1780.

牡蒿 *mu hao*

Herbs, perennial, 50–130 cm tall; rootstock 1.5–2.5 cm thick, woody, upper parts puberulent or glabrescent, strongly aromatic. Sterile stems 5–30 cm, leaves clustered at apex; leaf

blade spatulate, 3.5–8 × 1–3 cm, pinnately lobed, toothed, apex rounded. Basal and lower stem leaves ± sessile; leaf blade oblong-obovate to broadly spatulate or flabellate, (3–)4–6(–8) × (1–)2–2.5(–3) cm, puberulent or glabrescent, obliquely pinnatipartite or -cleft from apex to center, few serrate apically. Middle stem leaves: leaf blade spatulate, cuneate, or narrowly spatulate, 2.5–3.5(–4.5) × 0.5–1(–2) cm, obliquely partite or cleft and few serrate at apex or lobes linear. Uppermost leaves 3-cleft or entire; leaflike bracts elliptic, lanceolate, or linear-lanceolate. Synflorescence a ± narrow panicle, 15–20 × 3–15(–20) cm panicle; branches almost horizontal or obliquely patent, 3–20 cm. Capitula many, nodding, shortly to long pedunculate. Involucre ovoid or subglobose, 1.5–2.5 mm in diam.; phyllaries glabrous, outermost ovate, very narrowly white scarious on margin, apex acute. Florets 12–15(–20), yellow. Marginal female florets 3–8(–11); corolla narrow, 2-toothed. Disk florets 5–10, male. Achenes dark brown, 0.8–1 mm, obovoid. Fl. and fr. Jul–Nov. $2n = 18, 36, 37$.

Forest margins, waste areas, shrublands, hills, slopes, roadsides; low elevations to 3300 m. Anhui, Fujian, S Gansu, Guangdong, Guangxi, Guizhou, Hainan, S Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, E and S Liaoning, S Shaanxi, Shandong, Shanxi, Sichuan, Taiwan, E Xizang, Yunnan, Zhejiang [Afghanistan, Bhutan, N India, Japan, Korea, Laos, Myanmar, Nepal, Pakistan, Philippines, E Russia, Thailand, Vietnam].

- 1a. Middle stem leaf blades spatulate, apex truncate or obtuse, margin few serrate or obliquely cleft from middle to apex, lobes various but not linear 178a. var. *japonica*
 1b. Middle stem leaf blades narrowly spatulate, margin not serrate toward apex, obliquely 3–5-partite or -sect, lobes linear 178b. var. *hainanensis*

178a. *Artemisia japonica* var. *japonica*

牡蒿(原变种) mu hao (yuan bian zhong)

Artemisia cuneifolia Candolle; *A. glabrata* Wallich ex Besser; *A. japonica* subf. *intermedia* Pampanini; *A. japonica* var. *lanata* Pampanini; *A. japonica* f. *laxiflora* Nakai; *A. japonica* subf. *laxiflora* (Nakai) Pampanini; *A. japonica* var. *macrocephala* Pampanini; *A. japonica* var. *microcephala* Pampanini; *A. japonica* var. *myriocephala* Pampanini; *A. japonica* f. *silvestrii* Pampanini; *A. japonica* subf. *spatulata* Pampanini; *A. japonica* f. *vestita* Pampanini; *A. morrisonensis* Hayata var. *minima* Pampanini; *A. subintegra* Kitamura; *Chrysanthemum japonicum* Thunberg; *Oligosporus japonicus* (Thunberg) Poljakov.

Middle stem leaves spatulate, entire, obtuse or truncate, few serrate at apex or obliquely cleft from apex to center; lobes oblong or elliptic, not narrowly linear.

Forest margins, waste areas, shrublands, hills, slopes, roadsides; low elevations to 3300 m. Anhui, Fujian, S Gansu, Guangdong, Guangxi, Guizhou, S Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, E and S Liaoning, S Shaanxi, Shandong, Shanxi, Sichuan, Taiwan, E Xizang, Yunnan, Zhejiang [Afghanistan, Bhutan, N India, Japan, Korea, Laos, Myanmar, Nepal, Philippines, E Russia, Thailand, Vietnam].

Artemisia japonica is used in the preparation of antitoxic and anti-febrile medicines.

178b. *Artemisia japonica* var. *hainanensis* Y. R. Ling, Bull. Bot. Res., Harbin 8(4): 58. 1988.

海南牡蒿 hai nan mu hao

Middle stem leaves narrowly spatulate, obliquely 3–5-partite or -sect; lobes linear, rarely 3-serrate.

- Roadsides, waste areas. Guangxi, Hainan.

179. *Artemisia parviflora* Buchanan-Hamilton ex D. Don, Prodr. Fl. Nepal. 181. 1825.

西南牡蒿 xi nan mu hao

Artemisia japonica Thunberg var. *parviflora* (Buchanan-Hamilton ex D. Don) Pampanini; *A. japonica* subf. *tongtchouanensis* (H. Léveillé) Pampanini; *A. tongtchouanensis* H. Léveillé; *Oligosporus parviflorus* (Buchanan-Hamilton ex D. Don) Poljakov.

Herbs, perennial, or subshrubs, 40–80 cm tall, yellow or brown pubescent, sometimes glabrescent. Lower stem leaves: petiole 2–3 cm; leaf blade ovate or elliptic-ovate, 2–3 × 1.5–2 cm, 2-pinnatipartite or -sect; segments 2 or 3 pairs, elliptic or subspatulate, 15–25 × 5–10 mm, 2- or 3-partite; lobules lanceolate, or deeply serrate. Middle stem leaves ± sessile; leaf blade obovate-spatulate, flabellate, or cuneate, 2–3 × 0.5–1 cm, obliquely 3–5-partite or -sect; lobes linear, linear-lanceolate, or linear-oblancheolate, 5–10 × 1–2 mm, apex acuminate. Uppermost leaves 3-partite or entire; leaflike bracts linear or linear-lanceolate. Synflorescence a ± narrow panicle. Capitula many. Involucre ovoid or subglobose, 1–2 mm in diam. Marginal female florets 2–4. Disk florets 4–10, male. Achenes oblong. Fl. and fr. Aug–Oct. $2n = 18, 36$.

Grasslands, slopes, forest margins, roadsides, ravines, field margins; 400–4000 m. S Gansu, Guizhou, Henan, W Hubei, S Qinghai, S Shaanxi, Sichuan, Xizang, Yunnan [Afghanistan, Bhutan, India, Myanmar, Nepal, Sri Lanka].

180. *Artemisia hancei* (Pampanini) Y. Ling & Y. R. Ling, Bull. Bot. Res., Harbin 2(2): 39. 1982.

雷琼牡蒿 lei qiong mu hao

Artemisia hallaisanensis Nakai var. *hancei* Pampanini, Nuovo Giorn. Bot. Ital., n.s., 34: 659. 1927.

Subshrubs, 30–50 cm tall, pubescent or glabrescent. Lower and middle stem leaves: petiole 1–2 cm; leaf blade ovate, obovate, obovate-spatulate, or spatulate, 1–1.5 × 0.7–1.2 cm, gray or yellowish and sericeous-pubescent, later sparsely pubescent or glabrescent, 1- or 2-pinnatipartite or -sect; segments 2 pairs, narrowly spatulate, oblanceolate, or falcate, 4–5 × 3–4 mm, apex usually 2- or 3-parted, rarely lobes of middle cauline leaves lanceolate or linear. Uppermost leaves and leaflike bracts 1(or 2)-pinnatisect; lobes narrowly linear or narrowly lanceolate, apex acute. Synflorescence a ± broad panicle. Capitula many. Involucre subglobose, 1.5–2 mm in diam. Marginal female florets 3–5. Disk florets 8–15, male. Achenes obovoid or oblong. Fl. and fr. Sep–Nov.

Seashore dunes; sea level to near sea level. S Guangdong, W Hainan [Vietnam].

181. *Artemisia nanschanica* Krascheninnikov, Bot. Mater. Gerb. Glavn. Bot. Sada R.S.F.S.R. 3: 19. 1922.

昆仑蒿 kun lun hao

Oligosporus nanschanicus (Krascheninnikov) Poljakov.

Herbs, perennial, 10–20(–30) cm tall, with horizontal rhizomes, with short fertile branches, gray or yellowish puberulent or glabrescent, fetid. Lower stem leaves: petiole 0.3–0.6 cm; leaf blade spatulate, obovate, or ovate, 1–2 × 0.5–1 cm, obliquely pinnati-subpalmatipartite or -cleft; lobes elliptic, oblong, or elliptic-lanceolate, 5–10 × 1–2 mm. Middle stem leaves sessile; leaf blade spatulate or obovate-spatulate, obliquely (2 or 3)(or 4)-partite, rarely -sect; lobes elliptic or linear, 5–8 × 1(–2) mm. Uppermost leaves and leaflike bracts spatulate, obliquely 2- or 3-partite, -cleft, or entire. Synflorescence a narrow panicle. Capitula shortly pedunculate or sessile. Involucre subglobose or hemispheric, 3–3.5(–4) mm in diam. Marginal female florets 10–15. Disk florets 12–20, male. Achenes oblong or obovoid-oblong. Fl. and fr. Jul–Oct.

• Dry slopes, steppes, rocky terraces or slopes; 2100–5300 m. S Gansu, Qinghai, S Xinjiang, Xizang.

182. *Artemisia pengchuoensis* Y. R. Ling & S. Y. Zhao, Bull. Bot. Res., Harbin 5(2): 11. 1985.

彭措蒿 peng cuo hao

Herbs, perennial, 30–40 cm tall, puberulent. Lower stem leaves: petiole 1.5–2.5 cm; leaf blade ovate or oblong-ovate, 2–2.5 × 2–2.5 cm, puberulent or glabrescent, 2-pinnatisect; segments 2 pairs; lobules linear or linear-lanceolate, 3–4 × 1–1.5 mm, apex acute. Middle and upper stem leaves sessile; leaf blade ovate, 1- or 2-pinnatisect; segments 2 or 3 pairs, linear or linear-lanceolate, 3–4 × 2–2.5 mm, occasionally basal lobes lobulate; leaflike bracts 3–5-sect. Synflorescence a long, narrow panicle. Capitula closely spaced, shortly pedunculate or sessile. Involucre subglobose, 2–2.5(–3) mm in diam. Marginal female florets 3–8. Disk florets 7–15, male. Achenes obovoid. Fl. and fr. Aug–Oct.

• Roadsides; low to middle elevations. W Sichuan.

183. *Artemisia dubia* Wallich ex Besser, Tent. Abrot. 39. 1832.

牛尾蒿 niu wei hao

Subshrubs, 80–120(–180) cm tall, much branched; branches 15–35 cm or more, usually flexuous, pubescent or glabrescent. Leaves shortly petiolate to almost sessile, abaxially grayish green arachnoid hairy to subglabrous, adaxially green and white dotted with or without sparse T-shaped hairs. Lowermost leaves ovate or oblong, 5-partite. Middle stem leaves ovate, 5–12 × 3–7(–9) cm, 5-partite; lobes elliptic, oblong-lanceolate, or lanceolate, 30–80 × 5–12 mm, base attenuate. Uppermost leaves ternate, 3-partite; leaflike bracts entire, elliptic-lanceolate or lanceolate. Synflorescence a narrow to broad panicle, 15–30 × 10–20 cm; primary branches ascending to ± patent (upper), to 25 × 2–3 cm. Capitula many, almost sessile. Involucre broadly ovoid or globose, 1.5–2 mm in diam.; outer phyllaries sparsely arachnoid hairy, green, apex acute. Florets 8–20, purplish. Marginal florets 6–8; corolla basally broadened, 2-

toothed. Disk florets 2–12, male; corolla tube glandular, apex very sparsely hairy. Achenes brown, oblong or obovoid, 1.25–1.5 mm. Fl. and fr. Aug–Oct. $2n = 34, 54$.

Slopes, steppes, riverbanks, roadsides, valleys, canyons, forest margins; low elevations to 3500 m. C and S Gansu, NW Guangxi, Guizhou, Hebei, S Henan, W Hubei, Nei Mongol, Ningxia, Qinghai, Shaanxi, W Shandong, Shanxi, Sichuan, E Xizang, Yunnan [Bhutan, India, Japan, Nepal, Thailand].

1a. Leaves abaxially persistently

densely pubescent 183a. var. *dubia*

1b. Leaves abaxially glabrescent 183b. var. *subdigitata*

183a. *Artemisia dubia* var. *dubia*

牛尾蒿(原变种) niu wei hao (yuan bian zhong)

Artemisia dracunculus Linnaeus f. *thomsonii* Pampanini; *A. subdigitata* Mattfeld var. *thomsonii* (Pampanini) S. Y. Hu.

Leaf blades abaxially persistently densely pubescent.

Dry slopes, steppes, forest margins, roadsides; low elevations to 3500 m. S Gansu, Nei Mongol, W Sichuan, E Xizang, W Yunnan [Bhutan, India, Japan, Nepal, Thailand].

183b. *Artemisia dubia* var. *subdigitata* (Mattfeld) Y. R. Ling, Kew Bull. 42: 445. 1987.

无毛牛尾蒿 wu mao niu wei hao

Artemisia subdigitata Mattfeld, Repert. Spec. Nov. Regni Veg. 22: 243. 1926; *A. cannabina* Jacquemont ex Besser; *A. desertorum* Sprengel var. *jacquemontiana* (Besser) Candolle; *A. dracunculus* var. *inodora* Besser, p.p.; *A. dracunculus* f. *pinnata* Besser ex Pampanini; *A. dracunculus* var. *subdigitata* (Mattfeld) Pampanini; *A. jacquemontiana* Besser; *A. subdigitata* var. *falciloba* Mattfeld; *A. subdigitata* var. *intermedia* Kitagawa; *Oligosporus jacquemontianus* (Besser) Poljakov.

Leaf blades abaxially glabrescent.

Slopes, riverbanks, roadsides, valleys, canyons, forest margins; low elevations to 3000 m. C and S Gansu, NW Guangxi, Guizhou, Hebei, S Henan, W Hubei, S Nei Mongol, Ningxia, Qinghai, Shaanxi, W Shandong, Shanxi, Sichuan, Yunnan [Bhutan, N India, Nepal].

“*Artemisia wulingschanensis* Bar. et Skv.” (Liou, Clav. Pl. Chin. Bor.-Orient. 393. 1959) belongs here but was not validly published because no Latin description or diagnosis, or reference to such, was provided (*Vienna Code*, Art. 36.1).

184. *Artemisia tridactyla* Handel-Mazzetti, Acta Horti Gothob. 12: 275. 1938.

指裂蒿 zhi lie hao

Herbs, perennial, or subshrubs, 7–60 cm tall, glabrescent; branches many, to 15 cm. Lower and middle stem leaves ± sessile; leaf blade elliptic, 2–5 × 2–3 cm, abaxially densely adpressed sericeous-pubescent except on veins, adaxially glabrous, ternately 3-partite(-cleft); lobes linear or linear-lanceolate, 20–25 × 2–4 mm, base attenuate, margin revolute. Uppermost leaves and leaflike bracts linear or linear-lanceolate, entire, 30–45 × 1–2.5 mm. Synflorescence a ± narrow conical simple panicle; lowermost ultimate branches to 7 cm; bracts linear, often longer than involucre. Capitula mostly widely spaced, sometimes in clusters of 2 or 3; peduncle to 6 mm. In-

volucre hemispheric or subglobose, 3–4 mm in diam. Marginal female florets 18–21. Disk florets 15–19, male. Achenes obovoid. Fl. Aug–Oct.

• Slopes, grasslands, forest margins; ca. 3800 m. S and W Sichuan, E Xizang.

- 1a. Stem 20–60 cm tall; middle stem leaves 4–5 cm, lobes 2–2.5 mm wide 184a. var. *tridactyla*
 1b. Stem 7–10 cm tall; middle stem leaves 2–4 cm, lobes 1–2 mm wide 184b. var. *minima*

184a. *Artemisia tridactyla* var. *tridactyla*

指裂蒿(原变种) zhi lie hao (yuan bian zhong)

Stem 20–60 cm tall. Middle stem leaves 4–5 cm; lobes 2–2.5 mm wide.

• Slopes, grasslands, forest margins; ca. 3800 m. S Sichuan, E Xizang.

184b. *Artemisia tridactyla* var. *minima* Y. R. Ling, Bull. Bot. Res., Harbin 8(3): 7. 1988.

小指裂蒿 xiao zhi lie hao

Stem 7–10 cm tall. Middle stem leaves 2–4 cm; lobes 1–2 mm wide.

• W Sichuan.

185. *Artemisia giraldii* Pampanini, Nuovo Giorn. Bot. Ital., n.s., 34: 657. 1927.

华北米蒿 hua bei mi hao

Subshrubs, 50–80(–120) cm tall, puberulent or glabrescent; branches 8–14 cm, obliquely ascending. Lowermost leaves ± sessile; leaf blade ovate or ovate-oblong, deeply 3(–5)-lobed or entire; lobes linear-lanceolate or -oblanceolate. Middle stem leaves: leaf blade elliptic, 2–3 × 0.8–1.5 cm, abaxially densely arachnoid pubescent, adaxially gray pubescent, ternately 3-partite; lobes linear or linear-lanceolate, 10–20 × 1–2 mm, margin revolute. Uppermost leaves and leaflike bracts 3-partite or entire. Synflorescence a lax panicle to 7 cm, lower branches to 3 cm, very slender, with flowering branches from upper nodes forming large compound panicle. Capitula shortly pedunculate or sessile. Involucre broadly ovoid, subglobose, or oblong, ca. 2 × 1.5–2 mm; phyllaries glabrous. Marginal female florets 4–8; corolla limb glabrous. Disk florets 5–7, male. Achenes obovoid. Fl. and fr. Jul–Oct.

• Terraces, slopes, dry river valleys, hills, roadsides, forest mar-

gins, forest steppes, shrublands; 1000–1200(–2300) m. Gansu, Hebei, Nei Mongol, Ningxia, Shaanxi, Shanxi, NW Sichuan.

- 1a. Middle stem leaves 3(or 5)-partite; capitula ± sessile 185a. var. *giraldii*
 1b. Middle stem leaves entire, rarely 3-partite; capitula peduncles 5–10 mm 185b. var. *longipedunculata*

185a. *Artemisia giraldii* var. *giraldii*

华北米蒿(原变种) hua bei mi hao (yuan bian zhong)

Artemisia dracunculus Linnaeus f. *chinensis* Pampanini; *A. dracunculus* f. *falciloba* Pampanini; *A. dracunculus* f. *intermedia* Pampanini; *A. dracunculus* subf. *oblonga* Pampanini; *Oligosporus giraldii* (Pampanini) Poljakov.

Middle stem leaves 3(–5)-partite. Capitula ± sessile.

• Terraces, slopes, dry river valleys, hills, roadsides, forest margins, forest steppes, shrublands; 1000–1200(–2300) m. Gansu, Hebei, Nei Mongol, Ningxia, Shaanxi, Shanxi, NW Sichuan.

185b. *Artemisia giraldii* var. *longipedunculata* Y. R. Ling, Bull. Bot. Res., Harbin 8(3): 7. 1988.

长梗米蒿 chang geng mi hao

Middle stem leaves usually entire, rarely 3-partite. Capitula pedunculate, peduncle 5–10 mm.

• Hebei, Nei Mongol.

186. *Artemisia conaensis* Y. Ling & Y. R. Ling, Acta Phytotax. Sin. 18: 511. 1980.

错那蒿 cuo na hao

Herbs, perennial, 30–80 cm tall, gray puberulent or glabrescent; branches 8–14 cm, ascending. Lower and middle stem leaves sessile; leaf blade elliptic, 5–20 × 1–1.5 cm, abaxially densely arachnoid pubescent, adaxially gray-black when dried, sparsely gray pubescent, 3–7-partite; lobes linear, linear-lanceolate, or elliptic-lanceolate, 5–8(–10) × 1–2(–3) mm, basal lobes usually lobulate; lobules elliptic. Uppermost leaves and leaflike bracts linear or linear-lanceolate. Synflorescence a ± narrow panicle. Capitula many. Involucre globose or hemispheric, 2–3 mm in diam. Marginal female florets 5–10; corolla limb puberulent. Disk florets 8–15, male. Achenes oblong or obovoid. Fl. and fr. Jul–Oct.

• Waste areas, terraces, rocky slopes; 3000–4000 m. E Xizang.

Artemisia conaensis is used medicinally.

152. SERIPHIDIUM (Besser ex Lessing) Fourreau, Ann. Soc. Linn. Lyon, sér. 2, 17: 89. 1869.

绢蒿属 juan hao shu

Lin Yourun (林有润 Ling Yeou-ruenn, Ling Yuou-ruen); Christopher J. Humphries, Michael G. Gilbert

Artemisia subg. *Seriphidium* Besser ex Lessing, Syn. Gen. Compos. 264. 1832 [“*Scriphida*”].

Shrubs or herbs, caespitose or solitary in annual herbs, strongly aromatic, sterile branched, tomentose, arachnoid pubescent, or glabrescent. Leaves alternate. Lowermost or middle stem leaves 2- or 3(or 4)-pinnatisect, -cleft, pectinately sect, or ternately 3-sect; lobes or lobules narrowly linear, or narrowly lanceolate, rarely filiform, elliptic, or pectinate. Uppermost leaves and leaflike bracts divided or entire. Capitula in narrow or broad panicles, rarely spicate panicles, sessile, ellipsoid or oblong, rarely ovoid, ovoid-campan-

ulate, or globose, heterogamous, disciform. Phyllaries in (3 or)4–6(or 7) series, densely pubescent or arachnoid pubescent. Bisexual florets (1–)3–12(–20); anther appendages linear or linear-lanceolate. Achenes ovoid or obovoid, subcompressed.

About 100 species: arid regions of C, S, and SW Asia (including Arabian peninsula), N Africa, Europe; 31 species (six endemic) in China.

Some species contain flavonoids and santonin; some are used for medicine.

Molecular data (Watson et al., BMC Evolutionary Biology; <http://www.biomedcentral.com/1471-2148/2/17/>; accessed 10 Apr 2011) show that the Old World members of *Seriphidium* s.s. form a well-defined monophyletic group embedded within Old World *Artemisia* s.l. The New World members (*A.* sect. *Tridentatae* L. M. Schultz) formed a polyphyletic group distributed among New World species of *Artemisia* and are here excluded from *Seriphidium* s.s.

- 1a. Lowermost leaves 2-ternately 3-sect, middle stem leaves ternately 3-sect (3. *S.* sect. *Juncea*) 31. *S. junceaum*
- 1b. Lowermost and middle stem leaves pinnatisect or pinnatipartite.
- 2a. Leaves 2(or 3)-sect, lobules pectinate or narrowly serrate (2. *S.* sect. *Minchunensia*) 30. *S. minchunense*
- 2b. Leaves 1–3(or 4)-pinnatisect, lobules narrowly lanceolate or filiform or leaves entire or lobes with orbicular serrations (1. *S.* sect. *Seriphidium*).
- 3a. Leaves 1- or 2-pinnatipartite, lobes or lobules elliptic or ovate-elliptic, less than 5 mm, or leaves pinnatisect, lobes orbicular-serrate, or partly entire.
- 4a. Middle stem leaves 1(or 2)-pinnatipartite, segments 3 or 4 pairs, lobes or lobules elliptic or ovate, occasionally margins 2- or 3-toothed 8. *S. scopiforme*
- 4b. Middle stem leaves pinnatifid, segments 10(–15) pairs, orbicularly lobed or leaves linear and entire 23. *S. santolinum*
- 3b. Leaves 1–3-pinnatisect, lobules 5–8 mm.
- 5a. Stems caespitose, less than 25 cm tall; capitula densely spaced along branches forming short spicate or compound capitate synflorescences.
- 6a. Vegetative parts white tomentose; phyllaries densely gray tomentose 25. *S. rhodanthum*
- 6b. Vegetative parts gray arachnoid tomentose or pubescent, or sometimes yellowish puberulent, sometimes partly glabrescent; phyllaries pubescent to densely arachnoid pubescent.
- 7a. Phyllaries gland-dotted 24. *S. borotalense*
- 7b. Phyllaries not gland-dotted.
- 8a. Vegetative parts yellowish puberulent; leaf blade 0.5–0.8 cm 27. *S. grenardii*
- 8b. Vegetative parts gray arachnoid tomentose or pubescent; leaf blade 1.5–3.5(–4) cm.
- 9a. Stems much branched and caespitose; lowermost leaves 1- or 2-pinnatisect, or subpalmately 2- or 3-pinnatisect 26. *S. korovinii*
- 9b. Stems less branched, not largely caespitose; lowermost leaves 2- or 3-pinnatisect.
- 10a. Lowermost leaves ovate, 2- or 3-pinnatisect, segments (3 or)4 or 5(or 6) pairs, lobules 2–3(–4) mm, apex obtuse 28. *S. compactum*
- 10b. Lowermost leaves suborbicular, (2 or)3-pinnatisect, segments (2 or)3 or 4 pairs, lobules 3–4 mm, apex acute 29. *S. lehmannianum*
- 5b. Branches long or short; capitula spreading on branches, in narrow or broad panicles.
- 11a. Lowermost leaves 2- or 3-pinnatisect; middle stem leaves 1–3-pinnatisect.
- 12a. Branches less than 3 cm; stem, branches, and leaves arachnoid pubescent, later glabrescent; middle stem leaves with 2–5 pairs of segments; capitula in narrow panicles.
- 13a. Stems laxly caespitose; stem and branches arachnoid pubescent or glabrescent; middle stem leaves with (3 or)4 or 5 pairs of segments, not gland-dotted; phyllaries convex 6. *S. karatavicum*
- 13b. Stems densely caespitose; stem and branches pubescent, later glabrescent; middle stem leaves with 2 or 3 pairs of segments, gland-dotted; phyllaries keeled 17. *S. gracilescens*
- 12b. Branches more than (3–)5 cm; stem, branches, and leaves arachnoid tomentose or pubescent, or lower parts pubescent; middle stem leaves with 4–6 pairs of segments; capitula in broad or narrow and elongated panicles.
- 14a. Lower and middle stem leaves less than 2.5 cm; branches spreading.
- 15a. Synflorescence a narrow or somewhat broad panicle; capitula usually in groups of 2 or 3 along branchlets, ovoid-oblong or ellipsoid, ca. 2 mm in diam. 13. *S. brevifolium*
- 15b. Synflorescence a broad, much-branched panicle; capitula solitary, subglobose, 2.5–3 mm in diam. 14. *S. thomsonianum*

- 14b. Lower and middle stem leaves more than 2.5 cm; branches ascending.
- 16a. Stem arachnoid tomentose; lower leaves broadly ovate or ovate-oblong, middle stem leaf lobules 2–4 mm 1. *S. schrenkianum*
- 16b. Stem densely tomentose or pubescent, later partly glabrescent; lower leaves elliptic-ovate or ovate-oblong, middle stem leaf lobules more than 5 mm.
- 17a. Stem, branches, leaves, and phyllaries arachnoid tomentose or pubescent, but stem and phyllaries glabrescent at anthesis; branches more and spreading; capitula ellipsoid or oblong, in broad or somewhat broad panicles 5. *S. mongolorum*
- 17b. Stem, branches, leaves, and phyllaries arachnoid pubescent or tomentose, hairs present or glabrescent in lower stem at anthesis; branches from middle to above on stem; capitula oblong, oblong-ovoid, or ovoid, in somewhat broad, elongated, or narrow panicles.
- 18a. Middle stem leaves (1 or)2-pinnatisect, lobules 1–1.5 mm wide; capitula 2–2.5 mm in diam., in narrow or somewhat broad panicles 4. *S. finitum*
- 18b. Middle stem leaves 2- or 3-pinnatisect, lobules 0.5–1 mm wide; capitula 1–2 mm in diam., at upper part of stem in somewhat broad panicles.
- 19a. Rootstock thick, lower bark peeling; middle stem leaves pinnatisect, segments 4 or 5 pairs; phyllaries strongly convex 2. *S. transiliense*
- 19b. Root solitary, lower bark not peeling; middle stem leaves (2 or)3-pinnatisect, segments 5 or 6 pairs; phyllaries ± flat 7. *S. sawanense*
- 11b. Lowermost leaves 1- or 2-pinnatisect, middle stem leaves 1- or 2-pinnatisect.
- 20a. Capitula 2–2.5 mm; branches from middle part of stem, spreading, 10–15 cm; panicles broad, conical 16. *S. ferganense*
- 20b. Capitula less than 3 mm in diam.; branches from upper part of stem, less than 10 cm, or if from lower stem then short or more than 10 cm; panicles broad or narrow.
- 21a. Middle stem leaves pinnatisect, segments 1 or 2(or 3) pairs; phyllaries and florets deciduous after anthesis 9. *S. kaschgaricum*
- 21b. Middle stem leaves 1-pinnatisect, or 2-pinnatisect and then with segments (2 or)3–5; phyllaries and florets persistent after anthesis.
- 22a. Stems many and thickly caespitose, branches 2–3(–5) cm, ascending; lobes and lobules of leaves deciduous or nearly deciduous.
- 23a. Branches from middle part of stem, ascending; leaves persistent after anthesis; middle stem leaves with 3 or 4 pairs of segments, lobes or lobules needlelike, more than 3 mm, central lobes 4–12 mm.
- 24a. Stem 30–45 cm tall, branches 2–4(–5) cm; lowermost leaves 2-pinnatisect, middle stem leaves 1- or 2-pinnatisect; capitula in narrow or somewhat broad panicles 21. *S. sublessingianum*
- 24b. Stem 5–25(–35) cm tall, branches 1–2(–3) cm; lower leaves 1(or 2)-pinnatisect, middle stem leaves 1(or 2)-pinnatisect; capitula in narrow, spikelike panicles 22. *S. amoenum*
- 23b. Branches from upper part of stem, spreading or ascending; leaves deciduous or semideciduous after anthesis; middle stem leaves with 2–5 pairs of segments, central lobes 2–3 mm.
- 25a. Stem, branches, and leaves densely tomentose or pubescent; leaves with (3 or)4 or 5 pairs of segments, semideciduous after anthesis; capitula in dense narrow pyramidal panicles 19. *S. semiaridum*
- 25b. Stem, branches, and leaves densely arachnoid tomentose or pubescent; leaves with 3 or 4(or 5) pairs of segments, deciduous after anthesis; capitula in loose somewhat broad panicles on upper stem.
- 26a. Branches from upper stem, 2–3(–5) cm; lower leaves ovate, 1–2(–3) × 0.8–1 cm; capitula in loose somewhat broad panicles 18. *S. terrae-albae*

- 26b. Branches from upper stem, 5–8 cm; lower leaves ovate-oblong or elliptic-ovate, 2–2.5 × 1–1.5 cm; capitula in somewhat broad and elongated panicles 20. *S. heptapotamicum*
- 22b. Stems few or several, not thickly caespitose; branches more than (3–)5 cm; lobes or lobules not deciduous.
- 27a. Branches ascending from upper part of stem; middle stem leaves with (3 or)4 or 5 pairs of segments.
- 28a. Stem, branches, leaves, and phyllaries gray puberulent or glabrescent; capitula in groups of 3–5 along branches 15. *S. aucheri*
- 28b. Stem, branches, leaves, and phyllaries arachnoid pubescent, later partly glabrescent; capitula uniformly distributed along branches 3. *S. nitrosum*
- 27b. Branches ascending or spreading from middle or lower parts of stem; middle stem leaves with (2 or)3 or 4 pairs of segments.
- 29a. Lowermost leaves 3–6 × 1.5–4.5 cm; capitula in dense narrow panicles 12. *S. cinum*
- 29b. Lowermost leaves 1–3 × 0.5–2(–2.5) mm; capitula in sparse narrow panicles.
- 30a. Branches spreading from lower stem; capitula in somewhat broad or narrow panicles 11. *S. issykkulense*
- 30b. Branches ascending from middle of stem; capitula in narrow elongated panicles 10. *S. fedtschenkoanum*

1. *Seriphidium* sect. *Seriphidium*

绢蒿组 juan hao zu

Herbs, perennial, or subshrubs, tomentose or glabrescent. Leaves 1–3(or 4)-pinnatisect, -partite, or entire.

About 85 species: arid regions of C, S, and SW Asia, N Africa, C, E, S, and W Europe; 29 species (five endemic) in China.

1. *Seriphidium schrenkianum* (Ledebour) Poljakov, Trudy Bot. Inst. Akad. Nauk Kazakhsk. S.S.R. 11: 172. 1961.

草原绢蒿 cao yuan juan hao

Artemisia schrenkiana Ledebour, Fl. Ross. 2: 575. 1845.

Herbs, perennial, with a strong stock, 30–50(–60) cm tall, densely gray and arachnoid tomentose. Lowermost leaves: petiole 2–4 cm; leaf blade broadly ovate or ovate-oblong, 3–6 × 1.5–2.5 cm, arachnoid tomentose, 2- or 3-pinnatisect; segments 4 or 5(or 6) pairs; lobules 2–6 × 1–1.5 mm, obtuse apically. Middle stem leaves 2-pinnatisect. Uppermost leaves and leaf-like bracts pinnatisect. Synflorescence a broad or somewhat broad panicle. Involucre oblong or ellipsoid-oblong, 1.5–2(–2.5) mm in diam.; phyllaries densely gray tomentose. Florets 5 or 6. Achenes ovoid or obovoid. Fl. and fr. Aug–Oct.

Desert steppes, steppes, meadow steppes, waste areas, riverbanks, lakeshores, terraces, canyons, saline-alkaline soils, dunes; 100–1000 m. E Xinjiang [Kazakhstan, Mongolia, Russia].

2. *Seriphidium transiliense* (Poljakov) Poljakov, Trudy Bot. Inst. Akad. Nauk Kazakhsk. S.S.R. 11: 174. 1961.

伊犁绢蒿 yi li juan hao

Artemisia transiliensis Poljakov, Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk S.S.S.R. 16: 417. 1954.

Subshrubs, with a thick rootstock, 40–80 cm tall, densely gray or greenish arachnoid tomentose, later glabrescent, lower bark brown, usually peeling off. Lowermost leaves: petiole 2–3.5 cm; leaf blade oblong, 3.5–6 × 2.5–5 cm, gray arachnoid pubescent, 2(or 3)-pinnatisect; segments 4 or 5(or 6) pairs; lobules

narrowly linear or narrowly linear-lanceolate, 4–8 × 0.5–1 mm, mucronulate apically. Middle stem leaves 1- or 2-pinnatisect. Upper leaves pinnatisect; leaflike bracts linear, entire. Synflorescence a dense, narrow, elongated panicle. Capitula ± sessile. Involucre oblong-ellipsoid or oblong, 1–2 mm in diam.; phyllaries strongly convex, densely pubescent. Florets 3–5; corolla limb red or yellow. Achenes obovoid. Fl. and fr. Aug–Oct.

Slopes, canyons, rocky hills, riverbanks, steppes, roadsides; low to middle elevations. N Xinjiang [Kazakhstan].

3. *Seriphidium nitrosum* (Weber ex Stechmann) Poljakov, Trudy Bot. Inst. Akad. Nauk Kazakhsk. S.S.R. 11: 172. 1961.

西北绢蒿 xi bei juan hao

Herbs, perennial, or subshrubs, arachnoid pubescent or partly glabrescent; flowering stems 5–50 cm tall; root solitary; upper parts with spreading branches. Lower leaves 3–7 cm overall; petiole long; leaf blade ovate-oblong or elliptic-lanceolate, 30–40 × 5–20 mm, (1 or)2-pinnatisect; segments 4 or 5 pairs; lobules narrowly linear, 3–5 × 0.3–0.8 mm. Middle stem leaves 1- or 2-pinnatisect. Upper leaves pinnatisect; leaflike bracts linear, entire, rarely pinnatisect. Synflorescence a somewhat broad to slender, cylindrical panicle. Capitula remote or grouped along branches, sessile. Involucre cylindrical or ovoid-cylindrical, 1.5–2 mm in diam.; phyllaries densely arachnoid pubescent, later sparsely pubescent or glabrescent. Florets 3–6; corolla purple-pink or yellow. Achenes obovoid. Fl. and fr. Aug–Oct.

Desert or semidesert steppes, Gobi Desert, rocky slopes, dry canyons, dry riverbanks, roadsides, terraces, saline-alkaline soils; low ele-

vations to 1500 m. NW Gansu, W Nei Mongol, Xinjiang [Kazakhstan, Mongolia, Russia].

- 1a. Stem 40–50 cm; lower leaves 2-pinnatisect; capitula dispersed along branches in somewhat broad elongated panicles 3a. var. *nitrosus*
 1b. Stem 5–10(–15) cm; lower leaves 1- or 2-pinnatisect; capitula grouped along branches in spike-like panicles 3b. var. *gobicum*

3a. *Seriphidium nitrosus* var. *nitrosus*

西北绢蒿(原变种) xi bei juan hao (yuan bian zhong)

Artemisia nitrosa Weber ex Stechmann, *Artemis.* 24. 1775; *A. humilis* M. Bieberstein (1798), not Miller (1768); *A. lerchiana* Weber ex Stechmann var. *gmeliniana* (Besser) Candolle, p.p.; *A. maritima* f. *gmeliniana* (Besser) Ledebour, p.p.; *A. maritima* subsp. *gmeliniana* (Besser) Krascheninnikov, p.p.; *A. maritima* var. *gmeliniana* Besser, p.p.; *A. maritima* f. *humilis* Ledebour.

Stem 40–50 cm tall. Lowermost leaves 2-pinnatisect, somewhat glabrescent. Synflorescence a somewhat broad elongated panicle. Capitula dispersed along branches.

Gobi Desert, rocky slopes, dry canyons, dry riverbanks, roadsides, terraces, saline-alkaline soils; low elevations to 1500 m. NW Gansu, W Nei Mongol, Xinjiang [Kazakhstan, Mongolia, Russia].

3b. *Seriphidium nitrosus* var. *gobicum* (Krascheninnikov) Y. R. Ling, Bull. Bot. Res., Harbin 8(3): 114. 1988.

戈壁绢蒿 ge bi juan hao

Artemisia mongolorum Krascheninnikov subsp. *gobica* Krascheninnikov, Trudy Bot. Inst. Akad. Nauk S.S.S.R., Ser. 1, Fl. Sist. Vyssh. Rast. 3: 350. 1937; *A. gobica* (Krascheninnikov) Grubov; *A. mongolorum* var. *salsuginosa* Krascheninnikov; *A. nitrosa* var. *gobica* (Krascheninnikov) Poljakov; *A. schischkinii* Krascheninnikov.

Stem 5–15 cm tall. Lowermost leaves 1- or 2-pinnatisect, persistently grayish tomentose pubescent. Synflorescence a narrow spike-like panicle. Capitula in groups along branches.

Desert or semidesert steppes, Gobi Desert, saline-alkaline soils. Xinjiang [Kazakhstan, Mongolia, Russia].

4. *Seriphidium finitum* (Kitagawa) Y. Ling & Y. R. Ling, Acta Phytotax. Sin. 18: 513. 1980.

东北蚰蒿 dong bei hui hao

Artemisia finita Kitagawa, Rep. Inst. Sci. Res. Manchoukuo 6: 124. 1942.

Subshrubs, 50–60 cm tall, densely gray arachnoid pubescent. Lower stem leaves: petiole 2–5 cm; leaf blade oblong or ovate-oblong, 2–3(–5) × 1.2–2 cm, grayish arachnoid pubescent, 2- or 3-pinnatisect; segments (3 or)4 or 5 pairs; lobules 2 or 3 pairs, narrowly lanceolate, 3–13 × 1–1.5 mm, obtuse apically. Middle stem leaves ± sessile; leaf blade ovate or ovate-oblong, (1 or)2-pinnatisect; lobules narrowly linear or narrowly linear-lanceolate. Upper leaves and leaflike bracts 3-lobed or entire. Synflorescence a narrow or somewhat broad panicle. Involucre oblong-obovoid or oblong, 2–2.5 mm in diam.; phyl-

laries gray pubescent. Florets 3–9(–13). Achenes obovoid. Fl. and fr. Aug–Oct.

• Rocky slopes, semidesert steppes, riverbanks, lakeshores, meadows. E Nei Mongol.

5. *Seriphidium mongolorum* (Krascheninnikov) Y. Ling & Y. R. Ling, Bull. Bot. Res., Harbin 8(3): 115. 1988.

蒙青绢蒿 meng qing juan hao

Artemisia mongolorum Krascheninnikov, Trudy Bot. Inst. Akad. Nauk S.S.S.R., Ser. 1, Fl. Sist. Vyssh. Rast. 3: 350. 1937.

Subshrubs, 30–45 cm tall, gray tomentose, later partly glabrescent. Lower stem leaves: petiole 15–25 mm; leaf blade elliptic or ovate-oblong, 3–4 × 2–3 cm, densely incanous tomentose, later sparsely tomentose or glabrescent, 2(or 3)-pinnatisect; segments 4 or 5 pairs; lobules linear or lanceolate, 2–3 × 1–1.5 mm. Middle stem leaves 1- or 2-pinnatisect; lobules narrowly linear, ca. 1 mm wide. Upper leaves and leaflike bracts pinnatisect or 3-lobed. Synflorescence a somewhat broad elongated panicle. Involucre ellipsoid or oblong, 2–3 mm in diam.; phyllaries pubescent. Florets 3–6. Achenes obovoid. Fl. and fr. Aug–Oct.

Desert or semidesert steppes, rocky slopes, Gobi Desert; 1100–2700 m. Nei Mongol, N Qinghai [SW Mongolia].

6. *Seriphidium karatavicum* (Krascheninnikov & Abolin ex Poljakov) Y. Ling & Y. R. Ling, Bull. Bot. Res., Harbin 8(3): 115. 1988.

卡拉套绢蒿 ka la tao juan hao

Artemisia karatavica Krascheninnikov & Abolin ex Poljakov, Bot. Mater. Gerb. Glavn. Bot. Sada R.S.F.S.R. 16: 396. 1954.

Subshrubs, 35–60(–70) cm tall, with a thick rootstock, densely gray tomentose, later partly glabrescent. Lower stem leaves ± sessile; leaf blade ovate, 2.5–3(–5) × 1.5–2 cm, incanous arachnoid tomentose, 2- or 3-pinnatisect; segments (3 or)4 or 5 pairs; lobules linear or linear-lanceolate, [40–60(–80) × 5–10 mm,] acute apically. Middle stem and upper leaves 1- or 2-pinnatisect; leaflike bracts narrowly linear. Synflorescence a narrow panicle. Involucre ellipsoid-ovoid, 1.5–2 mm in diam.; phyllaries gray arachnoid tomentose or glabrescent. Florets 3–7. Achenes ovoid or obovoid. Fl. and fr. Sep–Oct.

Rocky slopes; low elevations. NW Xinjiang [Kazakhstan].

7. *Seriphidium sawanense* Y. R. Ling & Humphries, Bull. Bot. Res., Harbin 10(1): 49. 1990.

沙湾绢蒿 sha wan juan hao

Subshrubs, 40–60 cm tall, silvery tomentose. Lower and middle stem leaves: petiole 3–6 mm; leaf blade ovate-elliptic or oblong, 3–4.5 × 1–2.5 cm, 3-pinnatisect; segments 5 or 6 pairs; lobules linear, 2.5–3.5 × ca. 0.5 mm. Upper leaves 2(or 3)-pinnatisect; leaflike bracts 1- or 2-pinnatisect. Synflorescence a narrow panicle. Involucre oblong, 1–1.5 mm in diam.; phyllaries densely silvery pubescent. Florets 3–5. Achenes obovoid. Fl. and fr. Aug–Oct.

• Gobi Desert, semidesert steppes; low elevations to 1500 m. N Xinjiang.

8. *Seriphidium scopiforme* (Ledebour) Poljakov, Trudy Bot. Inst. Akad. Nauk Kazakhsk. S.S.R. 11: 172. 1961.

帚状绢蒿 zhou zhuang juan hao

Artemisia scopiformis Ledebour, Fl. Ross. 2: 575. 1845 ["*scopaeformis*"]; *A. scopiformis* f. *longiracemosa* Poljakov.

Herbs, perennial, 20–40(–50) cm tall, forming compact tussocks, gray arachnoid pubescent, later glabrescent. Lower and middle stem leaves: petiole 0.5–1 cm; leaf blade elliptic or ovate-elliptic, 1.5–3 × 0.5–1 cm, gray arachnoid pubescent, later glabrescent, 1(or 2)-pinnatipartite; segments 3 or 4 pairs, elliptic or ovate, margin 2 or 3-toothed. Upper leaves and leaf-like bracts pinnatipartite, 3-partite, or entire. Synflorescence a somewhat broad conical panicle. Involucre ovoid or oblong, 2–3 mm in diam.; phyllaries gray arachnoid pubescent. Florets 3–5. Achenes obovoid. Fl. and fr. Aug–Oct.

Gobi Desert. E and N Xinjiang [Kazakhstan].

9. *Seriphidium kaschgaricum* (Krascheninnikov) Poljakov, Trudy Bot. Inst. Akad. Nauk Kazakhsk. S.S.R. 11: 175. 1961.

新疆绢蒿 xin jiang juan hao

Subshrubs, 30–35 cm tall, with vertical woody rootstock, branching from lower parts, branches slender, erect, densely arachnoid pubescent or glabrescent. Lower and middle stem leaves: petiole 5–8 mm; leaf blade elliptic or oblong-ovate, 1.5–2 × 1–1.5 cm, stiff, arachnoid pubescent or ± glabrescent, 1- or 2-pinnatisect; segments 2 or 3 pairs; lobes or lobules 1–5 × 0.5–1.5(–2) mm. Uppermost leaves and leaflike bracts linear, entire. Synflorescence a ± broad conical to ovoid panicle. Capitula ± dense or spreading along branches, sessile or shortly pedunculate. Involucre oblong-obovoid or ovoid-ellipsoid, 2–3 mm in diam., base ± cuneate; phyllaries recurved, arachnoid pubescent, later glabrescent. Florets 4–6; corolla purple-red. Achenes ovoid or obovoid. Fl. and fr. Aug–Oct.

Slopes, Gobi Desert, dry valleys, rocky hills, roadsides; low elevations to 1200 m. N Xinjiang [Kazakhstan].

- 1a. Lobules of leaves 3–5 mm; capitula spreading along branches 9a. var. *kaschgaricum*
 1b. Lobules of leaves 1–3 mm; capitula ± dense along branches 9b. var. *dshungaricum*

9a. *Seriphidium kaschgaricum* var. *kaschgaricum*

新疆绢蒿(原变种) xin jiang juan hao (yuan bian zhong)

Artemisia kaschgarica Krascheninnikov, Trudy Bot. Inst. Akad. Nauk S.S.S.R., Ser. 1, Fl. Sist. Vyssh. Rast. 3: 350. 1937.

Lobules of leaves 3–5 mm. Synflorescence a broad and ovoid panicle. Capitula spreading along branches.

Slopes, Gobi Desert, dry valleys, rocky hills, roadsides; low elevations to 1200 m. N Xinjiang [Kazakhstan].

9b. *Seriphidium kaschgaricum* var. *dshungaricum* (Filatova) Y. R. Ling, Bull. Bot. Res., Harbin 8(3): 116. 1988.

准噶尔绢蒿 zhun ga er juan hao

Artemisia kaschgarica var. *dshungarica* Filatova, Fl. Kazakhst. 9: 128. 1966.

Lobules of leaves 1–3 mm. Capitula ± dense along branches and in somewhat broad panicles.

• N Xinjiang.

10. *Seriphidium fedtschenkoanum* (Krascheninnikov) Poljakov, Trudy Bot. Inst. Akad. Nauk Kazakhsk. S.S.R. 11: 176. 1961.

苍绿绢蒿 cang lu juan hao

Artemisia fedtschenkoana Krascheninnikov, Trudy Bot. Inst. Akad. Nauk S.S.S.R., Ser. 1, Fl. Sist. Vyssh. Rast. 3: 351. 1937.

Herbs, perennial, 15–35 cm tall, gray pubescent or glabrescent. Lower stem leaves: petiole 5–15 mm; leaf blade ovate or elliptic, 1.5–3 × 1–2(–2.5) cm, pubescent, 2-pinnatisect; segments 2 or 4 pairs; lobules linear or linear-lanceolate, distal lobules 4–6, lateral lobules 2–3 × 0.3–0.8 mm, apex mucronulate. Middle stem leaves pinnatisect. Upper leaves and leaflike bracts linear, entire. Synflorescence a long narrow panicle. Involucre ovoid-oblong or ovoid, 1.5–2 mm in diam.; phyllaries puberulent, later glabrescent. Florets 2 or 3. Achenes oblong-ovoid. Fl. and fr. Aug–Oct.

Semidesert steppes, meadows, hills, dry slopes, terraces, roadsides; below 1500 m. W Gansu, E, S, and SW Xinjiang [Kazakhstan, Kyrgyzstan, Tajikistan].

11. *Seriphidium issykkulense* (Poljakov) Poljakov, Trudy Bot. Inst. Akad. Nauk Kazakhsk. S.S.R. 11: 173. 1961.

伊塞克绢蒿 yi sai ke juan hao

Artemisia issykkulensis Poljakov, Bot. Mater. Gerb. Glavn. Bot. Sada R.S.F.S.R. 17: 415. 1955; *A. fedtschenkoana* Krascheninnikov var. *issykkulensis* (Poljakov) Poljakov.

Subshrubs, 20–40 cm tall, gray puberulent. Lowermost leaves: petiole 5–15 mm; leaf blade oblong-ovate or ovate, 10–25 × 4–6 mm, gray puberulent, 2-pinnatisect; segments 2–4 pairs; lobules narrowly linear, distal lobules 4 or 5, lateral lobules 1.5–3 × 0.3–0.6 mm, obtuse apically. Middle stem and upper leaves pinnatisect; leaflike bracts narrowly linear-lanceolate. Capitula ± dense along branches and in somewhat broad or narrow panicles. Involucre oblong-ovoid or ovoid, 1–1.5 mm in diam.; phyllaries puberulent. Florets 3–5. Achenes ovoid or obovoid. Fl. and fr. Aug–Nov.

Rocky slopes, Gobi Desert, semidesert and desert steppes; low elevations to 1400 m. N Xinjiang [Kazakhstan].

12. *Seriphidium cinum* (O. Berg & C. F. Schmidt) Poljakov, Trudy Bot. Inst. Akad. Nauk Kazakhsk. S.S.R. 11: 176. 1961.

蛔蒿 hui hao

Artemisia cina O. Berg & C. F. Schmidt, Darstell. Beschr. Off. Gew. 4: t. 29. 1863.

Herbs, perennial, 20–40(–70) cm tall, gray arachnoid pu-

bescent or glabrescent. Lowermost leaves ovate or ovate-oblong, 3–6 × 1.5–4.5 cm, 2(or 3)-pinnatisect; segments 3 or 4 pairs; lobules narrowly linear-lanceolate, 2–5 × 0.3–0.8 mm, mucronulate apically. Middle stem and uppermost leaves pinnatisect; leaflike bracts narrowly linear. Synflorescence a narrow panicle. Capitula ± dense. Involucre ellipsoid-ovoid or ovoid-oblong, ca. 2 mm in diam.; phyllaries glabrescent. Florets 3–5. Achenes ovoid. Fl. and fr. Aug–Oct.

Cultivated. N Gansu, N Shaanxi, Xinjiang [Kazakhstan].

Seriphidium cinum is a source of α -santonin, used as an anthelmintic drug.

13. *Seriphidium brevifolium* (Wallich ex Candolle) Y. Ling & Y. R. Ling, *Acta Phytotax. Sin.* 18: 513. 1980.

短叶绢蒿 duan ye juan hao

Artemisia brevifolia Wallich ex Candolle, *Prodr.* 6: 103. 1838.

Subshrubs or shrubs, 15–35(–45) cm tall, gray arachnoid pubescent, later glabrescent. Lower stem leaves: petiole 3–5 mm; leaf blade ovate, 1.5–2.5 × 1–2 cm, 2- or 3-pinnatisect; segments 2–4 pairs; lobules linear, 2–4 mm. Middle stem leaves 2-pinnatisect. Upper leaves and leaflike bracts pinnatisect or entire. Synflorescence a narrow or somewhat broad panicle. Capitula usually 2 or 3 together along branchlets. Involucre ovoid-oblong or ellipsoid, ca. 2 mm in diam.; phyllaries densely pubescent. Florets 3 or 4(–8). Achenes oblong-ovoid or ovoid-ellipsoid. Fl. and fr. Aug–Oct.

Slopes, valleys, saline-alkaline soils; 2700–4500 m. W Xizang [Afghanistan, N India, N Pakistan].

14. *Seriphidium thomsonianum* (C. B. Clarke) Y. Ling & Y. R. Ling, *Acta Phytotax. Sin.* 18: 513. 1980.

西藏绢蒿 xi zang juan hao

Artemisia maritima Linnaeus var. *thomsoniana* C. B. Clarke, *Compos. Ind.* 160. 1876; *A. thomsoniana* (C. B. Clarke) Filatova.

Subshrubs, 30–80 cm tall, gray arachnoid pubescent. Lower and middle stem leaves: petiole short; leaf blade ovate or broadly ovate, 2–3 × 2–3 cm, gray pubescent, 2- or 3-pinnatisect; segments 4(or 5) pairs; lobules linear, 0.5–1.5 mm. Upper leaves 1- or 2-pinnatisect; leaflike bracts 3–5-lobed. Synflorescence a broad, much-branched panicle. Involucre subglobose, 2.5–3 mm in diam.; phyllaries densely puberulent or ± glabrescent. Florets 6–10. Achenes oblong. Fl. and fr. Aug–Oct.

Slopes; 3600–4300 m. W Xizang [Afghanistan, N India, N Pakistan].

15. *Seriphidium aucheri* (Boissier) Y. Ling & Y. R. Ling, *Acta Phytotax. Sin.* 18: 513. 1980.

光叶绢蒿 guang ye juan hao

Artemisia aucheri Boissier, *Fl. Orient.* 3: 367. 1875; *A. maritima* Linnaeus var. *aucheri* (Boissier) Pampanini.

Subshrubs, 30–40 cm tall, gray pubescent, later glabrescent. Lower and middle stem leaves: petiole 5–10 mm; leaf

blade ovate, 2–3 × 1–2 cm, pubescent, later glabrescent, 2-pinnatisect; segments 3 or 4(or 5) pairs; lobules linear, 5–10(–15) mm. Upper leaves pinnatisect; leaflike bracts narrowly linear, entire, rarely 3- or 5-lobed. Synflorescence a broad or somewhat broad and elongated panicle. Capitula usually in groups of 3–5 along branchlets. Involucre oblong, 1.5–2 mm in diam.; phyllaries puberulent, later glabrescent. Florets 3–5. Achenes oblong-ovoid or obovoid. Fl. and fr. Aug–Oct.

Slopes, canyons, roadsides; 2400–3700 m. W Xizang [Afghanistan, Pakistan; SW Asia (Iran)].

16. *Seriphidium ferganense* (Krascheninnikov ex Poljakov) Poljakov, *Trudy Bot. Inst. Akad. Nauk Kazakhsk. S.S.R.* 11: 173. 1961.

费尔干绢蒿 fei er gan juan hao

Artemisia ferganensis Krascheninnikov ex Poljakov, *Bot. Mater. Gerb. Glavn. Bot. Sada R.S.F.S.R.* 16: 409. 1954.

Herbs, perennial, 40–50 cm tall, densely gray tomentose, later partly glabrescent. Lowermost leaves: petiole 1–1.5 cm; leaf blade oblong, densely tomentose, 2-pinnatisect; segments 3 or 4 pairs; lobules narrowly linear, (3)–6–9(–12) × 0.5–1(–1.5) mm, acute apically. Middle stem and upper leaves pinnatisect; leaflike bracts linear. Capitula in broad pyramidal paniculate synflorescences. Involucre ovoid-ellipsoid, 2–2.5 mm; phyllaries pubescent. Florets 5–6. Achenes ovoid or obovoid. Fl. and fr. Aug–Oct.

Desert margins, saline-alkaline soils, desert steppes, rocky slopes and canyons; low to middle elevations. SW Xinjiang [Kazakhstan, Kyrgyzstan].

17. *Seriphidium gracilescens* (Krascheninnikov & Iljin) Poljakov, *Trudy Bot. Inst. Akad. Nauk Kazakhsk. S.S.R.* 11: 175. 1961.

纤细绢蒿 xian xi juan hao

Artemisia gracilescens Krascheninnikov & Iljin, *Sist. Zametki Mater. Gerb. Krylova Tomsk. Gosud. Univ. Kuybysheva* 1949(1–2): 2. 1949.

Subshrubs, 15–30 cm tall, with a thick rootstock, gray pubescent, later glabrescent. Lower stem leaves: petiole 3–5 mm; leaf blade triangular-ovate, 1–2 × 0.6–1 cm, gray pubescent and gland-dotted, 2- or 3-pinnatisect; segments 2 or 3 pairs, 3-lobed; lobules narrowly linear. Middle stem leaves ovate-oblong, 1- or 2-pinnatisect. Upper leaves oblong-ovate, 1- or 2-pinnatisect; leaflike bracts narrowly linear, entire. Synflorescence a narrow conical panicle. Involucre oblong or ellipsoid, 1–1.5 mm in diam.; phyllaries keeled, gland-dotted and puberulent or later sparsely puberulent. Florets 2–5. Achenes oblong. Fl. and fr. Aug–Oct.

Rocky slopes, Gobi Desert, dry canyons, terraces, roadsides, semi-desert or desert steppes, saline-alkaline soils; 800–2300 m. N Xinjiang [Kazakhstan, Mongolia, Russia].

18. *Seriphidium terrae-albae* (Krascheninnikov) Poljakov, *Trudy Bot. Inst. Akad. Nauk Kazakhsk. S.S.R.* 11: 175. 1961.

白茎绢蒿 bai jing juan hao

Artemisia terrae-albae Krascheninnikov, *Otchet Rabotakh*

Pochv.-Bot. Otryada Kazakhstansk. Eksped. Akad. Nauk S.S.S.R. 4(2): 269. 1930.

Herbs perennial, 8–15(–30) cm tall, with a thick rootstock, densely white arachnoid tomentose, sometimes partly glabrescent. Lower stem leaves: petiole short; leaf blade ovate, 1–2(–3) × 0.8–1 cm, 1- or 2-pinnatisect; segments 3 or 4 pairs; lobules linear, 2–3 × 0.3–0.5 mm. Middle and upper stem leaves pinnatisect; leaflike bracts linear. Synflorescence a lax, somewhat broad panicle. Involucre oblong-ovoid or ovoid, 1.5–3 mm in diam.; phyllaries keeled, white arachnoid pubescent. Florets 4 or 5. Achenes obovoid or ovoid. Fl. and fr. Aug–Oct.

Dunes, desert margins, Gobi Desert; low or middle elevations. N Xinjiang [Kazakhstan, Mongolia].

19. *Seriphidium semiaridum* (Krascheninnikov & Lavrova) Y. Ling & Y. R. Ling, Bull. Bot. Res., Harbin 8(3): 118. 1988.

半凋萎绢蒿 ban diao wei juan hao

Artemisia terrae-albae Krascheninnikov subsp. *semiarida* Krascheninnikov & Lavrova in Krylov, Fl. Zapadnoi Sibiri 11: 2787. 1949; *A. semiarida* (Krascheninnikov & Lavrova) Filatova; *A. terrae-albae* var. *semiarida* (Krascheninnikov & Lavrova) Poljakov.

Herbs, perennial, 20–30 cm tall, densely gray tomentose, later partly glabrescent. Lower stem leaves: petiole 3–10 mm; leaf blade ovate-elliptic, 1–2(–3) × 1–1.5 cm, 1- or 2-pinnatisect; segments (3 or) 4 or 5 pairs; lobules linear or linear-lanceolate, 2–4 × 0.3–0.5 mm. Middle stem leaves pinnatisect; leaflike bracts linear. Synflorescence a narrow conical panicle. Involucre ovoid-oblong or ovoid-ellipsoid, 1.5–2.5 mm in diam.; phyllaries densely gray tomentose. Florets 3–5. Achenes ovoid or obovoid. Fl. and fr. Aug–Oct.

Desert and semidesert steppes, saline-alkaline soils; low to middle elevations. N Xinjiang [Kazakhstan].

20. *Seriphidium heptapotamicum* (Poljakov) Y. Ling & Y. R. Ling, Bull. Bot. Res., Harbin 8(3): 119. 1988.

半荒漠绢蒿 ban huang mo juan hao

Artemisia heptapotamica Poljakov, Bot. Mater. Gerb. Glavn. Bot. Sada R.S.F.S.R. 18: 278. 1957; *A. terrae-albae* Krascheninnikov var. *heptapotamica* (Poljakov) Poljakov.

Herbs, perennial, 20–35(–40) cm tall, with a thick rootstock, densely gray arachnoid tomentose, later partly glabrescent. Lower and middle stem leaves: petiole short; leaf blade oblong-ovate or ovate-elliptic, 2–2.5 × 1–1.5 cm, 2-pinnatisect (1(or) 2)-pinnatisect in middle leaves); segments 3 or 4(or) 5 pairs; lobules linear, 3–5 × 0.3–0.5 mm, acute apically. Upper leaves and leaflike bracts pinnatisect or entire. Synflorescence a somewhat broad and elongated panicle. Involucre oblong or ovoid, 1.5–2.5 mm in diam.; phyllaries sparsely arachnoid pubescent. Florets 3 or 4. Achenes ovoid or obovoid. Fl. and fr. Aug–Oct.

Semidesert and desert steppes; 800–1500 m. N Xinjiang [Kazakhstan].

21. *Seriphidium sublessingianum* (Krascheninnikov ex Poljakov) Poljakov, Trudy Bot. Inst. Akad. Nauk Kazakhsk. S.S.R. 11: 174. 1961.

针裂叶绢蒿 zhen lie ye juan hao

Artemisia sublessingiana Krascheninnikov ex Poljakov, Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk S.S.S.R. 16: 395–396. 1954; *A. gorjaevii* Poljakov; *A. polystricha* Poljakov; *A. sublessingiana* var. *gorjaevii* (Poljakov) Poljakov; *A. sublessingiana* var. *polystricha* (Poljakov) Poljakov.

Subshrubs, 30–45 cm tall, gray arachnoid puberulent; non-flowering stems developing fibrous brownish bark. Lowermost leaves: petiole 1–2(–2.5) cm; leaf blade oblong-ovate or ovate, 3–4 × 1–2 cm, 2-pinnatisect; segments 3 or 4(or) 5 pairs; lobules narrowly linear, 5–12 × 0.3–0.5 mm, subacuminate. Middle stem and uppermost leaves sessile, 1(or) 2)-pinnatisect with palmatisect, sometimes pinnatisect, auricles; leaflike bracts pinnatisect or 3- or 5-lobed, or entire. Capitula sessile, in narrow or somewhat broad and elongated panicles. Involucre cylindrical-ovoid or ellipsoid-ovoid, 3–4 × 1–2 mm; phyllaries gray tomentose, later glabrescent. Florets 2–7(–8). Achenes ovoid or obovoid. Fl. and fr. Aug–Oct.

Rocky slopes, Gobi Desert, dry valleys, semidesert steppes, dunes; 800–1300 m. N Xinjiang [Kazakhstan, Mongolia, Russia].

Poljakov (Fl. URSS 26: 596–597. 1961) recognized two further varieties of *Artemisia sublessingiana*: var. *gorjaevii*, with slender erect stems usually 20–30 cm tall and short narrowly linear leaf lobes, and var. *polystricha*, with lower stem leaves not more than 2 cm and often 3 stigmatic lobes.

“*Artemisia maritima* Linnaeus [var.] *sublessingiana*” (Keller, Bot.-Geogr. Issledov. Zaisansk. Semipalatinsk. Obl. 2: 89. 1912) belongs here but is a nomen nudum and was therefore not validly published (*Vienna Code*, Art. 32.1(d)).

22. *Seriphidium amoenum* (Poljakov) Poljakov, Trudy Bot. Inst. Akad. Nauk Kazakhsk. S.S.R. 11: 174. 1961.

小针裂叶绢蒿 xiao zhen lie ye juan hao

Artemisia amoena Poljakov, Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk S.S.S.R. 16: 421. 1954.

Subshrubs, 5–25(–35) cm tall, with a thick rootstock, gray arachnoid pubescent, later glabrescent. Lower stem leaves: petiole short; leaf blade ovate or oblong-ovate, 4–8 × 1.5–2(–2.5) cm, 1(or) 2)-pinnatisect; segments 3 or 4(or) 5 pairs, occasionally middle of lateral lobes 3-lobed; lobules or lobes narrowly linear or narrowly linear-lanceolate, 4–12 × 1–2.5 mm, mucronulate apically. Middle stem leaves pinnatisect; lobes narrowly linear. Upper leaves and leaflike bracts narrowly linear, 4–5 mm. Synflorescence a narrow spikelike panicle. Involucre oblong-ovoid or oblong, 1.5–2 mm in diam.; phyllaries cyst-form, gray pubescent. Florets 4 or 5. Achenes ovoid or obovoid. Fl. and fr. Aug–Oct.

• Rocky slopes, Gobi Desert, saline-alkaline soils; low elevations to 1500 m. N Xinjiang.

Seriphidium amoenum contains the anthelmintic α -santonin.

23. *Seriphidium santolinum* (Schrenk) Poljakov, Trudy Bot. Inst. Akad. Nauk Kazakhsk. S.S.R. 11: 173. 1961.

沙漠绢蒿 sha mo juan hao

Artemisia santolina Schrenk, Bull. Cl. Phys.-Math. Acad. Imp. Sci. Saint-Petersbourg 3: 106. 1845.

Subshrubs, 25–35(–45) cm tall, with a thick rootstock, densely gray tomentose, later glabrescent. Lower and middle stem leaves ± sessile; leaf blade elliptic-linear or broadly linear, 1–7 × 0.5–1.5 mm, pinnatifid; segments 10(–15) pairs, small, suborbicular or oblong, or orbicularly 2- or 3-lobed. Upper leaves and leaflike bracts entire. Synflorescence a broad lax panicle. Involucre ovoid or ovoid-oblong, 2–3.5 mm in diam.; phyllaries densely gray puberulent. Florets 3 or 4. Achenes ovoid or obovoid. Fl. and fr. Aug–Oct.

Desert dunes; below 1400 m. N Xinjiang [Kazakhstan; SW Asia (Caucasus, Iran)].

24. *Seriphidium borotalense* (Poljakov) Y. Ling & Y. R. Ling, Bull. Bot. Res., Harbin 8(3): 120. 1988.

博洛塔绢蒿 bo luo ta juan hao

Artemisia borotalensis Poljakov, Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk S.S.S.R. 16: 425. 1954.

Herbs, perennial, 12–20 cm tall, with a thick rootstock, gray arachnoid tomentose. Lower stem leaves: petiole 5–8 mm; leaf blade elliptic, 1–2(–3) × 0.8–1.5(–2) cm, densely gray tomentose, 2-pinnatisect; segments (3 or)4 or 5 pairs; lobules linear, 1.5–3 × 0.5–1 mm, obtuse apically. Middle stem leaves pinnatisect. Upper leaves and leaflike bracts narrowly linear, entire. Synflorescence a narrow spikelike panicle. Involucre oblong-ovoid, 1.5–2 mm in diam.; phyllaries densely arachnoid pubescent, gland-dotted. Florets 5–7. Achenes obovoid or obovoid-ellipsoid. Fl. and fr. Aug–Oct.

• Gobi Desert, desert and semidesert steppes, rocky slopes, terraces; 1000–1500 m. N Xinjiang.

25. *Seriphidium rhodanthum* (Ruprecht) Poljakov, Trudy Bot. Inst. Akad. Nauk Kazakhsk. S.S.R. 11: 175. 1961.

高山绢蒿 gao shan juan hao

Artemisia rhodantha Ruprecht, Mém. Acad. Imp. Sci. Saint Pétersbourg, Sér. 7, 14(4): 52. 1869.

Herbs, perennial, 4–15(–20) cm tall, with a thick rootstock and capitate branches, densely white tomentose. Lower stem leaves: petiole 5–10 mm; leaf blade suborbicular or ovate, densely incanous tomentose, 2(or 3)-pinnati- or subpalmatisect; segments 3 or 4(or 5) pairs; lobules linear, 2–3 mm. Middle stem leaves shortly petiolate, 2-pinnatisect. Upper leaves pinnatisect; leaflike bracts linear or elliptic, entire. Synflorescence a narrow, spikelike panicle. Involucre ovoid or ovoid-oblong, 1.5–2(–2.5) mm in diam.; phyllaries densely gray tomentose. Florets 5–7; corolla limb red. Achenes ovoid or obovoid. Fl. and fr. Aug–Oct.

Rocky slopes, steppes, terraces; (1500–)2100–3700 m. SW Xinjiang [Kazakhstan, Kyrgyzstan, Tajikistan].

26. *Seriphidium korovinii* (Poljakov) Poljakov, Trudy Bot. Inst. Akad. Nauk Kazakhsk. S.S.R. 11: 175. 1961.

昆仑绢蒿 kun lun juan hao

Artemisia korovinii Poljakov, Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk S.S.S.R. 18: 279. 1957.

Herbs, perennial, 15–25 cm tall, with a thick rootstock, gray pubescent, later glabrescent. Lower stem leaves: petiole short; leaf blade ovate, 1–2.5 × 0.5–1 cm, pubescent, 1- or 2-pinnatisect; segments 2(or 3) pairs, 3-lobuled or not; lobes or lobules linear, elliptic, or elliptic-lanceolate, 1.5–3 mm. Middle stem leaves pinnatisect. Upper leaves and leaflike bracts linear, elliptic-lanceolate, or elliptic, entire. Synflorescence a narrow spikelike panicle. Involucre ovoid or ovoid-oblong, 2–2.5(–3) mm in diam.; phyllaries puberulent, gland-dotted. Florets 4 or 5; corolla limb yellow or red. Achenes ovoid or obovoid. Fl. and fr. Aug–Oct.

Gobi Desert, rocky slopes, semidesert steppes; 2000–3000 m. S Xinjiang [Afghanistan, Kazakhstan, Kyrgyzstan, Tajikistan].

27. *Seriphidium grenardii* (Franchet) Y. R. Ling & Humphries, Bull. Bot. Res., Harbin 8(3): 121. 1988.

高原绢蒿 gao yuan juan hao

Artemisia grenardii Franchet, Bull. Mus. Hist. Nat. (Paris) 3: 323. 1897 [“*grenardi*”]; *A. stracheyi* J. D. Hooker & Thomson ex C. B. Clarke var. *grenardii* (Franchet) Y. R. Ling.

Subshrubs, 15–20 cm tall, yellowish puberulent. Lower and middle stem leaves: petiole 5–10 mm; leaf blade ovate or oblong, 0.5–0.8 × 0.3–0.5 cm, (1 or)2-pinnatisect; segments 3 or 4 pairs; lobules or lobes lanceolate or elliptic-lanceolate, 2–3 × 0.5–1 mm. Upper leaves and leaflike bracts pinnatisect, 3-lobed or entire. Synflorescence a narrow spikelike panicle. Involucre ovoid or subglobose, 2–3 mm in diam.; phyllaries yellowish puberulent. Florets 4–6. Achenes obovoid. Fl. and fr. Aug–Oct.

• High mountains. S Xinjiang.

28. *Seriphidium compactum* (Fischer ex Candolle) Poljakov, Trudy Bot. Inst. Akad. Nauk Kazakhsk. S.S.R. 11: 175. 1961.

聚头绢蒿 ju tou juan hao

Artemisia compacta Fischer ex Candolle, Prodr. 6: 102. 1838; *A. lerceana* Weber ex Stechmann var. *gmeliniana* (Besser) Candolle, p.p.; *A. maritima* Linnaeus var. *compacta* (Fischer ex Candolle) Ledebour; *A. maritima* var. *fischeriana* Besser; *A. maritima* f. *gmeliniana* (Besser) Ledebour, p.p.; *A. maritima* subsp. *gmeliniana* (Besser) Krascheninnikov, p.p.; *A. maritima* var. *gmeliniana* Besser, p.p.

Herbs, perennial or subshrubs, 15–40 cm tall, with a rootstock, gray arachnoid tomentose, later glabrescent. Lower stem leaves: petiole 5–10 mm; leaf blade ovate, 1.5–3.5(–4) × 1–2(–3) cm, arachnoid pubescent, later glabrescent, 2- or 3-pinnatisect; segments (3 or)4 or 5(or 6) pairs; lobules linear, 2–3(–4) × 0.5–1 mm, obtuse apically. Middle stem leaves 1- or 2-pinnatisect. Upper leaves pinnatisect or 3–5-lobed; leaf-

like bracts linear. Synflorescence a narrow racemelike panicle; branches short and dense. Capitula sessile. Involucre ovoid or ovoid-oblong, 2–3 mm in diam.; phyllaries pubescent. Florets 3–5; corolla limb red. Achenes obovoid. Fl. and fr. Aug–Oct.

Rocky slopes, semideserts, from low elevations to subalpine areas. W Gansu, W Nei Mongol, Ningxia, NE Qinghai, Xinjiang [Kazakhstan, Mongolia, Russia].

29. *Seriphidium lehmannianum* (Bunge) Poljakov, Trudy Bot. Inst. Akad. Nauk Kazakhsk. S.S.R. 11: 175. 1961.

球序绢蒿 qiu xu juan hao

Artemisia lehmanniana Bunge, Beitr. Fl. Russl. 164. 1852.

Subshrubs, 15–40(–50) cm tall, with many short sterile

branches, densely arachnoid pubescent, later glabrescent. Lower stem leaves: petiole 10–20 mm; leaf blade suborbicular, 1.5–2.5(–3) × 1.5–2.5(–3) cm, (2 or)3-pinnatisect; segments (2 or)3 or 4 pairs; lobules linear, 3–4 × 0.5–0.8 mm. Middle stem leaves 2-pinnatisect; lobules short, narrow to linear. Upper leaves 1(or 2)-pinnatisect; leaflike bracts divided or entire. Synflorescence a very narrow panicle; branches very short with densely crowded capitula. Involucre ovoid-oblong or ovoid, 1.5–2.5 mm in diam.; phyllaries sparsely arachnoid pubescent. Florets 4–8; corolla limb red. Achenes ovoid or obovoid. Fl. and fr. Aug–Oct.

Rocky slopes, canyons, roadsides; 1800–2400 m. N Xinjiang [Afghanistan, India, Kazakhstan; SW Asia (Iran)].

2. *Seriphidium* sect. *Minchunensia* Y. R. Ling, Bull. Bot. Res., Harbin 8(3): 122. 1988 [“*Minchünensia*”].

民勤绢蒿组 min qin juan hao zu

Perennial herbs, arachnoid tomentose. Leaves pectinately 2(or 3)-pinnatisect; lobules serrate or subserrate, arachnoid pubescent or glabrescent.

• One species: China.

30. *Seriphidium minchunense* Y. R. Ling, Bull. Bot. Res., Harbin 5(3): 159. 1985 [“*minchünense*”].

民勤绢蒿 min qin juan hao

Herbs, perennial, 30–50 cm tall, densely gray arachnoid tomentose, later partly glabrescent or sparsely tomentose. Lower stem leaves: petiole 5–8 mm; leaf blade ovate, densely arachnoid pubescent, later sparsely pubescent, 2(or 3)-pectinately pinnatisect; segments 3(or 4) pairs; lobules 10–25 × 0.5–1 mm,

serrate or pectinate, obtuse apically. Middle stem leaves 1- or 2-pectinately pinnatisect; segments 2 or 3 pairs; lobules serrate or shortly linear. Upper leaves and leaflike bracts pinnatisect or 3-lobed. Synflorescence a lax, broad conical panicle; branches at ca. 90° to main stem. Involucre oblong or oblong-campanulate, 2–2.5 mm in diam.; phyllaries arachnoid puberulent. Florets 5–8. Achenes obovoid or oblong-ovoid. Fl. and fr. Aug–Oct.

• Rocky terraces; 1300–1400 m. C and W Gansu, E Xinjiang.

3. *Seriphidium* sect. *Juncea* (Poljakov) Y. R. Ling & Humphries, Bull. Bot. Res., Harbin 8(3): 122. 1988.

三裂叶绢蒿组 san lie ye juan hao zu

Artemisia sect. *Juncea* Poljakov in Schischkin & Bobrov, Fl. URSS 26: 626. 1961 [“*Junceum*”].

Subshrubs or shrubs, tomentose or pubescent. Leaves 1- or 2-ternate.

Thirteen species: N Africa, Asia, Europe; one species in China.

31. *Seriphidium juncea* (Karelin & Kirilov) Poljakov, Trudy Bot. Inst. Akad. Nauk Kazakhsk. S.S.R. 11: 175. 1961.

三裂叶绢蒿 san lie ye juan hao

Subshrubs, 24–40 cm tall, gray pubescent. Lower stem leaves: petiole 15–40 mm; leaf blade ovate or obovate, 1.5–5 × 1.5–3.5 cm, densely incanous pubescent, 2-ternate; lobules linear or linear-oblongate, 10–15 × 1–1.5 mm, mucronulate apically. Middle stem leaves: petiole 5–15 mm; leaf blade ternately 3-lobed; lobes linear-lanceolate or linear, 10–15 × 2–4 mm. Upper leaves and leaflike bracts entire. Synflorescence a narrow or somewhat broad panicle. Involucre oblong-ovoid or ellipsoid-ovoid, 2.5–4 mm in diam.; phyllaries densely or sparsely pubescent. Florets 4–7. Achenes obovoid. Fl. and fr. Aug–Oct.

Rocky slopes, Gobi Desert, desert steppes; 800–1500 m. N Xinjiang [Kazakhstan].

- 1a. Leaf blade 2.5–4 cm, distal lobes 10–15 mm; involucre 2.5–3(–3.5) mm in diam. 31a. var. *juncea*
- 1b. Leaf blade 1.5–2 cm, distal lobes 4–6 mm; involucre 3–4 mm in diam. 31b. var. *macrosciadium*

31a. *Seriphidium juncea* var. *juncea*

三裂叶绢蒿(原变种) san lie ye juan hao (yuan bian zhong)

Artemisia juncea Karelin & Kirilov, Bull. Soc. Imp. Naturalistes Moscou 15: 383. 1842.

Leaves 2.5–4 cm; distal lobes 1–1.5 cm. Involucre 2.5–3(–3.5) cm in diam.; phyllaries sparsely pubescent.

Rocky slopes, Gobi Desert, desert steppes; 800–1500 m. N Xinjiang [Kazakhstan].

31b. *Seriphidium junceum* var. *macrosciadium* (Poljakov) Y. Ling & Y. R. Ling, Bull. Bot. Res., Harbin 8(3): 123. 1988.

大头三裂叶绢蒿 da tou san lie ye juan hao

Artemisia macrosciadia Poljakov, Bot. Mater. Gerb. Bot.

Inst. Komarova Akad. Nauk S.S.S.R. 16: 423. 1954; *A. juncea* var. *macrosciadia* (Poljakov) Poljakov.

Leaves 1.5–2 cm; distal lobes 4–6 mm. Involucre 3–4 mm in diam.; phyllaries densely pubescent.

Rocky slopes, Gobi Desert, desert steppes; 800–1500 m. N Xinjiang [Kazakhstan].

153. **CROSSOSTEPHIUM** Lessing, *Linnaea* 6: 220. 1831.

芙蓉菊属 fu rong ju shu

Shi Zhu (石铸 Shih Chu); Christopher J. Humphries, Michael G. Gilbert

Subshrubs, pubescent. Leaves alternate, narrowly spatulate or oblanceolate, apically few lobed or entire. Capitula disciform, heterogamous, many, in a frondose raceme or panicle. Involucres hemispheric; phyllaries in 3 rows, outer ones herbaceous, inner ones broadly scariosus at margin. Receptacle hemispheric, epaleate. Marginal female florets in 1 row, tubular, 2- or 3-denticulate, gland-dotted outside. Disk florets tubular, 5-lobed, gland-dotted outside. Anther obtuse at base, with apical oblong appendage; style branches linear, apex truncate. Achenes obovoid, weakly 5-ribbed. Pappus coroniform, of small scales.

One species: China, Japan.

Molecular data (Watson et al., BMC Evolutionary Biology; <http://www.biomedcentral.com/1471-2148/2/17/>; accessed 10 Apr 2011) suggests that *Crossostephium* is embedded within *Artemisia*.

1. *Crossostephium chinensis* (Linnaeus) Makino, Bot. Mag. (Tokyo) 20: 33. 1906.

芙蓉菊 fu rong ju

Artemisia chinensis Linnaeus, Sp. Pl. 2: 849. 1753; *Chrysanthemum artemisioides* (Lessing) Kitamura; *Crossostephium artemisioides* Lessing; *Tanacetum chinense* (Linnaeus) A. Gray ex Maximowicz.

Plants 10–40 cm tall, much branched in upper part, densely gray-white pubescent. Leaves sessile, aggregated at apex of branches; leaf blade narrowly spatulate or narrowly lanceolate, 2–4 × 0.4–0.5 cm, both surfaces densely gray-white pubescent, base cuneate-attenuate, margin entire or sometimes apex 3- or 4-lobed, thick. Capitula rather small, disciform, ca. 7 mm in

diam., many, in a frondose raceme along branches. Involucres hemispheric; phyllaries in 3 rows, outer and middle ones equal, elliptic, herbaceous, abaxially densely gray-white pubescent, apex obtuse or acute, inner ones oblong, small, abaxially subglabrous, margin broadly scariosus. Marginal female florets in 1 row, tubular, ca. 1.5 mm, gland-dotted outside, apex 2- or 3-denticulate. Disk florets many, tubular, densely gland-dotted outside, 5-lobed. Pappus ca. 0.5 mm, coroniform, of small scales. Fl. and fr. year-round.

Littoral plant found on raised coral outcrops. Fujian, Guangdong, Taiwan, Yunnan, Zhejiang [Japan].

Crossostephium chinensis is rare and possibly threatened in the wild but is often cultivated for ornamental and medicinal purposes. The whole plant is used medicinally for treating infantile convulsions.

154. **FILIFOLIUM** Kitamura, *Acta Phytotax. Geobot.* 9: 157. 1940.

线叶菊属 xian ye ju shu

Shi Zhu (石铸 Shih Chu); Christopher J. Humphries, Michael G. Gilbert

Herbs, perennial, base somewhat woody, covered with fibrous leaf sheaths; indumentum absent or of medifixed hairs. Leaves alternate, pinnatisect with long filiform lobes. Synflorescence a ± flat-topped cyme. Capitula small, heterogamous, disciform. Involucre hemispheric; phyllaries in 4 rows. Receptacle conical, epaleate. Marginal florets female; corolla tapering above, apex minutely 4-toothed. Disk florets apparently bisexual but functionally male, apex 5-lobed, compressed into resinous mass. Anther apical appendage triangular. Achenes obliquely obovoid, thinly walled, with 2 adaxial-lateral rows of myxogenic cells. Corona absent.

One species: China, Japan, Korea, Mongolia, Russia (Siberia).

Molecular data (Watson et al., BMC Evolutionary Biology; <http://www.biomedcentral.com/1471-2148/2/17/>; accessed 10 Apr 2011) place *Filifolium* as the sister group to *Artemisia* subg. *Dracunculus* (Besser) Rydberg.

1. *Filifolium sibiricum* (Linnaeus) Kitamura, *Acta Phytotax. Geobot.* 9: 157. 1940.

线叶菊 xian ye ju

Tanacetum sibiricum Linnaeus, Sp. Pl. 2: 1844. 1753; *Artemisia sibirica* (Linnaeus) Maximowicz; *Chrysanthemum trinoides* Handel-Mazzetti.

Herbs, perennial, 20–60 cm tall, roots robust, woody; base densely clothed by old fibrous leaf sheaths; stems solitary or few and tightly clustered, corymbosely branched in upper parts, striate, glabrous. Basal leaves long petiolate; leaf blade obovate or oblong in outline, ca. 20 × 5–6 cm, 2(or 3)-pinnatisect, both surfaces green, glabrous; primary lateral segments many paired; ultimate segments filiform, alternate. Synflorescence a flat-

topped cyme; capitula 1–10(–15). Involucres hemispheric, 4–5 mm in diam.; phyllaries in 3 rows, ovate to broadly ovate, margin scarious, apex rounded. Florets yellow. Marginal female florets 6; corolla ascidiform, tapering above, minutely 2–4-denticulate, exterior with sessile glands. Disk florets many, tubular, ca. 2 mm, 5-lobed. Achenes dark, obovate or elliptic, slightly

compressed, glabrous, 2-striate adaxially. Fl. and fr. Jun–Sep. $2n = 16, 18$.

Grasslands on mountain slopes; 1500–2600 m. Hebei, Heilongjiang, Jilin, Liaoning, Nei Mongol, Shanxi [Japan, Korea, Mongolia, Russia (Siberia)].

155. NEOPALLASIA Poljakov, Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk S.S.S.R. 17: 429. 1955.

栉叶蒿属 zhi ye hao shu

Shi Zhu (石铸 Shih Chu); Christopher J. Humphries, Michael G. Gilbert

Herbs, annual or perennial. Leaves alternate, pectinate to pinnatisect. Synflorescence of short axillary spikes grouped into a slender, leafy panicle. Capitula rather small, heterogamous, disciform. Involucre ovoid or broadly ovoid; phyllaries in 3 or 4 rows, scarious margins broad. Receptacle narrowly conical, epaleate. Marginal florets usually 3 or 4, female, fertile; corolla narrowly tubular, apex not toothed. Disk florets of two kinds; outer bisexual, inner completely male with reduced ovaries; all central florets with corolla apex 5-lobed. Anther bases obtuse; apical appendage rhomboid-acuminate. Style branches linear. Achenes in a row around base of receptacle, ellipsoid, somewhat compressed or triquetrous, brown, striate. Corona absent.

One species: China, Kazakhstan, Mongolia, Russia.

Molecular data (Watson et al., BMC Evolutionary Biology; <http://www.biomedcentral.com/1471-2148/2/17/>; accessed 10 Apr 2011) indicate that *Neopallasia* is closely related to *Seriphidium* s.s. and could be included with that genus within a more broadly conceived *Artemisia*.

1. *Neopallasia pectinata* (Pallas) Poljakov, Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk S.S.S.R. 17: 430. 1955.

栉叶蒿 zhi ye hao

Artemisia pectinata Pallas, Reise Russ. Reich. 3: 755. 1776; *A. pectinata* var. *yunnanensis* Pampanini; *A. yunnanensis* (Pampanini) Krascheninnikov (1958), not Jeffrey ex Diels (Jun 1912), nor H. Léveillé (Nov 1912); *Neopallasia tibetica* Y. R. Ling; *N. yunnanensis* (Pampanini) Y. R. Ling.

Herbs, 12–40 cm tall; stems erect, unbranched or branched from base, purplish, ± densely white sericeous. Lower and middle stem leaves sessile; leaf blade oblong-elliptic, 1.5–3 × 0.5–1 cm, both surfaces green, glabrous, sometimes with sessile glands, pectinately pinnatisect; segments linear-subulate, somewhat rigid. Upper stem leaves to below synflorescence similar,

but smaller. Synflorescence of short axillary spikes grouped into a slender, leafy panicle. Capitula many, rather small, sessile. Involucres ovoid or broadly ovoid, 2.5–3 mm in diam.; phyllaries in 3 or 4 rows, abaxially glabrous, scarious margin broad, outer ones somewhat short, inner ones rather narrow. Marginal female florets 3 or 4, fertile, narrowly tubular, without apical teeth. Disk florets tubular, 5-lobed, of two kinds: outer bisexual, inner completely male with reduced ovaries. Achenes brown, elliptic, 1.2–1.5 mm, somewhat compressed.

Deserts, gravelly places of river valleys, wastelands; 1300–3400 m. Gansu, Hebei, Heilongjiang, Jilin, Liaoning, Nei Mongol, Ningxia, Qinghai, Shanxi, Sichuan, Xinjiang, Xizang [Kazakhstan, Mongolia, Russia].

Neopallasia pectinata is a highly variable species, and the Chinese entities *N. tibetica* and *N. yunnanensis* seem best treated as synonymous with it.

156. ALLARDIA Decaisne in Jacquemont, Voy. Inde 4(Bot.): 87. 1841.

扁毛菊属 bian mao ju shu

Shi Zhu (石铸 Shih Chu); Christopher J. Humphries, Michael G. Gilbert

Waldheimia Karelin & Kirilov.

Herbs, perennial, glabrous to densely tomentose. Leaves alternate, closely spaced, sometimes rosulate, spatulate or cuneate, apex 3–5-lobed or -parted, or oblong, pinnatisect or pinnatifid. Capitula solitary, pedunculate, heterogamous, radiate. Involucre hemispheric; phyllaries in 3 or 4 rows, scarious margins dark brown. Receptacle convex, epaleate. Marginal florets in 1 row, female or neuter, usually sterile; lamina pink, white, or bluish violet. Disk florets many, yellow or bluish violet, bisexual, fertile; corolla tubular, apex 5-lobed. Anther bases obtuse, apical appendage ovate-lanceolate. Style branches linear, apex truncate. Achenes somewhat curved, faintly 5–10-ribbed, generally with sessile glands, sometimes pilose. Corona of 20–50 bristlelike scales, with flat and palmate base, apex brownish, sometimes wider.

Eight species: Afghanistan, China, India, Kazakhstan, Mongolia, Nepal, Pakistan, Russia, Tajikistan, Uzbekistan; eight species (one endemic) in China.

The exact date of publication of *Allardia* is uncertain, but such evidence as there is (Zain-ul-Abidin, *Biologia* 4: 212–214. 1958) suggests that it was in 1841, thus predating *Waldheimia*, which was published in 1842.

- 1a. Leaves 4–5 cm; blade oblong, pinnatisect or pinnatipartite; ray florets female; achenes pilose, with distinct corona.
 2a. Leaves arachnoid lanate on both surfaces; capitula 1.2–2 cm wide; achenes ca. 3 mm, pilose 1. *A. tomentosa*
 2b. Leaves glabrous on both surfaces; capitula to 1 cm wide; achenes ca. 1.5 mm, glabrescent 2. *A. stoliczkae*
- 1b. Leaves 0.8–2 cm; blade spatulate or cuneate, palmately 3–5-lobed or -parted; ray florets sometimes sterile; achenes mostly glabrous (pilose in *A. lasiocarpa*), with reduced corona.
 3a. Achenes pilose 8. *A. lasiocarpa*
 3b. Achenes glabrous.
 4a. Plants glabrous or tomentose only below involucre and on peduncle; achene 2.5–4 mm.
 5a. Capitula 2.5–3.5 cm in diam., peduncles glabrous; phyllaries 6–7 mm, glabrous, apex cuspidate; achenes 2.5–4 mm 3. *A. tridactylites*
 5b. Capitula 1.5–2.5 cm in diam., peduncles sparsely hairy; phyllaries 3.5–4.5 mm, basally hairy, apex ± obtuse; achenes 2.5–3.5 mm 4. *A. glabra*
 4b. Plants grayish white lanate; achenes 1.2–2 mm.
 6a. Plants rather sparsely lanate; capitula ca. 2 cm in diam.; leaves 8–12 mm 5. *A. huegelii*
 6b. Plants densely lanate, hairs thick.
 7a. Capitula 3.5–4 cm in diam.; leaves 10–15 mm, distinctly 3–5-lobed 6. *A. vestita*
 7b. Capitula 1.5–2 cm in diam.; leaves 4–8 mm, obscurely 3-lobed 7. *A. nivea*

1. *Allardia tomentosa* Decaisne in Jacquemont, Voy. Inde 4(Bot.): 87. 1841.

羽裂扁毛菊 *yu lie bian mao ju*

Waldheimia tomentosa (Decaisne) Regel.

Herbs, perennial, 10–15 cm tall, with procumbent much-branched rhizomes. Stems many, laxly caespitose, branched or not, bases with remains of brown scarious leaf sheaths. Petioles enlarged at base; leaf blade oblong to linear-oblong, 4–5 × 0.2–1.5 cm, 2-pinnatipartite, both surfaces white arachnoid lanate, primary lateral pinnae 6–9-paired, distal pinnae gradually smaller; ultimate pinna lanceolate to ovate, apex long mucronulate. Capitulum solitary, pedunculate. Involucre hemispheric, 17–20 mm in diam.; phyllaries in 3 or 4 rows, abaxially lanate, scarious margin broad, dark brown, outer ones lanceolate, short, apex acute, inner ones linear-oblong, subscarious. Ray florets 10–20, white or pale pink; lamina linear-oblong, 6–11 mm. Disk florets yellow, 5-lobed. Achenes narrowly oblong, ca. 4.5 mm, 6–8-ribbed; ribs pale red-brown in upper part, sparsely villous in upper 1/2, with sessile glands; corona scales many, ca. 6 mm, brownish at apex. Fl. and fr. Aug–Sep.

Talus on mountain slopes; 4200–5200 m. W Xizang (Burang) [Afghanistan, India, Kazakhstan, Pakistan, Uzbekistan].

2. *Allardia stoliczkae* C. B. Clarke, Compos. Ind. 145. 1876.

光叶扁毛菊 *guang ye bian mao ju*

Waldheimia korolkowii Regel & Schmalhausen; *W. stoliczkae* (C. B. Clarke) Ostenfeld.

Herbs, perennial, ca. 15 cm tall, with procumbent, many-branched rhizomes; stems glabrous. Leaf blades 4–5 × 1(–1.5) cm, glabrous, 1- or 2-pinnatisect. Capitulum solitary, terminal, pedunculate. Phyllaries glabrous, scarious margin dark. Ray floret lamina white or pale pink, ca. 15 mm. Achenes sparsely pilose or glabrous.

Rocky slopes, stony riverbeds; [3000–5000 m]. Xinjiang, W Xizang [Afghanistan, India, Kazakhstan, Pakistan, Uzbekistan].

No Chinese specimens were seen. The account is based on Fl. URSS (26: 268. 1961) and Rast. Tsentral. Azii (14a: 23. 2007).

3. *Allardia tridactylites* (Karelin & Kirilov) Schultz Bipontinus, Pollichia 20–21: 442. 1863.

三指扁毛菊 *san zhi bian mao ju*

Waldheimia tridactylites Karelin & Kirilov, Bull. Soc. Imp. Naturalistes Moscou 15: 126. 1842.

Herbs, perennial, to 6 cm, with woody, procumbent, much-branched rhizome; stems many; entire plant glabrous. Leaves in dense rosettes, sessile; leaf blade cuneate, 1–2 × 0.5–1 cm, glabrous, base cuneate-attenuate, apex 3(–5)-lobed or -parted. Capitulum solitary, terminal, 2.5–3.5 cm in diam., sessile. Involucre hemispheric, 1.5–2 cm in diam.; phyllaries in 3 or 4 rows, abaxially glabrous, scarious margin broad, dark brown, outer phyllaries ovate-oblong to oblong, ca. 7 mm, apex cuspidate, inner ones oblong, ca. 8 mm. Ray florets 8–15; lamina pinkish white, pink, or purple-red, elliptic-oblong, 7–11 × 2.5–4 mm, apex 2- or 3-denticulate. Disk florets: corolla yellow, 4–5.5 mm, apex 5-lobed. Achenes 2.5–4 × 0.6–0.8 mm, somewhat curved, 5-ribbed, glabrous, with sessile glands. Corona scales many, bristlelike, usually tinged reddish or brownish, 6.5–8 mm. Fl. Jul–Sep.

Floodlands, talus on mountain slopes; 3000–4000 m. Xinjiang, Xizang [Kazakhstan, Mongolia, Russia].

4. *Allardia glabra* Decaisne in Jacquemont, Voy. Inde 4(Bot.): 88. 1841.

扁毛菊 *bian mao ju*

Waldheimia glabra (Decaisne) Regel; *W. tridactylites* Karelin & Kirilov subsp. *glabra* (Decaisne) Podlech.

Herbs, perennial, to 4 cm, with woody, procumbent, much-branched rhizomes; stems many; entire plant grayish or grayish green, loosely tomentose to pubescent with long simple hairs. Leaves in dense rosettes, sessile; leaf blade cuneate, 1–1.5 × 0.5–0.8 cm, both surfaces glabrous, base cuneate-attenuate, apex 3(–5)-lobed or -parted. Capitulum solitary, terminal, 2.5–3.5 cm in diam., sessile. Involucre hemispheric, 1–1.5 cm in diam.; phyllaries in 3 or 4 rows, abaxially hairy at base, scarious margin broad, dark brown, apex ± obtuse, outer phyllaries ovate-oblong to oblong, ca. 7 mm, inner ones oblong, ca. 8 mm.

Ray florets 8–15; lamina deep pink to almost white, elliptic-oblong, 6–10 × 2.5–4 mm, apex 2- or 3-denticulate. Disk florets: corolla yellow, 3.5–5 mm, apex 5-lobed. Achenes 2.5–3.5 × 0.5–0.7 mm, somewhat curved, 5-ribbed, glabrous, with sessile glands. Corona scales 6–7.5 mm, tinged pinkish violet or brownish. Fl. Jul–Sep.

Scree slopes, rock crevices; (3500–)4900–5500 m. Xizang [Afghanistan, Bhutan, N India, Kazakhstan, Pakistan, Uzbekistan].

5. *Allardia huegelii* Schultz Bipontinus, *Pollichia* 20–21: 442. 1863.

多毛扁毛菊 duo mao bian mao ju

Waldheimia huegelii (Schultz Bipontinus) Tzvelev; *W. stracheyana* Regel.

Herbs perennial, ca. 2 cm tall, with creeping much-branched rhizomes; stems many, short, strongly fragrant. Leaves sessile; leaf blade oblong-cuneate, 8–12 × 3–5 mm, both surfaces gray-white lanate, apex 3-parted. Capitulum solitary, ca. 2 cm in diam., pedunculate or not. Involucre hemispheric, ca. 15 mm in diam.; phyllaries in 3 rows, abaxially lanate, oblong-lanceolate to oblong-linear, scarious margin broad or narrow, dark, apex obtuse or acute. Ray florets pink; lamina oblong, ca. 7 mm, apex minutely 2- or 3-toothed. Disk florets many, yellow, 5-lobed. Achenes ca. 1.5 mm, glabrous, with sessile glands. Corona scales many, apically greenish, subulate, ca. 3 mm. Fl. and fr. Aug.

Among stones; ca. 5800 m. S Xizang (Zhongba) [Tajikistan (Pamirs)].

6. *Allardia vestita* J. D. Hooker & Thomson ex C. B. Clarke, *Compos. Ind.* 145. 1876.

厚毛扁毛菊 hou mao bian mao ju

Waldheimia vestita (J. D. Hooker & Thomson ex C. B. Clarke) Pampanini.

Herbs, perennial, 4–6 cm tall, with creeping woody rhizomes; stems many, erect; most parts densely and thickly yellowish or gray-white lanate. Leaves sessile; leaf blade cuneate, 1–1.5 × 0.4–0.5 cm, apex 3-lobed. Capitulum solitary at apex, shortly pedunculate. Involucre hemispheric, ca. 1.5 cm in diam.; phyllaries in 4 or 5 rows, ovate to oblong, 4–6 mm, abaxially lanate, scarious margin deep brown. Ray florets pink; lamina broadly elliptic. Disk florets yellow, 5-lobed. Achenes

ca. 2 mm, with sessile glands. Pappus many, bristlelike, deplanate, 2–3 mm, apically brownish. Fl. and fr. Aug–Sep.

Mountain slopes; 5000–5300 m. S Xizang (Tingri) [India, Pakistan].

7. *Allardia nivea* J. D. Hooker & Thomson ex C. B. Clarke, *Compos. Ind.* 145. 1876.

小扁毛菊 xiao bian mao ju

Waldheimia nivea (J. D. Hooker & Thomson ex C. B. Clarke) Regel.

Herbs, perennial, villous, with dense appressed gray-white hairs. Rhizome procumbent, woody, much branched. Stems many, erect, with dense lanate leaves. Leaves sessile; leaf blade cuneate, 4–8 × 1.5–2.5 mm, apex 3-lobed. Capitulum solitary at apex, shortly pedunculate. Involucre hemispheric, 8–11 mm in diam.; phyllaries in 3 or 4 rows, abaxially lanate, margin narrowly brown scarious, outer and middle ones ovate to oblong, 4–5 mm, inner ones oblanceolate, ca. 6 mm. Ray florets 17–20, red; lamina oblong, 7–8 mm, apex 2-denticulate. Disk florets yellow, 5- or 6-lobed. Achenes ca. 1.2 mm, glabrous, with sessile glands. Pappus many, bristlelike, pale yellow, ca. 2.5 mm. Fl. and fr. Jul.

Lateral moraines of glaciers; 5300–5400 m. S Xizang (N slopes of Qomolangma Feng) [Afghanistan, India, Nepal, Pakistan].

8. *Allardia lasiocarpa* (G. X. Fu) Bremer & Humphries, *Bull. Nat. Hist. Mus. London, Bot.* 23: 98. 1993.

毛果扁毛菊 mao guo bian mao ju

Waldheimia lasiocarpa G. X. Fu, *Acta Phytotax. Sin.* 17(2): 113. 1979.

Herbs, perennial. Stems procumbent, much branched. Leaves sessile; leaf blade spatulate, 1.5–2 × 0.6–0.7 cm, both surfaces sparsely lanate, apex 5–7-parted or -lobed. Capitulum solitary, to 3 cm in diam., sessile. Involucre hemispheric; phyllaries in 3 or 4 rows, triangular-lanceolate to oblong, 5–7 mm, abaxially sparsely lanate. Ray florets deep pink; lamina elliptic-oblong, ca. 13 mm, apex entire. Disk florets yellow. Achenes terete, ca. 2.5 mm, 5-ribbed, white villous, with sessile glands. Pappus many, bristlelike, deplanate, yellow-brown, longer than corolla.

• Stony grasslands by rivers, broken stony places on mountain slopes; 4700–5200 m. S Xizang (N slopes of Qomolangma Feng).

157. *CANCRINIA* Karelin & Kirilov, *Bull. Soc. Imp. Naturalistes Moscou* 15: 124. 1842.

小甘菊属 xiao gan ju shu

Shi Zhu (石铸 Shih Chu); Christopher J. Humphries, Michael G. Gilbert

Poljakovia Grubov & Filatova.

Subshrubs or perennial herbs, compact, tomentose. Leaves alternate to rosulate, dense or lax. Capitula terminal, solitary or several and corymbose, homogamous, discoid. Involucres hemispheric or cup-shaped; phyllaries herbaceous, in 3 or 4 rows, margin brown, dark brown, or hyaline scarious. Receptacle convex or flat, epaleate. Florets all bisexual, yellow, tubular, fertile, 5-lobed, with a narrow tube and a distinct limb. Anther obtuse at base, with apical ovate-lanceolate appendage. Style branches linear. Achenes trigonously terete, faintly 5- or 6-ribbed, glabrous or sparsely pilose. Corona of 5–12 pappuslike lanceolate scales ca. as long as or slightly longer than corolla.

About 30 species: C Asia, China, Mongolia, Russia; five species in China.

- 1a. Subshrubs (30–)40–50 cm tall 1. *C. maximowiczii*
 1b. Compact ± scapose herbs 5–20 cm tall.
 2a. Phyllaries with scarious margins colorless; pappus of 5 scales; plants growing at 500–2000 m.
 3a. Plants annual or biennial, easily pulled out of ground; achenes glabrous; pappus with all scales acute; receptacle conspicuously conical-globose 2. *C. discoidea*
 3b. Plants perennial, often forming mats; achenes sparsely pilose; pappus with 3 scales aristate mucronate; receptacle flat or slightly convex 3. *C. lasiocarpa*
 2b. Phyllaries with scarious margins brown; pappus of 8–12 scales; plants growing above 3000 m.
 4a. Scarious phyllary margins broad, dark brown, enlarged at apex; achenes glabrous or pilose only toward apex 4. *C. chrysocephala*
 4b. Scarious phyllary margins narrow, pale brown, not enlarged at apex; achenes uniformly sparsely pilose 5. *C. tianschanica*

1. *Canceria maximowiczii* C. Winkler, Trudy Imp. S.-Peterburgsk. Bot. Sada 12: 29. 1892.

灌木小甘菊 *guan mu xiao gan ju*

Canceria paucicephala Y. Ling; *Poljakovia falcatolobata* (Krascheninnikov) Grubov & Filatova; *Tanacetum falcatolobatum* Krascheninnikov.

Subshrubs, (30–)40–50 cm tall; branchlets ribbed, white tomentose, brown gland-dotted. Leaves petiolate; leaf blade oblong-linear, 1.5–3 × 0.5–1.2 cm, pinnatifid, abaxially gray-white tomentose, adaxially sparsely tomentose or glabrescent, both surfaces brown gland-dotted, lateral lobes 2–5-paired, falcate, margin entire or 1- or 2-denticulate. Uppermost leaves linear, entire or denticulate. Synflorescence a flat-topped cyme; capitula 2–5. Involucre campanulate or broadly campanulate, 5–7 mm in diam.; phyllaries in 3 or 4 rows, abaxially sparsely pilose, brown gland-dotted, scarious margin narrow, pale brown; outer ones ovate-triangular or oblong-ovate, inner ones oblong-ovate, scarious margin hyaline. Florets yellow, 5-lobed. Achenes ca. 2 mm, 5-ribbed, gland-dotted. Corona scales 5, lanceolate. Fl. and fr. Jul–Oct.

Gravelly mountain slopes, alluvial fans by riverbanks; 2100–3600 m. Gansu, Nei Mongol, Qinghai, Xinjiang, Yunnan [Mongolia].

2. *Canceria discoidea* (Ledebour) Poljakov ex Tzvelev in Schischkin & Bobrov, Fl. URSS 26: 313. 1961.

小甘菊 *xiao gan ju*

Pyrethrum discoideum Ledebour, Icon. Pl. 2: t. 153. 1830; *Canceria brachypappus* C. Winkler; *Chrysanthemum ledebourianum* Y. Ling; *Matricaria ledebourii* (Schultz Bipontinus) Schischkin; *Microcephala discoidea* (Ledebour) K. Bremer et al.; *Tanacetum ledebourii* Schultz Bipontinus.

Herbs, perennial or biennial, 5–20 cm tall, with slender taproot; stems erect or ascending, branched from base, scapose, conspicuously lanate. Leaves all basal, petiolate; leaf blade oblong or ovate, 2–4 × 0.5–1.5 cm, 2-pinnatifid, both surfaces gray-green, white lanate or subglabrescent; primary lateral lobes 2–5-paired; ultimate lobes ovate or broadly linear. Capitula solitary, terminal, several per plant; peduncle 4–15 cm. Involucre coryliform, 7–12 mm in diam.; phyllaries in 3 or 4 rows, herbaceous, abaxially sparsely lanate to glabrescent, scarious margin hyaline; outer phyllaries linear-lanceolate, 3–4 mm, inner ones

longer, linear-oblong. Receptacle conspicuously convex, conical-globose. Florets yellow, 5-lobed. Achenes ca. 2 mm, 5-ribbed, glabrous. Corona scales 5. Fl. and fr. Apr–Sep.

Mountain slopes, Gobi Desert; 500–1200 m. Gansu, Nei Mongol, Xinjiang, Xizang [Kazakhstan, Mongolia, Russia].

3. *Canceria lasiocarpa* C. Winkler, Trudy Imp. S.-Peterburgsk. Bot. Sada 12: 30. 1892.

毛果小甘菊 *mao guo xiao gan ju*

Herbs, perennial, 7–15 cm tall, with slender woody taproot; stems erect or ascending, branched from base to ± form mat, white lanate. Petiole lanate, base enlarged; leaf blade lanceolate-ovate to oblong, 0.7–1.5 × 0.5–0.8 cm, pinnatisect, both surfaces gray-green, white lanate. Capitula solitary, terminal, several per plant; peduncle 4–8 cm. Involucre coryliform, 8–12 mm in diam.; phyllaries in 3 rows, herbaceous, scarious margin nearly absent, outer phyllaries linear-lanceolate, apex acute, inner ones linear-oblong, scarious margin broad, hyaline. Florets yellow, 5-lobed. Achenes ca. 2 mm, 5-ribbed, sparsely villos. Corona scales 5, 3 of these aristate mucronate. Fl. and fr. Jun–Sep.

Mountain slopes; 1500–2000 m. Gansu, Ningxia, Xizang [Mongolia].

4. *Canceria chrysocephala* Karelin & Kirilov, Bull. Soc. Imp. Naturalistes Moscou 15: 125. 1842.

黄头小甘菊 *huang tou xiao gan ju*

Herbs, perennial, scapose, with slender taproot; stems lanate. Leaves in basal rosettes; petiole longer than blade; leaf blade oblong or ovate, 2–3 × 0.5–1 cm, 2-pinnatifid, both surfaces gray-white, densely lanate; primary lateral lobes 3- or 4-paired, linear-oblong to obovate; ultimate lobes obtuse or slightly acute at apex. Capitula solitary, terminal, several per plant; peduncle 2–8 cm. Involucre coryliform, 1–1.7 cm in diam.; phyllaries in 3 rows, abaxially densely lanate, scarious margin broad, brown or deep brown; outer phyllaries lanceolate or linear-lanceolate, inner ones longer, oblong-linear. Florets yellow, 5-lobed. Achenes 1.5–2.2 mm, 5- or 6-ribbed, glabrous, rarely sparsely pilose at apex. Corona scales 8–12, lanceolate, brownish. Fl. and fr. Jul–Aug.

Rocky places on mountain slopes, meadows, gravelly places, floodlands; 3300–3800(–4000) m. Xinjiang (Tian Shan) [Kazakhstan].

5. *Cancrinia tianschanica* (Krascheninnikov) Tzvelev in Schischkin & Bobrov, Fl. URSS 26: 315. 1961.

天山小甘菊 tian shan xiao gan ju

Cancrinia chrysocephala Karelin & Kirilov subsp. *tianschanica* Krascheninnikov, Bot. Mater. Gerb. Glavn. Bot. Sada R.S.F.S.R. 3: 81. 1922.

Herbs, perennial, ± scapose, to 10 cm tall, sparsely grayish hirsute, hairs simple. Basal leaves many, petiolate; leaf blade oblong or ovate, 2–3 × 0.5–1 cm, 2-pinnatipartite, both surfaces densely lanate; primary lateral lobes 3- or 4-paired; ultimate

lobes obtuse or slightly acute at apex. Stem leaves very reduced, margin entire. Capitulum solitary, long pedunculate. Involucres coryliform, 4–6 mm in diam.; phyllaries in 3 rows, herbaceous, scarious margin narrow, glossy brown, outer phyllaries lanceolate or linear-lanceolate, inner ones longer, oblong-linear. Florets yellow, 5-lobed. Achenes 1.5–2.2 mm, 5- or 6-ribbed, sparsely pilose. Corona scales 8–12, linear or elliptic-linear. Fl. and fr. Jul–Aug.

Rocky places on mountain slopes, meadows, gravelly places, floodlands; ca. 3200 m. Xinjiang (Tian Shan) [Kazakhstan (C Tian Shan)].

158. *RICHTERIA* Karelin & Kirilov, Bull. Soc. Imp. Naturalistes Moscou 15: 126. 1842.

灰叶匹菊属 hui ye pi ju shu

Shi Zhu (石铸 Shih Chu); Christopher J. Humphries, Michael G. Gilbert

Subshrubs, basally woody; most parts tomentose; stems covered by sheathing leaf bases. Leaves alternate and basally rosulate, blade pinnatisect. Capitula solitary, pedunculate, radiate. Phyllaries with dark brown margins. Receptacle convex, epaleate. Ray florets female; lamina white. Disk corolla 5-lobed. Achenes faintly 6–10-ribbed, with sessile glands. Pappus of 6–10 obovate, apically brownish scales at least 1/2 as long as corolla.

Three species: Afghanistan, NW China, N India, Mongolia, Russia; C Asia, SW Asia (Iran); one species in China.

1. *Richteria pyrethroides* Karelin & Kirilov, Bull. Soc. Imp. Naturalistes Moscou 15: 127. 1842.

灰叶匹菊 hui ye pi ju

Chrysanthemum arassanicum C. Winkler; *C. artemisiifolium* Klatt; *C. pyrethroides* (Karelin & Kirilov) B. Fedtschenko; *C. richteria* Benthams; *C. transiliense* (Herder) Minkwitz; *Pyrethrum arassanicum* (C. Winkler) O. Fedtschenko; *P. pyrethroides* (Karelin & Kirilov) B. Fedtschenko ex Krascheninnikov; *P. transiliense* (Herder) Regel; *P. transiliense* var. *subsessile* Regel; *P. transiliense* var. *subvillosum* Regel; *P. transiliense* var. *tomentosum* Regel; *Tanacetum transiliense* Herder.

Herbs, perennial, (5–)10–40 cm tall, rhizomatous; stems erect or ascending, base covered with sheathing leaf bases, fascicled, rarely solitary, few branched or not, gray-white, villous with curved long simple hairs especially below capitulum. Bas-

al leaves: petioles to 4 cm; leaf blade narrowly elliptic, 1.5–7 × 0.6–2 cm, 2-pinnatisect, both surfaces gray-white, densely or sparsely villous; primary lateral segments 3–8-paired; ultimate segments linear-lanceolate or ovate-lanceolate, sessile, rather small. Synflorescence terminal, with 1(–3) capitula, not conspicuously flat-topped. Involucre coryliform, 1–1.4 cm in diam.; phyllaries in 4 rows, scarious margin dark brown, outer phyllaries ovate or long ovate-triangular, 3–4(–6) mm, middle and inner ones narrowly lanceolate or oblanceolate, 5–15 mm, middle ones abaxially densely villous with fluffy curved long simple hairs, inner ones glabrous or nearly so abaxially. Ray florets white or pale red; lamina elliptic or narrowly elliptic, 5–15 mm, apex 3-denticulate. Achenes ca. 2.5 mm. Corona ca. 1 mm, divided to base. Fl. and fr. Jun–Aug.

Meadows, rocky mountain slopes, floodlands; below 3700 m. Xinjiang [N India, Kazakhstan, Russia, Uzbekistan].

159. *HANDELIA* Heimerl, Oesterr. Bot. Z. 71: 215. 1922.

天山蓍属 tian shan shi shu

Shi Zhu (石铸 Shih Chu); Christopher J. Humphries, Michael G. Gilbert

Herbs, perennial; stems 1 to few, thick, with wide pith; indumentum of basifixed hairs. Basal leaves large, petiolate; stem leaves small, sessile, oblong, 3-pinnatisect. Synflorescences cymose, dense or lax, ± flat-topped. Capitula homogamous, discoid. Involucres hemispheric; phyllaries in 3 rows, oblong, scarious margins broad. Receptacle conical, paleate; palea narrowly oblong or oblanceolate, scarious. Florets yellow, bisexual; corolla tubular, apex 5-lobed, gland-dotted. Anther bases obtuse, apical appendage acute. Style branches claviform-oblong. Achenes small, cuneate, inconspicuously 5-ribbed adaxially, with abaxial rim. Corona absent.

One species: Afghanistan, China, Kazakhstan, Pakistan, Uzbekistan.

1. *Handelia trichophylla* (Schrenk ex Fischer & C. A. Meyer) Heimerl, Oesterr. Bot. Z. 71: 215. 1922.

天山蓍 tian shan shi

Achillea trichophylla Schrenk ex Fischer & C. A. Meyer, Enum. Pl. Nov. 1: 48. 1841.

Herbs, perennial, 30–100 cm tall, with robust taproot; stem usually solitary, thick, striate, lower part densely dirty white

lanate, upper part glabrescent. Basal leaves petiolate; leaf blade oblong, 5–30 × 2–12 cm, 3-pinnatisect, densely pilose; ultimate segments subfiliform, sessile, smaller. Synflorescence lax or dense, ± flat-topped. Involucres hemispheric, ca. 5 mm in diam.; phyllaries in 3 rows, oblong, scarious margin broad, adaxially sparsely villous. Florets many, yellow, tubular, 5-

lobed, gland-dotted. Achenes yellow-brown, cuneate, 1–1.5 × 0.3–0.5 mm, with abaxial rim. Corona absent.

Xinjiang [Afghanistan, Kazakhstan, Pakistan, Uzbekistan].

The description above is based on specimens from Kazakhstan and Uzbekistan and on the account in Fl. URSS (26: 125. 1961).

160. PSEUDOHANDELIA Tzvelev in Schischkin & Bobrov, Fl. URSS 26: 878. 1961.

拟天山蓍属 ni tian shan shi shu

Shi Zhu (石铸 Shih Chu); Christopher J. Humphries, Michael G. Gilbert

Herbs, biennial to perennial, dying after flowering; stems 1–4, thick with wide pith; indumentum of basifixed hairs, arachnoid. Leaves alternate, 2- or 3-pinnatisect. Capitula many in dense pseudoumbel, long pedunculate, homogamous, discoid. Involucre hemispheric; phyllaries in 2 or 3 rows, margins scarious, pale; innermost phyllaries resembling receptacle scales. Receptacle hemispheric to conical, epaleate or with a few marginal palea. Florets yellow, bisexual, fertile, narrowly tubular with abruptly expanded campanulate limb, 5-lobed; tube glandular papillate. Anthers without basal appendages; apical appendage ovate-lanceolate, apex obtuse. Style branches linear, apex truncate. Achenes narrowly cylindrical, curved, circular in cross section, inconspicuously 4- or 5-ribbed, glandular-papillate. Pappus absent.

One species: Afghanistan, China, Kazakhstan, Tajikistan, Turkmenistan; SW Asia (Iran).

1. Pseudohandelia umbellifera (Boissier) Tzvelev in Schischkin & Bobrov, Fl. URSS 26: 363. 1961.

拟天山蓍 ni tian shan shi

Tanacetum umbelliferum Boissier, Diagn. Pl. Orient., ser. 2, 3: 30. 1856; *Chrysanthemum floccosum* Kitamura; *C. trichophyllum* (Regel & Schmalhausén) Kuntze; *C. umbelliferum* (Boissier) Hoffmann; *Lepidolopsis umbellifera* (Boissier) Poljakov; *Pyrethrum trichophyllum* (Regel & Schmalhausén) Bornmüller & Sintenis (1900–1901), not Grisebach (1846); *P. umbelliferum* (Boissier) Boissier; *T. trichophyllum* Regel & Schmalhausén.

Herbs, biennial or short-lived perennial, dying after flowering, 20–100 cm tall, roots long and thick; stems solitary or few, robust, unbranched below synflorescence, base covered

with persistent leaf bases; most parts densely arachnoid hairy. Leaf blade to 30 × 5–6 cm, bipinnate, ultimate segments linear, to 0.6 mm wide, with cartilaginous cusp. Synflorescence umbel-like. Capitula many, long pedunculate. Involucres hemispheric, 3–5 × 6–9 mm; outer phyllaries oblong, margin broadly scarious, erose; innermost phyllaries much narrower. Florets many; corolla yellow, with linear tube and abruptly expanded campanulate limb, 5-lobed, strongly glandular papillate. Achenes cylindrical, 1.8–2.4 × ca. 0.3 mm, obscurely 4- or 5-ribbed, tuberculate, glandular. Corona absent.

Stony slopes, sands, gravel beds, etc. Xinjiang [Afghanistan, Kazakhstan, Tajikistan, Turkmenistan; SW Asia (Iran)].

No material from China was seen by the present authors. The description is based primarily on the account in Fl. URSS.

161. HIPPOLYTIA Poljakov, Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk S.S.S.R. 18. 288. 1957.

女蒿属 nü hao shu

Shi Zhu (石铸 Shih Chu); Christopher J. Humphries, Michael G. Gilbert

Herbs, perennial, sometimes stemless, small subshrubs, or cushion plants; indumentum of medifixed hairs. Leaves alternate, pinnatifid or 3-lobed. Synflorescences cymose, dense or lax, forming panicles, clusters, or heads. Capitula few to many, homogamous, discoid. Involucre campanulate or conical; phyllaries in 3 or 4 rows, herbaceous or rigidly herbaceous, scarious margins white or brown. Receptacle flat to convex, epaleate. Florets all bisexual; corolla tubular, apex 5-lobed. Anther bases obtuse, apical appendage ovate-lanceolate. Style branches linear, apex truncate. Achenes subterete, 4–7-ribbed, with a ± distinct apical rim. Corona absent.

Nineteen species: C Asia, China, Himalaya, Mongolia; 11 species (six endemic) in China.

Hippolytia dolichophylla (Kitamura) K. Bremer & Humphries (Bull. Nat. Hist. Mus. London, Bot. 23: 106. 1993; *Chrysanthemum dolichophyllum* Kitamura, Acta Phytotax. Geobot. 23: 73. 1968, based on *Tanacetum longifolium* Wallich ex Candolle, Prodr. 6: 130. 1838, not Thunberg (1800); *C. longifolium* K. H. Rechinger (1955), not Sessé & Mociño (1894); *T. dolichophyllum* (Kitamura) Kitamura; *T. himachalense* Aswal & Mehrotra, nom. illeg. superfl.) was recorded from Sichuan in Annot. Checkl. Fl. Pl. Nepal (69. 2000, as *T. dolichophyllum*), disjunct from the main area of distribution in the Himalaya between Kashmir and Nepal (see http://www.efloras.org/florataxon.aspx?flora_id=110&taxon_id=242425863; accessed 8 Apr 2011). No specimen has been seen by the present authors. This species would key out as *H. herderi*, but it differs from that species and all others in *Hippolytia* by having leaves 12–25 cm.

- 1a. Rosette or cushion plants with concealed stems, to 7 cm tall, usually less; capitula in very dense sessile clusters.
- 2a. Rosette plants with a single central cluster of capitula.
- 3a. Leaves 2-pinnatisect 8. *H. glomerata*
- 3b. Leaves 3–7-pinnatisect 9. *H. syncalathiformis*
- 2b. Cushion plants with several distinct clusters of capitula.
- 4a. Leaves spatulate, apex 3–6-lobed 10. *H. gossypina*
- 4b. Leaves orbicular or flabelliform, biternate-palmately divided 11. *H. kennedyi*
- 1b. Plants with obvious stems, 7–50 cm tall; capitula in pedunculate panicles.
- 5a. Capitula fascicled-corymbose at apices of branches or stem; involucre campanulate, glossy, yellowish or straw-colored, phyllaries in 4 or 5 rows, scarious margins pale brownish or white.
- 6a. Perennial herbs, often with a solitary stem 3. *H. delavayi*
- 6b. Subshrubs.
- 7a. Leaves 2-pinnatisect, abaxially green or deep green, glabrous; florets ca. 3.2 mm 2. *H. desmantha*
- 7b. Leaves pinnatifid, abaxially gray-white, densely appressed pubescent; florets ca. 2 mm 1. *H. kaschgarica*
- 5b. Capitula corymbose or glomerulate; involucre cuneate or cuneate-campanulate, matt, phyllaries in 3 or 4 rows, scarious margins dark brown.
- 8a. Leaves 3-pinnatisect; capitula many 4. *H. yunnanensis*
- 8b. Leaves 2-pinnatisect; capitula 4–12.
- 9a. Plants to 30 cm tall; leaves narrowly elliptic or ovate, 2–4 cm, ultimate segments narrowly elliptic 5. *H. herderi*
- 9b. Plants to 12 cm tall; leaves ovate, ultimate segments linear.
- 10a. Stem leaves sessile 6. *H. senecionis*
- 10b. Stem leaves petiolate, petiole 5–10 mm 7. *H. tomentosa*

1. *Hippolytia kaschgarica* (Krascheninnikov) Poljakov, Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk S.S.S.R. 18: 290. 1957.

贺兰山女蒿 he lan shan nü hao

Tanacetum kaschgaricum Krascheninnikov, Trudy Bot. Inst. Akad. Nauk S.S.S.R., Ser. 1, Fl. Sist. Vyssh. Rast. 1: 175. 1933; *Chrysanthemum alashanense* (Y. Ling) Y. Ling; *Hippolytia alashanensis* (Y. Ling) C. Shih; *Poljakovia alashanensis* (Y. Ling) Grubov & Filatova; *P. kaschgarica* (Krascheninnikov) Grubov & Filatova; *T. alashanense* Y. Ling.

Subshrubs or small shrubs, 25–50 cm tall; old branches dark gray or gray-brown; branchlets of current year somewhat gray-white, indumentum dense and appressed powdery. Leaves in basal rosettes and scattered along stems; petiole 3–8 mm; leaf blade narrowly elliptic, lanceolate, or elliptic, 1.5–2 × 0.5–1 cm, pinnatifid, abaxially gray-white, densely appressed pubescent, adaxially green, glabrescent; lateral lobes 2–5-paired, all lobe margins entire or 1- or 2-toothed on one side; leaves below synflorescences sometimes simple, entire. Synflorescence a dense terminal flat-topped cyme; capitula 3–10, peduncle 0.5–1.5 cm, pubescent with appressed white powdery hairs. Involucre campanulate, 4–5 mm in diam.; phyllaries in 4 rows, rigidly herbaceous, glossy, yellowish or straw-colored, scarious margin brown or white, outer phyllaries lanceolate, ca. 1.8 mm, middle and inner ones oblanceolate, ca. 3 mm. Florets yellow, ca. 2 mm. Achenes ca. 1.5 mm. Fl. and fr. Aug–Oct.

• Mountain slopes, fissures of rocks, grasslands, desert steppes; 1900–2300 m. Gansu, Nei Mongol, Ningxia, Xinjiang.

Tzvelev (Fl. URSS 26: 412. 1961) suggested that this species would have to be removed from *Hippolytia*. Bremer and Humphries (Bull. Nat. Hist. Mus. London, Bot. 23: 106. 1993) also regarded this species as anomalous, and it was subsequently transferred by Grubov and Filatova to the new genus *Poljakovia* (Novosti Sist. Vyssh. Rast. 33: 227. 2001).

Filatova (Rast. Tsentral. Azii 14a: 30–31. 2007) treated *Hippolytia alashanensis* and *H. kaschgarica* as distinct species in *Poljakovia*: *P. alashanensis* with lower cauline leaves and leaves of sterile shoots pinnatisect, lateral segments linear, apex shortly cuspidate; and *P. kaschgarica* with lower cauline leaves and leaves of sterile shoots pinnatifid, lateral segments oblong-lanceolate, entire, apex subobtusate.

2. *Hippolytia desmantha* C. Shih, Acta Phytotax. Sin. 17(4): 63. 1979.

束伞女蒿 shu san nü hao

Subshrubs, 10–15 cm tall; old branches gray; young branches greenish or brown-green, pubescent with appressed powdery hairs. Leaves with petioles ca. 5 mm; leaf blade ovate, elliptic, obliquely elliptic, or narrowly flabelliform, 0.5–2 × 1–1.5 cm, both surfaces green, glabrous, 2-pinnatisect; primary lateral segments 2- or 3-paired; ultimate segments linear, narrowly elliptic, or lanceolate; leaves below synflorescence sometimes pinnatisect. Capitula 3–5, fascicled-corymbose at apices of branches, pedunculate; peduncle slender, ca. 1.5 cm, pubescent with appressed powdery hairs. Involucre campanulate, 4–5 mm in diam.; phyllaries in 4 rows, rigidly herbaceous, glossy, yellow-white or straw-colored, margin brownish, outer ones triangular-ovate, 1.5–2 mm, middle and inner ones narrowly elliptic or oblanceolate, ca. 4 mm. Florets yellow, ca. 3.2 mm. Achenes ca. 2 mm. Fl. and fr. Aug.

• Meadows, rock outcrops on valley slopes; 3800–3900 m. Qinghai (Yushu).

3. *Hippolytia delavayi* (Franchet ex W. W. Smith) C. Shih, Acta Phytotax. Sin. 17(4): 65. 1979.

川滇女蒿 chuan dian nü hao

Tanacetum delavayi Franchet ex W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 8: 345. 1915; *Chrysanthemum bulbosum* (Handel-Mazzetti) Handel-Mazzetti; *C. delavayi* (Franchet ex W. W. Smith) Handel-Mazzetti; *T. bulbosum* Handel-Mazzetti.

Herbs, perennial, 7–25 cm tall; stems erect, solitary, unbranched, somewhat scapelike, densely villous. Leaves in basal rosettes and scattered along stems; basal leaves: petiole 2–6 cm; leaf blade elliptic or narrowly elliptic, 2–7.5 × 1–2.5 cm, 2-pinnatisect, abaxially densely or sparsely villous, adaxially glabrous or nearly so; primary lateral segments 4–11-paired; ultimate segments linear, triangular-lanceolate, or falcate. Stem leaves few, similar to basal leaves, small; uppermost stem leaves pinnatifid. Synflorescence a terminal flat-topped cluster. Capitula 6–11; peduncles ca. 2 mm, villous or pubescent. Involucres campanulate, ca. 5 mm in diam.; phyllaries in 4 rows, rigidly herbaceous, glossy, yellow-white, scarious margin pale brown or white, outer phyllaries lanceolate, ca. 4 mm; middle and inner ones narrowly elliptic, elliptic-oblancheolate, or oblancheolate, 4.5–5 mm. Achenes ca. 2 mm, with a ± distinct apical rim. Fl. and fr. Aug–Oct.

- Alpine meadows; 3300–4000 m. Sichuan, Yunnan.

4. *Hippolytia yunnanensis* (Jeffrey) C. Shih, *Acta Phytotax. Sin.* 17(4): 65. 1979.

云南女蒿 yun nan nü hao

Tanacetum yunnanense Jeffrey, *Notes Roy. Bot. Gard. Edinburgh* 5: 188. 1912; *Chrysanthemum yunnanense* (Jeffrey) Handel-Mazzetti.

Herbs, perennial, 27–40 cm tall; stems erect, stout, upper parts corymbosely branched, red-purple, gray-white below synflorescence, densely villous, progressively sparsely villous toward base. Leaves in basal rosettes and scattered along stems; basal leaves: petiole to 13 cm; leaf blade elliptic or narrowly elliptic, 5–12 × 3–6 cm, 3-pinnatisect, abaxially villous, adaxially glabrescent or glabrous; primary lateral segments 11–14-paired; ultimate segments linear; stem leaves similar to basal leaves. Synflorescence a terminal ± flat-topped panicle or compound panicle. Capitula many, branches densely villous. Involucres cuneate or cuneate-campanulate, ca. 5 mm in diam.; phyllaries in 3 rows, abaxially sparsely villous, scarious margin dark brown, outer phyllaries lanceolate, ca. 3.5 mm, middle and inner ones lanceolate, oblancheolate, or narrowly elliptic, 3.5–4 mm, abaxially glabrous. Florets yellow, ca. 3 mm. Fl. Jun–Sep.

- Alpine meadows; 3400–4000 m. Yunnan.

5. *Hippolytia herderi* (Regel & Schmalhausen) Poljakov, *Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk S.S.S.R.* 18: 289. 1957.

新疆女蒿 xin jiang nü hao

Tanacetum herderi Regel & Schmalhausen, *Trudy Imp. S.-Peterburgsk. Bot. Sada* 5: 169. 1878; *Hippolytia leucophylla* (Regel) Poljakov; *T. leucophyllum* Regel.

Herbs, perennial, 10–30 cm tall; stems erect or ascending, with short flowering branches toward apex, sparsely pubescent, or glabrescent. Leaves in basal rosettes and scattered along stems; basal leaves and leaves on vegetative branches: petiole 3–5 cm; leaf blade narrowly elliptic or ovate, 2–4 × 1–1.5 cm, 2-pinnatisect, both surfaces gray-white, pubescent; primary lateral segments 2–4-paired; ultimate segments narrowly elliptic.

Stem leaves similar to basal leaves, shortly petiolate. Synflorescence a terminal dense or lax flat-topped cyme. Capitula 3–10. Involucre broadly cuneate or hemispheric, ca. 1 cm in diam.; phyllaries in 3 rows, abaxially sparsely pubescent, scarious margin broad, dark brown, outer phyllaries lanceolate, ca. 2 mm, middle and inner ones narrowly elliptic, 5–6 mm. Florets yellow, ca. 3.5 mm. Fl. Sep.

Mountain regions, meadows; ca. 2500 m. Xinjiang (Xinyuan) [Kazakhstan].

6. *Hippolytia senecionis* (Jacquemont ex Besser) Poljakov ex Tzvelev in Schischkin & Bobrov, *Fl. URSS* 26: 414. 1961.

普兰女蒿 pu lan nü hao

Artemisia senecionis Jacquemont ex Besser, *Bull. Soc. Imp. Naturalistes Moscou* 9: 75. 1836; *Tanacetum senecionis* (Jacquemont ex Besser) J. Gay ex Candolle.

Herbs, perennial, ca. 12 cm tall; stem solitary, gray-white, appressed pubescent especially below capitula. Leaves in basal rosettes and scattered along stems; basal leaves: petiole 0.8–1.5 cm; leaf blade ovate, ca. 1.2 × 1 cm, 2-pinnatisect, both surfaces gray, densely pubescent; primary lateral segments 3-paired; ultimate segments narrowly elliptic. Stem leaves similar to basal leaves, few; leaves below synflorescence pinnatifid. Synflorescence a terminal flat-topped cyme, ca. 2 cm in diam. Capitula ca. 6; peduncle densely lanate. Involucres cuneate-campanulate, 5–6 mm in diam.; phyllaries in 4 rows, abaxially lanate, scarious margin dark brown, outer phyllaries lanceolate, ca. 4 mm, middle ones narrowly lanceolate or oblancheolate, 5–5.5 mm, abaxially pubescent, inner ones similar but abaxially glabrous. Florets yellow, ca. 3.5 mm. Fl. Aug.

Desert steppes; 2000–3700 m. W Xizang (Burang) [India].

7. *Hippolytia tomentosa* (Candolle) Tzvelev in Schischkin & Bobrov, *Fl. URSS* 26: 416. 1961.

灰叶女蒿 hui ye nü hao

Tanacetum tomentosum Candolle, *Prodr.* 6: 130. 1838.

Herbs, perennial; stems solitary or fascicled, ca. 9 cm tall, erect, gray-white, appressed pubescent especially near capitula. Basal leaves with petiole 1–1.5 mm; leaf blade ovate, ca. 1.3 × 1 cm, both surfaces gray-white, densely pubescent, 2-pinnatisect; primary lateral segments 2- or 3-paired; ultimate segments narrowly elliptic. Stem leaves similar to basal leaves; leaves below synflorescence pinnatisect. Capitula 4–6, in apical dense corymb, pedunculate; peduncle very short, densely lanate or villous. Involucres campanulate, ca. 7 mm in diam.; phyllaries in 3 rows, abaxially villous, margin dark brown or pale brown scarious, outer ones lanceolate, ca. 4 mm, middle and inner ones elliptic or narrowly elliptic, 3–5 mm. Florets yellow, ca. 3.5 mm. Fl. Jun.

Deserts; 3500–3700(–4700) m. Xizang [Kashmir].

8. *Hippolytia glomerata* C. Shih, *Acta Phytotax. Sin.* 17(4): 67. 1979.

团伞女蒿 tuan san nü hao

Herbs, perennial, stemless; taproot long. Leaves in a single dense basal rosette around synflorescence; leaf blade narrowly ovate, elliptic, or narrowly elliptic, 1–1.5 × 0.5–0.8 cm, 2-pinnatisect, both surfaces densely villous; primary lateral segments 2–4-paired; ultimate segments narrowly elliptic or elliptic-lanceolate. Synflorescence a dense hemispheric glomerule, ca. 2 cm in diam. Capitula many. Involucres cuneate-campanulate, ca. 6 mm in diam.; phyllaries in 3 rows, abaxially villous, scarious margin dark brown; outer phyllaries lanceolate, 5–7 mm, middle and inner ones oblanceolate, 4–5 mm. Florets yellow, ca. 3.5 mm. Fl. Aug.

- Alpine meadows; ca. 4600 m. Xizang (Nyêmo).

9. *Hippolytia syncalathiformis* C. Shih, Acta Phytotax. Sin. 17(4): 66. 1979.

合头女蒿 he tou nü hao

Herbs, perennial, stemless; taproot long. Leaves in a single dense basal rosette around synflorescence; petiole 0.7–1.7 cm; leaf blade narrowly elliptic, 0.5–1 × 0.3–0.5 cm, 3–7-pinnatisect, abaxially densely villous, adaxially sparsely villous or subglabrescent; segments linear; sometimes leaves linear and entire. Synflorescence a dense hemispheric glomerule ca. 2 cm in diam. Capitula many. Involucres cuneate-campanulate, ca. 6 mm in diam.; phyllaries in 3 rows, herbaceous, abaxially villous, scarious margin dark brown, outer phyllaries lanceolate, 5–7 mm, middle and inner ones oblanceolate, 4–5 mm. Florets yellow, ca. 3 mm. Fl. Sep.

- Alpine meadows, rocky slopes; 4500–5500 m. Xizang.

10. *Hippolytia gossypina* (C. B. Clarke) C. Shih, Acta Phytotax. Sin. 17(4): 67. 1979.

棉毛女蒿 mian mao nü hao

Tanacetum gossypinum C. B. Clarke, Compos. Ind. 154. 1876.

Cushion plants, ca. 7 cm tall. Leafy shoots densely compact, with dense overlapping leaves. Leaves inconspicuously petiolate; leaf blade spatulate, 1–1.2 × 0.35–0.7 cm, white or gray-white, both surfaces densely long lanate, apex truncate or rounded, 3–6-divided. Capitula 10, in a dense corymb ca. 2.5 cm in diam. at apices of branches. Involucres cuneate, ca. 6 mm in diam.; phyllaries in 3 rows, outer ones linear, ca. 7 mm, abaxially densely long lanate, middle and inner ones oblanceolate, ca. 5 mm, abaxially lanate above middle part or at upper part in inner ones. Florets yellow, ca. 3 mm. Fl. Aug–Oct.

Deserts, alpine gravel heaps, exposed rocks at mountain summits; 4500–5400 m. Xizang (Yadong) [Bhutan, India, Nepal].

11. *Hippolytia kennedyi* (Dunn) Y. Ling, Acta Phytotax. Sin. 17(4): 67. 1979.

垫状女蒿 dian zhuang nü hao

Tanacetum kennedyi Dunn, Bull. Misc. Inform. Kew 1922: 117. 1922; *Chrysanthemum kennedyi* (Dunn) Kitamura.

Cushion plants, dense, 2–4 cm tall, with long thick roots; stems much branched, branches with dense thick leaf remnants. Leaves in dense rosettes at or near ground level; petiole 0.5–1.2 cm; leaf blade orbicular or flabelliform, 0.2–0.4 × 0.3–0.6 cm, biternately palmatisect or 2-pinnatisect, both surfaces densely dirty yellow, gray-white villous, or lanate. Synflorescence a large, dense, hemispheric glomerule, ca. 10 cm in diam. Capitula many; peduncle ca. 4 mm, densely villous. Involucres cuneate, ca. 7 mm in diam.; phyllaries in 3 rows, abaxially villous, especially in outer and middle ones, scarious margin dark brown, outer phyllaries lanceolate, ca. 4 mm, middle ones narrowly elliptic, ca. 3.5 mm, inner ones oblanceolate, ca. 3 mm. Florets yellow, ca. 3.5 mm. Achenes ca. 1.5 mm. Fl. and fr. Aug–Sep.

Gravelly places of alpine deserts; 4700–5200 m. Xizang [India].

The whole plant is used medicinally for treating laryngitis.

162. *KASCHGARIA* Poljakov, Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk S.S.S.R. 18: 282. 1957.

喀什菊属 ka shi ju shu

Shi Zhu (石铸 Shih Chu); Christopher J. Humphries, Michael G. Gilbert

Subshrubs; indumentum of stellate hairs. Leaves alternate, sessile, margin entire or at least apically parted. Synflorescences cymose; capitula in dense panicles or clusters, rather small, heterogamous, disciform. Involucres ovoid cupular; phyllaries in 2–4 rows. Receptacle convex, epaleate. Marginal florets 3–5, female, fertile; corolla pitcher-shaped, tapering above, apex 2- or 3-toothed. Disk florets many, bisexual; corolla tubular, apex 5-lobed, with scattered stellate hairs at apex. Anther bases obtuse; apical appendage lanceolate. Style branches linear, apex truncate. Achenes obovoid, obtusely angular, upper part striate. Corona absent.

Two species: China, Kazakhstan, Mongolia; two species in China.

- 1a. Fertile shoots with long declined branchlets; leaves narrowly lanceolate to linear, 1.7–5 mm wide, margin usually entire, occasionally 3-parted 1. *K. brachanthemoides*
 1b. Fertile shoots with short branchlets; leaves spatulate or oblanceolate, 7–15 mm wide, apex 3–5-partite, rarely pinnatisect 2. *K. komarovii*

1. *Kaschgaria brachanthemoides* (C. Winkler) Poljakov, Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk S.S.S.R. 18: 283. 1957.

密枝喀什菊 mi zhi ka shi ju

Artemisia brachanthemoides C. Winkler, Trudy Imp. S.-Peterburgsk. Bot. Sada 9: 422. 1886; *Tanacetum brachanthemoides* (C. Winkler) Krascheninnikov.

Subshrubs, ca. 50 cm tall; old branches grayish, year-old

branches virgate, narrowly angular, straw-colored in lower part, green in upper part. Middle leaves sessile; leaf blade linear to narrowly lanceolate, 1–2 × 0.17–0.5 cm, both surfaces glabrous or scattered pubescent with stellate hairs, margin entire, occasionally 3-parted. Distal leaves gradually smaller, linear. Synflorescence an irregular panicle, longer than wide, individual cymes with 2–5 capitula. Capitula ovoid, sessile or shortly pedunculate. Involucre cupular, ca. 2 mm in diam.; phyllaries in 2–4 rows, margin scarious, abaxially with scattered sessile glands, outer ones small, suborbicular, inner ones large, broadly elliptic or lanceolate-elliptic. Corolla yellow, exterior with scattered stellate hairs and sessile glands outside; marginal female florets 3–5, narrowly clavate, tapering above, ca. 1.7 mm, apex minutely 3-toothed; disk florets many, tubular, 1.8–2 mm, 5-lobed. Achenes narrowly obovoid, 1–1.3 mm, glabrous, inconspicuously obtusely 2- or 3-angular, apex truncate. Pappus absent.

Dry mountain valleys, old dry riverbeds; 1000–1500 m. Xinjiang (Toksun) [Kazakhstan].

2. *Kaschgaria komarovii* (Krascheninnikov & N. I. Rubtzov) Poljakov, Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk S.S.S.R. 18: 284. 1957.

喀什菊 ka shi ju

Tanacetum komarovii Krascheninnikov & N. I. Rubtzov in Krascheninnikov, Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk S.S.S.R. 9: 168. 1946; *Chrysanthemum komarovii* (Krascheninnikov & N. I. Rubtzov) S. Y. Hu.

Subshrubs, 40–55 cm tall; old branches grayish; year-old branches with lower parts straw-colored, upper parts pale green, scattered stellate pubescent. Middle stem leaves sessile; leaf blade spatulate or oblanceolate, 1–3 × 0.7–1.5 cm, apex 3–5-partite, rarely pinnatisect, sparsely stellate pubescent; upper stem leaves entire. Synflorescence a dense flat-topped fascicle sometimes with additional axillary capitula below. Capitula 3–5(–8). Involucre cupular, 2–3 mm in diam.; phyllaries in 2–4 rows, margin scarious, outer phyllaries suborbicular, inner ones broadly ovate. Florets yellow, exterior scattered stellate pubescent; marginal female florets 3–5, ascidiform, tapering above, 3-denticulate; disk florets many, tubular. Achenes ovoid, 1–1.2 mm.

Barren rocky slopes, rocky floors of gorges; 800–2000 m. Xinjiang [Kazakhstan, Mongolia].

163. *LEUCANTHEMELLA* Tzvelev in Schischkin & Bobrov, Fl. URSS 26: 137. 1961.

小滨菊属 xiao bin ju shu

Shi Zhu (石铸 Shih Chu); Christopher J. Humphries, Michael G. Gilbert

Decaneurum Schultz Bipontinus, Tanaceteeen, 44. 1844, not Candolle (1833).

Herbs, perennial, with procumbent rhizomes; indumentum absent or of basifixed and medifixed hairs. Leaves alternate, entire or pinnatipartite. Synflorescence a lax, ± flat-topped cyme, often reduced to solitary capitulum. Capitula heterogamous, radiate. Involucre coryliform; phyllaries in 2 or 3 rows, scarious margins brown or dark brown. Receptacle convex, epaleate. Marginal florets in 1 row, female, usually sterile; lamina white or reddish. Disk florets many, yellow, bisexual; corolla tubular, apex 5-lobed. Anther bases obtuse, apical appendage ovate or elliptic-ovate. Style branches linear, apex truncate. Achenes distinctly 8–12-ribbed, with apical rim. Corona absent.

Two species: China, Japan, Korea, Russia; Europe; one species in China.

1. *Leucanthemella linearis* (Matsumura) Tzvelev in Schischkin & Bobrov, Fl. URSS 26: 139. 1961.

小滨菊 xiao bin ju

Chrysanthemum lineare Matsumura, Bot. Mag. (Tokyo) 13: 83. 1899; *C. lineare* var. *manshuricum* Komarov; *Tanacetum lineare* (Matsumura) Kitamura.

Herbs, perennial, 25–90 cm tall, with long procumbent rhizomes; stems erect, usually clustered, unbranched except for synflorescence, pubescent or glabrous. Basal and lower stem leaves withered by anthesis. Middle stem leaves sessile; leaf blade elliptic or lanceolate, 5–8 × 2–4 cm, pinnatipartite below

middle, abaxially gland-dotted, adaxially asperous with acute papillae; terminal and lateral lobes ± linear, lateral lobes 1–3-paired. Synflorescence a terminal flat-topped cyme. Capitula 1–8, long pedunculate. Involucre coryliform, 1–1.5 cm in diam.; phyllaries in 2 or 3 rows, abaxially glabrous or nearly so, scarious margin brown or dark brown, outer phyllaries linear-lanceolate, inner ones narrowly elliptic. Ray florets: limb white, 1–2 cm, apex 2- or 3-denticulate. Disk florets yellow, 5-lobed. Achenes ca. 3 mm, with apical rim. Fl. and fr. Aug–Sep. $2n = 18$.

Marshlands, wet grasslands. Heilongjiang, Jilin, Nei Mongol [Japan, Korea, Russia].

164. *MICROCEPHALA* Pobedimova, Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk S.S.S.R. 21: 356. 1961.

小花菊属 xiao hua ju shu

Shi Zhu (石铸 Shih Chu); Christopher J. Humphries, Michael G. Gilbert

Herbs, annual; indumentum of basifixed hairs. Leaves alternate, pinnatisect. Synflorescence of solitary terminal capitula. Capitula pedunculate, heterogamous, radiate or disciform. Involucre hemispheric; phyllaries in 2 or 3 rows, scarious margins broad, pale.

Receptacle conical, hollow, epaleate. Marginal florets female, fertile; lamina when present white, usually absent in Chinese material. Disk florets yellow or reddish, bisexual, fertile; corolla tubular, inflated at base, apex 5-lobed. Anther appendages ovoid, almost 1/2 as long as anthers. Achenes circular to slightly dorsiventrally compressed in cross section, with 3–5 adaxial ribs, with multicellular hairs between ribs. Corona lacerate or fimbriate, slightly longer adaxially. $x = 7$.

Five species: Afghanistan, China, Kazakhstan, Kyrgyzstan, Pakistan, Turkmenistan; SW Asia (Iran); one species in China.

1. *Microcephala subglobosa* (Krascheninnikov) Pobedimova, Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk S.S.S.R. 21: 358. 1961.

近球状小花菊 jin qiu zhuang xiao hua ju

Matricaria subglobosa Krascheninnikov, Trudy Bot. Inst. Akad. Nauk S.S.S.R., Ser. 1, Fl. Sist. Vyssh. Rast. 3: 345. 1937.

Herbs, annual, 3–15 cm tall; stems simple or branched from base, sparsely white lanate. Leaves succulent, petiolate; leaf blade (0.8–)1–2(–3) × (0.3–)0.5–0.7(–1) cm, pinnate, sparsely grayish lanate; segments linear-lanceolate, apex acute; uppermost leaves linear. Capitula solitary; peduncle long, apically thicker, pubescent. Involucre very broadly obconical, 4–

10 mm wide; phyllaries linear-oblong, slightly recurved, green, margin narrowly membranous. Marginal florets usually absent, white when present; usually florets all tubular, lemon-yellow, slightly constricted in middle but not inflated below this, exserted from involucre. Achenes 1–1.5 × 0.25–0.5 mm, abaxially slightly convex, adaxially with 3 or 4 obscure ribs, densely white scaly in broader part. Corona oblique, to 0.5 mm, not deeply lacerate, lobes acuminate.

Xinjiang (Tian Shan) [Kazakhstan, Kyrgyzstan, Turkmenistan].

Microcephala subglobosa is atypical of the genus as a whole, which usually has prominent ray florets and disk florets that are obviously inflated at the base. It is known from China by only a single gathering.

165. *OPISTHOPAPPUS* C. Shih, Acta Phytotax. Sin. 17(3): 110. 1979.

太行菊属 tai hang ju shu

Shi Zhu (石铸 Shih Chu); Christopher J. Humphries, Michael G. Gilbert

Herbs, perennial, with somewhat woody stem basally. Leaves pinnatisect. Capitula heterogamous, radiate, 1–3 at apex, corymbose. Involucres cup-shaped; phyllaries in 4 rows, with broad scarious margins. Receptacle convex to conical, epaleate. Ray florets in 1 row; lamina white or pink. Disk florets many, bisexual, yellow, tubular, 5-lobed. Anthers obtuse at base, with apical lanceolate appendage. Style branches linear, apex truncate. Achenes obovoid, 3- or 4-ribbed. Pappus represented by 4–6 separate, unequal, mainly abaxial subulate scales.

• One species: China.

1. *Opisthopappus taihangensis* (Y. Ling) C. Shih, Acta Phytotax. Sin. 17(3): 112. 1979.

太行菊 tai hang ju

Chrysanthemum taihangense Y. Ling, Contr. Bot. Surv. N.W. China 1(2): 22. 1939; *Opisthopappus longilobus* C. Shih.

Herbs, perennial, 10–30 cm tall; stems ascending, purple-red or brown, densely or sparsely appressed pubescent, base somewhat woody. Basal leaves: petiole more than 0.5 cm; leaf blade ovate, broadly ovate, or elliptic, 2.5–3.5 × 2–2.5 cm, 1- or 2-pinnatisect, both surfaces sparsely pubescent or glabrous; primary lateral segments 2- or 3-paired; ultimate segments linear,

falcate, lanceolate, or obliquely triangular. Stem leaves similar to basal leaves; uppermost leaves pinnatifid. Capitula 1–3 at apices of branches. Involucre coryliform, ca. 1.5 cm in diam., abaxially glabrous or nearly so; phyllaries in 4 rows, abaxially rather densely pubescent, outer and middle phyllaries linear or oblanceolate, 4–5.5 mm, inner ones narrowly elliptic, 6–7 mm. Ray florets white or pink; lamina linear, ca. 2 cm, apex 3-denticulate. Disk florets yellow, 5-lobed. Achenes obovoid, ca. 1.2 mm, 3–5-ribbed. Corona scales 4–6, mainly abaxial.

• On rocks of mountain slopes, cliffs; 800–1200 m. Hebei, Henan, Shanxi.

The capitula are used to treat diseases of the liver.

166. *STILPNOLEPIS* Krascheninnikov, Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk S.S.S.R. 9: 207. 1946.

百花蒿属 bai hua hao shu

Shi Zhu (石铸 Shih Chu); Christopher J. Humphries, Michael G. Gilbert

Elachanthemum Y. Ling & Y. R. Ling.

Herbs, annual. Leaves opposite or alternate, pinnatisect, few lobed or entire. Capitula hemispheric or globose, homogamous, discoid, laxly corymbose or solitary at apex of branches. Involucres hemispheric or cupular-hemispheric; phyllaries in 3–5 rows, herbaceous, margin broadly scarious. Receptacle convex-subconical, epaleate. Florets tubular, bisexual, 5-lobed, with distinct tube and ± crateriform limb. Anther obtuse at base, with apical acuminate-triangular appendage. Style branches linear, apex truncate. Achenes obliquely obovoid to narrowly obovoid-oblanceolate, densely glandular, striate. Pappus absent.

Two species: China, Mongolia; two species in China.

Oberprieler et al. (in Kadereit & C. Jeffrey, *Fam. Gen. Vasc. Pl.* 8: 349, 357, 364. 2007) accepted *Elachanthemum* as a distinct genus on the basis of the smooth pollen, which placed it in a different group of genera from *Stilpnolepis*.

- 1a. Capitula 8–20 mm in diam., nodding or declined; phyllaries abaxially glabrous, without midrib; lateral leaf segments grouped at leaf base 1. *S. centiflora*
 1b. Capitula 5–6 mm in diam.; phyllaries abaxially floccose, with green midrib; lateral leaf segments uniformly distributed along leaf 2. *S. intricata*

1. *Stilpnolepis centiflora* (Maximowicz) Krascheninnikov, *Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk S.S.S.R.* 9: 209. 1946.

百花蒿 bai hua hao

Artemisia centiflora Maximowicz, *Bull. Acad. Imp. Sci. Saint-Pétersbourg* 26: 493. 1880; *A. centiflora* var. *pilifera* Y. Ling; *Stilpnolepis centiflora* var. *pilifera* (Y. Ling) H. C. Fu.

Herbs, annual, ca. 40 cm tall, with robust fusiform taproots; stems erect, striate, corymbosely branched in upper part, pubescent. Leaves sessile; leaf blade narrowly lanceolate to linear, 3.5–10 × 0.2–0.4 cm, pinnatisect, both surfaces sparsely pubescent; lateral segments 2- or 3-paired, crowded at base of leaf, stipulelike, short, linear; terminal segments linear, long. Synflorescence a lax, flat-topped cyme. Capitula nodding or declined; peduncle 1.5–3 cm. Involucre cupular-hemispheric, 0.8–2 cm in diam.; phyllaries in 4 or 5 rows, scarious margin broad, outer phyllaries broadly ovate, ca. 7 mm, middle and inner ones ovate or broadly obovate, ca. as long as outer ones or somewhat shorter. Florets many, bisexual, fertile, yellow, 5-lobed, with distinct tube and bowl-shaped limb. Achenes narrowly obovoid-triangular, 5–6 mm, densely glandular, inconspicuously striate. Pappus absent.

Dunes; 1100–1300 m. Gansu, Nei Mongol, Ningxia, Shaanxi [Mongolia].

2. *Stilpnolepis intricata* (Franchet) C. Shih, *Acta Phytotax. Sin.* 23: 471. 1985.

紊蒿 wen hao

Artemisia intricata Franchet, *Nouv. Arch. Mus. Hist. Nat., sér. 2*, 6: 50. 1883; *Elachanthemum intricatum* (Franchet) Y. Ling & Y. R. Ling; ?*E. intricatum* var. *macrocephalum* H. C. Fu.

Herbs, annual, with robust taproots; stems much branched from base, reddish or yellow-brown, sparsely pubescent. Leaves sessile; leaf blade elliptic or broadly ovate, 1–3 × 0.5–1.5 cm, pinnatisect, both surfaces sparsely pubescent; lateral segments 3-paired, linear; distal leaves 3–5-divided or entire. Synflorescences racemelike, forming lax panicle. Capitula pedunculate. Involucres hemispheric, 5–6 mm in diam.; phyllaries in 3–5 rows, ovate or broadly ovate, equal or outer ones somewhat shorter, with green midvein, abaxially sparsely pilose, scarious margin hyaline. Florets many, bisexual, yellow, 5-lobed, with a distinct tube and cupular limb. Achenes obliquely obovoid, 10–20-striate. Fl. and fr. Sep–Oct.

Deserts, steppes; 1300–1400 m. Gansu, Nei Mongol, Ningxia, Qinghai, Xinjiang [Mongolia].

167. **ACHILLEA** Linnaeus, *Sp. Pl.* 2: 896. 1753.

蓍属 shi shu

Shi Zhu (石铸 Shih Chu); Christopher J. Humphries, Michael G. Gilbert

Millefolium Miller; *Ptarmica* Miller.

Herbs, perennial, usually rhizomatous; indumentum of basifixed or sometimes submedifixed hairs. Leaves alternate, pinnately lobed to pinnatisect, rarely entire. Synflorescences cymose, usually ± flat-topped panicles, rarely capitula few together or solitary. Capitula relatively small, heterogamous, radiate, rarely homogamous and discoid. Involucres oblong, ovoid, or hemispheric; phyllaries in 2 or 3 rows, scarious margins brown- or yellowish white. Receptacle flat to convex, conical or rarely much elongated, paleate. Marginal florets in 1 row, female, fertile; lamina white, pink, red, or yellow, rather short and wide, occasionally absent. Disk florets yellow or pink, bisexual, corolla tubular, apex 5-lobed, ± winged, flattened, basally slightly saccate around achene especially adaxially. Anther bases obtuse, apical appendage lanceolate. Achenes dorsiventrally flattened with 2 lateral ribs. Corona absent.

About 200 species: mostly in Europe and temperate Asia; 11 species (one endemic, one introduced) in China.

Achillea sibirica Ledebour subsp. *subcartilaginea* Heimerl (*Denkschr. Kaiserl. Akad. Wiss., Wien. Math.-Naturwiss. Kl.* 48(2): 188. 1884; *A. subcartilaginea* (Heimerl) Heimerl, *Acta Horti Gothob.* 12: 254. 1938), described from Japan and reported from Shaanxi (*Giraldi* 2943; *Limpricht* 2803), may be a form of *A. alpina*. The taxon was not mentioned in *Fl. URSS* (26. 1961) or *Rast. Tsentral. Azii* (14a. 2007).

- 1a. Leaves entire, margin serrulate.
 2a. Leaves glabrous; ray floret lamina ca. 7 × 5 mm; paleae yellow villous at apex 4. *A. acuminata*
 2b. Leaves densely pubescent, depressed gland-dotted; ray floret lamina 3.2–3.5 × 3–3.8 mm; paleae white villous at apex 5. *A. salicifolia*
 1b. Leaves pinnately to tripinnately divided.
 3a. Leaves pinnately divided.

- 4a. Ray floret lamina 4–7 × 4–6 mm; segments or pinnae of leaves minutely spiniform-serrulate or 1- or 2-dentate or lobed.
 5a. Rhizomes short; leaves pinnatisect; capitula 5–8 or more 6. *A. impatiens*
 5b. Rhizomes long and slender; leaves pinnatilobed or pinnatipartite to pinnatisect; capitula 3–5 7. *A. ledebourii*
- 4b. Ray floret lamina 0.8–2.5 × 1–3 mm; pinnae of leaves with unequal teeth.
 6a. Involucres subglobose or broadly ovoid, (4–)5–7 mm in diam.; phyllaries with broad brown margin; leaves sparsely gland-dotted or not gland-dotted 8. *A. alpina*
 6b. Involucres ovoid, 3.5–4 mm in diam.; phyllaries with narrow yellow or brown margin; leaves densely gland-dotted 9. *A. ptarmicoides*
- 3b. Leaves bipinnately or tripinnately divided.
 7a. Leaves 2-pinnatisect, primary segments elliptic-lanceolate, 5–10 × 2–4 mm, ultimate segments few, lanceolate, not overlapping.
 8a. Involucres 4–6 mm in diam. 10. *A. wilsoniana*
 8b. Involucres 1.5–2(–2.5) mm in diam. 11. *A. nobilis*
- 7b. Leaves mostly tripinnatisect, lower stem leaf blades very narrow, ultimate segments 1–2(–3) mm, overlapping transversely.
 9a. Rachis 1.5–2 mm wide; ultimate segments of leaves relatively broad, lanceolate, rarely linear, 0.3–0.5 mm wide 1. *A. millefolium*
 9b. Rachis 0.5–1 mm wide; ultimate segments of leaves relatively narrow, 0.1–0.5 mm wide, filiform-linear or linear to lanceolate.
 10a. Ray floret lamina yellowish white, relatively small; involucres narrowly oblong, 4–4.5 × 2–2.5 mm; phyllaries sometimes with brownish narrow margin 2. *A. setacea*
 10b. Ray floret lamina pink, rarely turning white, relatively large; involucres oblong, 4–5 × 2.5–3 mm, with conspicuous brown or brownish margin 3. *A. asiatica*

1. *Achillea millefolium* Linnaeus, Sp. Pl. 2: 899. 1753.

著 shi

Herbs, perennial, 40–100 cm tall, with long rhizomes; stems erect, unbranched or branched in upper part, often with short sterile branches at leaf axils above middle, striate, usually white villous. Leaves sessile; leaf blade lanceolate, oblong-lanceolate, or sublinear, 5–20 × 1–2.5 cm, (2 or)3-pinnatisect, abaxially densely villous, adaxially densely depressed glandular punctuate; ultimate segments lanceolate to linear, 0.5–1.5 × 0.3–0.5 mm, apex cartilaginous-mucronulate. Synflorescence a terminal flat-topped panicle 2–6 cm in diam. Capitula many. Involucres oblong or subovoid, ca. 4 × 3 mm; phyllaries in 3 rows, elliptic or oblong, 1.5–3 × 1–1.3 mm, scarious margin pale yellow or brown; midvein convex. Paleae oblong-elliptic, scarious, abaxially yellow gland-dotted. Ray florets 5; lamina white, pink, or violet-red, suborbicular, 1.5–3 × 2–2.5 mm, apex 2- or 3-denticulate. Disk florets yellow, tubular, 2.2–3 mm, exterior gland-dotted, apex 5-lobed. Achenes greenish, oblong, ca. 2 mm, with white lateral ribs. Corona absent. Fl. and fr. Jul–Sep. $2n = 18, 27, 36 + 0-2B, 45, 54 + 0-3B, 72$.

Widely cultivated in China, locally naturalized. Nei Mongol, Xinjiang [native to temperate and alpine regions of N Hemisphere].

Achillea millefolium is a very variable species with many synonyms outside of China.

The whole plant is used medicinally for inducing sweat and dispelling diseases.

2. *Achillea setacea* Waldstein & Kitaibel, Descr. Icon. Pl. Hung. 1: 82. 1802.

丝叶著 si ye shi

Achillea millefolium Linnaeus var. *setacea* (Waldstein &

Kitaibel) W. D. J. Koch.

Herbs, perennial, 30–70 cm tall, with procumbent slender rhizomes; stems erect, unbranched or few branched in upper part, usually with short sterile branches at leaf axils above middle, white villous, especially in lower part. Basal leaves petiolete; leaf blade linear-lanceolate, rarely linear-oblong, 8–20 × 1–2 cm, (2 or)3-pinnatisect, both surfaces villous; primary segments many, 1–1.5 mm apart; ultimate segments filiform-linear or linear-lanceolate to lanceolate, 0.5–1.5 × 0.1–0.2 mm, apex cartilaginous-mucronulate; middle and upper stem leaves similar, sessile, gradually smaller. Synflorescence a terminal flat-topped panicle, 2.5–7 cm in diam. Capitula many. Involucres narrowly oblong or ovoid-oblong, 4–4.5 × 2–2.5 mm; phyllaries in 3 rows, yellowish green, midvein greenish, convex, abaxially brownish pilose, oblong-ovate to oblong, 2–4 × 0.8–1.2 mm, scarious margin sometimes with narrow pale brown edge, apex somewhat acute or obtuse. Paleae oblong-lanceolate to lanceolate, glabrous or appressed pilose on upper part. Ray florets 5; lamina yellowish white, semiobicular or suborbicular, 1.2–1.3 × 1.3–1.8 mm, apex subtruncate or 3-dentate. Disk florets yellow, tubular, 5-lobed. Achenes oblong-cuneate, 1.8–2 × ca. 0.8 mm, with narrow lateral ribs. Corona absent. Fl. and fr. Jul–Aug. $2n = 18, 36$.

Wastelands, forest margins, grasslands on mountain slopes, meadows, river valleys; 500–2400 m. Heilongjiang, Xinjiang [Kazakhstan, Mongolia, Russia; N Africa, SW Asia, Europe].

3. *Achillea asiatica* Sergievskaya, Sist. Zametki Mater. Gerb. Krylova Tomsk. Gosud. Univ. Kuybysheva 1946(1): 6. 1946.

亚洲著 ya zhou shi

Achillea millefolium Linnaeus var. *mandshurica* Kitamura; *A. setacea* Waldstein & Kitaibel subsp. *asiatica* (Sergievskaya) Voroschilov.

Herbs, perennial, (4–)18–60 cm tall, with procumbent slender rhizomes; stems erect, unbranched or upper parts few branched, usually with sterile branches at leaf axils, striate, conspicuously lanate-villous. Basal stem leaves petiolate or subsessile; leaf blade linear-oblong, linear-lanceolate, or linear-oblancoate, (2 or)3-pinnatisect, abaxially densely villous, adaxially sparsely villous; primary segments many, 1–1.5 mm apart; ultimate segments linear to lanceolate, 0.5–2 mm, apex cartilaginous-mucronulate; middle and upper stem leaves similar, sessile, progressively smaller. Synflorescence a dense, rarely lax, flat-topped panicle. Capitula many. Involucre oblong, 4–5 × 2.5–3 mm; phyllaries in 3 or 4 rows, ovate or oblong to lanceolate, 1.5–4 × 0.8–1.5 mm, scarious, midvein yellow-green, convex, margin brown or brownish. Paleae oblong-lanceolate, scarious, margin hyaline, sparsely pilose in upper part. Ray florets 5; lamina pink or violet-red, rarely turning white, suborbicular, 2–2.5 × 2–2.2 mm. Disk florets tubular, 5-lobed. Achenes oblong-cuneate, 2–2.2 mm, with lateral ribs. Corona absent. Fl. and fr. Jul–Sep. $2n = 18, 36$.

Grasslands on mountain slopes, moist forest margins, by rivers; 600–2600 m. Hebei, Heilongjiang, Liaoning, Nei Mongol, Xinjiang [Kazakhstan, Mongolia, Russia].

4. *Achillea acuminata* (Ledebour) Schultz Bipontinus, Flora 38: 15. 1855.

齿叶蓍 chi ye shi

Ptarmica acuminata Ledebour, Fl. Ross. 2: 529. 1845; *Achillea ptarmica* Linnaeus var. *acuminata* (Ledebour) Heimerl; *A. ptarmica* var. *angustifolia* Heimerl.

Herbs, perennial, 30–100 cm tall; stems solitary, erect, corymbosely branched, lower part glabrous, upper part densely pubescent. Basal and lower stem leaves withered by anthesis. Middle stem leaves sessile; leaf blade lanceolate or linear-lanceolate, 3–8(–11) × 0.4–0.9 cm, both surfaces pubescent at first, glabrescent or pubescent along veins abaxially, base slightly attenuate, margin double-serrulate, apex acuminate. Synflorescence a lax terminal flat-topped panicle. Capitula rather many. Involucres hemispheric, ca. 5 × 9 mm; phyllaries in 3 rows, scarious margin broad, yellowish or brownish, outer short, ovate-oblong, apex acute, inner ones oblong, apex rounded. Paleae similar to phyllaries, upper part and apex yellow villous. Ray florets 10–23; lamina white, 3–8 × 2.5–5.5 mm, apex 3-crenate. Disk florets white, tubular. Achenes oblanceolate, 2.5–3 × ca. 1.5 mm, with white lateral ribs. Corona absent. Fl. and fr. Jul–Aug.

Moist places on mountain slopes, meadows, forest margins; 500–2900 m. Gansu, Hebei, Henan, Jilin, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shanxi [Japan, Korea, Mongolia, Russia].

5. *Achillea salicifolia* Besser, Catal. Jard. Bot. Krzemieniec, Suppl. 1: 3. 1812.

柳叶蓍 liu ye shi

Herbs, perennial, 36–90 cm tall, with short rhizomes; stems erect, upper parts corymbosely branched, striate, densely pubescent with curved hairs, lower part sometimes glabrescent. Basal stem leaves withered by anthesis. Middle stem leaves sessile; leaf blade linear-lanceolate, 1.5–6 × 0.3–0.6 cm, both sur-

faces densely pubescent, depressed gland-dotted, base attenuate, margin double-serrulate, apex acuminate. Upper stem leaves gradually smaller. Synflorescence a flat-topped panicle. Capitula many. Involucres hemispheric, 3–4 mm in diam.; phyllaries in 3 rows, broadly lanceolate, 1.2–1.5 mm, abaxially densely pubescent, scarious margin yellowish or brown, midvein convex. Paleae similar to phyllaries. Ray florets ca. 8; lamina white, broadly elliptic, 3.2–3.5 × 3–3.8 mm, apex 2-crenate. Disk florets ca. 2.5 mm, 5-lobed. Achenes oblanceolate, ca. 1.8 × 1 mm, with white lateral ribs, sometimes 1-ribbed abaxially. Corona absent. Fl. and fr. Aug–Sep. $2n = 18, 36$.

Forest understories along rivers and marshes, moist grasslands; 500–1200 m. Shaanxi, Xinjiang [Kazakhstan, Russia; Europe].

6. *Achillea impatiens* Linnaeus, Sp. Pl. 2: 898. 1753.

褐苞蓍 he bao shi

Achillea impatiens subsp. *euimpatiens* Heimerl; *Ptarmica impatiens* (Linnaeus) Candolle.

Herbs, perennial, 40–60 cm tall, with short rhizomes; stem erect, few branched in upper part, pubescent above middle. Middle stem leaves sessile; leaf blade lanceolate, 1.5–4.5 × 0.3–0.9 cm, both surfaces sparsely pilose; rachis 1–2 mm wide, segments linear-lanceolate, margin entire, minutely serrulate or with 1 or 2 teeth on one side, apex acute. Upper stem leaves similar, gradually smaller. Synflorescence a terminal flat-topped cyme. Capitula 5–8 or more. Involucre hemispheric, 5–7 mm in diam.; phyllaries in 3 rows, broadly lanceolate, 3.5–4.5 × ca. 1.8 mm, abaxially sparsely villous, margin scarious, midvein convex, red-brown or deep brown. Paleae lanceolate, apex sparsely villous. Ray florets 8; lamina white, broadly elliptic, apex 3-crenate. Disk florets white, tubular. Achenes oblanceolate, ca. 2.5 × 1.3 mm, with winged lateral ribs. Corona absent. Fl. and fr. Jul–Aug. $2n = 18$.

Forest margins, riverbanks; 1500–2000 m. Xinjiang [Kazakhstan, Mongolia, Russia].

7. *Achillea ledebourii* Heimerl, Flora 66: 389. 1883 [*“ledebouri”*].

阿尔泰蓍 a er tai shi

Achillea impatiens Linnaeus subsp. *ledebourii* (Heimerl) Heimerl.

Herbs, perennial, ca. 40 cm tall, with long slender rhizomes; stems erect, corymbosely branched in upper part, pilose above middle. Middle stem leaves sessile; leaf blade lanceolate, 1.5–4 × 0.5–0.9 cm, pinnatilobed to pinnatisect or pinnatipartite, both surfaces sparsely villous, rachis 1.5–3 mm wide; lobes or segments linear-lanceolate, basal ones large, margin minutely serrulate, sometimes 1-dentate on one side, apex acuminate or acute. Synflorescence a terminal, clustered, flat-topped cyme. Capitula 3–5. Involucres hemispheric, 5–6 mm in diam.; phyllaries in 3 rows, ovate or broadly elliptic, 3–5.2 × 2–3 mm, scarious margin broad, midvein deep brown, convex. Paleae brown, lanceolate-elliptic, 4–5 × ca. 1.5 mm, scarious, apex sparsely white villous. Ray florets 8; lamina white, broadly elliptic, apex 3-crenate. Disk florets white, tubular. Achenes broadly lanceolate, ca. 2 mm, with white lateral ribs. Corona absent. Fl. and fr. Jul–Sep.

Forest understories; 2200–2500 m. Xinjiang [Kazakhstan, Russia].

8. *Achillea alpina* Linnaeus, Sp. Pl. 2: 899. 1753.

高山蓍 gao shan shi

Achillea mongolica Fischer ex Sprengel; *A. sibirica* Ledebour; *A. sibirica* subsp. *mongolica* (Fischer ex Sprengel) Heimerl; *A. sinensis* Heimerl; *Ptarmica mongolica* (Fischer ex Sprengel) Candolle; *P. sibirica* (Ledebour) Ledebour.

Herbs, perennial, 30–80 cm tall, with short rhizomes; stems erect, branched in upper part, usually with sterile branches at leaf axils above middle, sparsely or densely pilose. Basal stem leaves withered by anthesis. Middle stem leaves sessile; leaf blade linear-lanceolate, 6–10 × 0.7–1.7 cm, pectinately pinnatifid or pinnatifid, abaxially densely villous, adaxially sparsely villous; lobes linear or linear-lanceolate, basally amplexicaul, margin unequally serrulate, apex acute; upper stem leaves similar, progressively smaller. Synflorescence a dense terminal flat-topped panicle. Capitula many. Involucres broadly oblong or subglobose, (4–)5–7 mm in diam.; phyllaries in 3 rows, broadly lanceolate to elliptic, 2–4 × 1.2–2 mm, abaxially sparsely villous, scarios margin brown, midvein convex. Paleae similar to phyllaries. Ray florets 6–8; lamina white, broadly elliptic, apex 3-denticulate. Disk florets white, 5-lobed. Achenes broadly oblanceolate, ca. 2 × 1.1 mm, with white lateral ribs, sometimes 1- or 2-ribbed abaxially. Corona absent. Fl. and fr. Jul–Sep. $2n = 36$.

Grasslands on mountain slopes, forest margins, under thickets, meadows, river valleys; 800–2400 m. Anhui, Gansu, Hebei, Heilongjiang, Jilin, Liaoning, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shanxi, Sichuan, Yunnan [Japan, Korea, Mongolia, Nepal, Russia].

9. *Achillea ptarmicoides* Maximowicz, Mém. Acad. Imp. Sci. St.-Petersbourg Divers Savans 9: 154. 1859.

短瓣蓍 duan ban shi

Achillea sibirica Ledebour var. *discoidea* Regel; *A. sibirica* subsp. *ptarmicoides* (Maximowicz) Heimerl; *A. sibirica* var. *ptarmicoides* (Maximowicz) Makino; *Ptarmica ptarmicoides* (Maximowicz) Voroschilov.

Herbs, perennial, 70–100 cm tall, with short rhizomes; stems erect, usually unbranched, middle leaf axils with sterile branches, sparsely white pilose. Basal stem leaves withered by anthesis. Middle stem leaves sessile; leaf blade linear or linear-lanceolate, 6–8 × 0.5–0.7 cm, pectinately pinnatifid or subpinnatifid, abaxially sparsely pilose, adaxially densely pilose, densely glandular punctate; pinnae linear, margin irregularly serrulate, apex acute. Upper stem leaves similar, gradually smaller. Synflorescence a dense terminal flat-topped panicle. Capitula many. Involucres campanulate, 5–6 × 3.5–4 mm; phyllaries in 3 rows, scarios margin yellowish or brownish, outer phyllaries ovate, 1.5–2 × 1.2–1.5 mm, apex somewhat acute, middle ones elliptic, ca. 2.8 × 1.5 mm, apex obtuse, inner ones oblong, ca. 3.2 × 2 mm. Paleae similar to phyllaries. Ray florets 6–8; lamina yellowish white, broadly elliptic, very small, 0.8–1.5 × ca. 1.1 mm, apex 3-crenate. Disk florets white, tubular, 5-lobed. Achenes oblong or broadly oblanceolate, ca. 2.2 × 1.2 mm, with white lateral ribs. Corona absent. Fl. and fr. Jul–Sep.

River valleys, meadows, mountain slopes, under thickets; 200–400 m. Hebei, Heilongjiang, Liaoning, Nei Mongol [Japan, Korea, Mongolia, Russia].

10. *Achillea wilsoniana* (Heimerl ex Handel-Mazzetti) Heimerl in Handel-Mazzetti, Symb. Sin. 7: 1110. 1936.

云南蓍 yun nan shi

Achillea sibirica Ledebour subsp. *wilsoniana* Heimerl ex Handel-Mazzetti, Sitzungsber. Kaiserl. Akad. Wiss., Math.-Naturwiss. Cl., Abt. 1, 61: 22. 1924; *A. wilsoniana* f. *obconica* Heimerl.

Herbs, perennial, with short rhizomes. Stems erect, 35–100 cm tall, densely villous above middle, glabrescent in lower part, usually corymbosely branched, with sterile branches at leaf axils in upper part. Proximal stem leaves withered by anthesis. Middle stem leaves sessile; leaf blade oblong, 4–6.5 × 1–2 cm, abaxially sparsely pilose, adaxially densely pilose, 2-pinnatisect; primary segments many, close together, elliptic-lanceolate, 5–10 × 2–4 mm; secondary segments few, lanceolate, proximal ones large, distal ones small; rachis ca. 1.5 mm wide, margin entire or dentate. Capitula many, in an apical compound corymb. Involucres broadly campanulate or hemispheric, 4–6 mm in diam.; phyllaries in 3 rows, overlapping, outer ovate-lanceolate, short, ca. 2.3 × 1.2 mm, apex slightly acute, middle ones ovate-elliptic, ca. 2.5 × 1.8 mm, inner ones long elliptic, ca. 4 × 1.8 mm, apex obtuse or rounded; midvein convex. Paleae lanceolate, ca. 4.5 mm, sparsely villous in upper part. Ray florets 6–8(–16); lamina white, occasionally with pinkish margin, ca. 2.2 × 2.2 mm, apex deeply or shallowly 3-denticulate. Disk florets yellowish or white, tubular. Achenes oblong-cuneate, ca. 2.5 × 1.1 mm, with winged lateral ribs. Pappus absent. Fl. and fr. Jul–Sep.

• Grasslands on mountain slopes, under thickets; 400–3700 m. Gansu, Guizhou, Hubei, Hunan, Shaanxi, Shanxi, Sichuan, Yunnan.

The entire plant is used in medicines to stop bleeding, to alleviate pain, and for strengthening the stomach.

11. *Achillea nobilis* Linnaeus, Sp. Pl. 2: 899. 1753.

壮观蓍 zhuang guan shi

Herbs, perennial, (15–)25–35(–50) cm tall, with short rhizomes; stems few, erect or slightly ascending, simple or branched near top, ± densely lanate-floccose, densely leafy. Middle stem leaves sessile; leaf blade ovate or oblong-elliptic, (2–)3–6 cm, 2-pinnatisect, lanate-floccose; primary segments few, distant especially toward base, linear, 10–15 mm; secondary segments lanceolate or linear, pinnatifid, lobules lanceolate, 0.5–1(–2) mm. Synflorescence a dense, terminal, rounded panicle. Capitula many. Involucre ovoid, less often cylindrical-ovoid, 1.5–2(–2.5) mm in diam.; phyllaries keeled, pale, scarios margin narrow, usually white. Paleae white, membranous, lanceolate, slightly shorter than floret. Ray floret lamina white or yellowish white, orbicular-reniform to semicircular, (0.6–)1–1.6(–1.9) mm, apex truncate, unequally 3-toothed. Achenes oblong, ca. 1 mm.

Open grasslands, forest margins, naturalizing in disturbed sites. Xinjiang [Kazakhstan, Russia, Turkmenistan; SW Asia (Caucasus, Turkey), C and S Europe].

Achillea nobilis is apparently known from China only by a single 19th century gathering by Karelin and Kirilov. A similar record for the

European *A. magna* Linnaeus, which is not otherwise recorded from C Asia, is most likely a misidentification of *A. nobilis*.

168. ANTHEMIS Linnaeus, Sp. Pl. 2: 893. 1753.

春黄菊属 chun huang ju shu

Shi Zhu (石铸 Shih Chu); Christopher J. Humphries, Michael G. Gilbert

Herbs, annual or perennial, or subshrubs; indumentum of medifixed hairs. Leaves alternate, pinnatisect to variously lobed, occasionally entire. Synflorescences cymose; capitula solitary or in lax, ± flat-topped panicles, pedunculate, heterogamous and radiate, rarely homogamous and discoid. Involucres usually ± hemispheric to ovoid; phyllaries in 3 rows, scarious margins narrow. Receptacle convex to narrowly conical, paleate, rarely basally or completely epaleate; palea oblong or subulate, scarious, apex truncate or acute to acuminate. Marginal florets in 1 row, female, fertile; lamina white or yellow [or rarely reddish]. Disk florets many, yellow, rarely reddish, bisexual; corolla tubular, apex 5-lobed. Anther bases obtuse. Style branches truncate. Achenes oblong or obconic, smooth to prismatic to 4 or 5 (or 8)-ribbed, dorsiventrally compressed. Corona absent or shallow, often adaxially more developed or forming an adaxial auricle.

About 100(–150) species: mainly in S Europe and SW Asia; one species (introduced) in China.

Anthemis arvensis Linnaeus (田春黄菊 tian chun huang ju) is cultivated in E China.

- 1a. Phyllary margins narrowly scarious; achenes tuberculate; plants fetid 1. *A. cotula*
 1b. Phyllary margins broadly scarious; achenes smooth; plants not fetid *A. arvensis* (see comment above)

1. *Anthemis cotula* Linnaeus, Sp. Pl. 2: 894. 1753.

臭春黄菊 chou chun huang ju

Anthemis foetida Lamarck; *Maruta cotula* (Linnaeus) Candolle; *M. foetida* (Lamarck) Cassini.

Herbs, annual, (15–)30–50 cm tall, fetid; stems erect, corymbosely branched, sparsely pubescent or subglabrescent. Leaves sessile; leaf blade ovate-oblong, 1.5–6 × 0.5–3 cm, 2-pinnatisect; ultimate segments narrowly linear. Capitula terminal, solitary, long pedunculate, 1–2 cm in diam. Involucre hemi-

spheric; phyllaries in 3 rows, oblong, scarious margin narrow, apex obtuse. Ray florets white; lamina 5–14 × 3–6 cm, elliptic. Disk florets yellow, tubular, 5-lobed. Achenes oblong-turbinate, 1–1.5 mm, tuberculate, obscurely 8(–10)-ribbed. Corona absent. Fl. and fr. Jun–Jul. $2n = 18$.

Cultivated and possibly naturalized. Nei Mongol [native to N Africa, SW Asia, and Europe; introduced elsewhere].

Anthemis cotula has been recorded as a weed from E Mongolia and can be expected to behave similarly in China.

169. TANACETUM Linnaeus, Sp. Pl. 2: 843. 1753.

菊蒿属 ju hao shu

Shi Zhu (石铸 Shih Chu); Christopher J. Humphries, Michael G. Gilbert

Gymnocline Cassini; *Pontia* Bubani; *Pyrethrum* Zinn.

Herbs, perennial, subshrubs, or shrubs, lower parts somewhat woody; indumentum absent or of basifixed and/or medifixed hairs. Leaves alternate, rarely rosulate, pinnatifid to 3-pinnatisect, rarely entire. Synflorescences cymose, mostly flat-topped, sometimes reduced to a solitary capitulum. Capitula heterogamous or homogamous, radiate, disciform or discoid. Involucres campanulate; phyllaries in 3–5 rows, scarious margins broad or narrow, usually brown, less often white. Receptacle convex or flat, epaleate, usually pilose. Marginal florets in 1, very rarely 2, rows, or absent, female, fertile; lamina white or red, less often yellow, or absent, ovate, elliptic, or linear. Disk florets many, yellow, bisexual; corolla tubular, apex 5-lobed. Anther bases obtuse; apical appendage ovate-lanceolate or broadly lanceolate. Style branches linear, apex truncate. Achenes terete or obscurely 3-angled, 5–10(–12)-ribbed, often with sessile glands, never with myxogenic cells. Corona present, 0.1–0.4 mm, sometimes of free scales, rarely an adaxial auricle (very rarely absent).

About 100 species: N Africa, C Asia, Europe; 19 species (two endemic, two introduced) in China.

Tanacetum partheniifolium (Willdenow) Schultz Bipontinus (Tanaceteeen, 56. 1844; *Pyrethrum partheniifolium* Willdenow, Sp. Pl. 3: 2156. 1803, “*parthenifolium*”; 伞房匹菊 san fang pi ju), native to C and SW Asia, and *T. parthenium* (Linnaeus) Schultz Bipontinus (Tanaceteeen, 55. 1844; *Matricaria parthenium* Linnaeus, Sp. Pl. 2: 890. 1753; 短舌匹菊 duan she pi ju), originating within Europe, possibly through selection from *T. partheniifolium*, are cultivated as ornamentals in China and are included in the following key. *Tanacetum parthenium* is used medicinally.

A gathering by Karelin and Kirilov from Xinjiang (“Sinkiang: Songaria-Kirghisici”), not seen by the present authors, has been named as *Pyrethrum achilleifolium* M. Bieberstein (Fl. Taur.-Caucas. 2: 327. 1808; *Tanacetum achilleifolium* (M. Bieberstein) Schultz Bipontinus, Tanaceteeen, 47. 1844), a C Asian species recorded west of the W Altai. It would key out below as *T. santolina*, from which it differs by its phyllaries broader, pubescent only at their bases, and with broader membranous margins.

- 1a. Ray florets absent: capitula disciform or discoid.
- 2a. Florets orange-red; plants 7–25 cm tall 10. *T. tatsienense*
- 2b. Florets yellow; plants 30–150 cm tall.
- 3a. Synflorescence with (5–)10–70(–100) capitula; stem leaves elliptic or elliptic-ovate, to 20 cm, ultimate segments ovate, obliquely triangular, or narrowly elliptic; capitula disciform 1. *T. vulgare*
- 3b. Synflorescence with 3–10(–12) capitula; stem leaves linear-oblong or oblong, 1–9 cm, ultimate segments linear or oblong; capitula discoid.
- 4a. Leaves less than 3 cm, with inconspicuous or short petioles, ultimate segments oblong, apex obtuse 18. *T. artemisioides*
- 4b. Leaves more than 4 cm, with long petioles, ultimate segments linear, acute 19. *T. falconeri*
- 1b. Ray florets conspicuous: capitula radiate.
- 5a. Ray florets yellow.
- 6a. Capitula 1 per stem; indumentum with curved simple hairs only 11. *T. atkinsonii*
- 6b. Capitula 3–16 per stem; indumentum with a mixture of simple hairs and T-shaped hairs.
- 7a. Basal leaves inconspicuously tripinnatisect, petiole to ca. 2.5 cm 6. *T. scopulorum*
- 7b. Basal leaves 2-pinnatisect, petiole 3–8 cm.
- 8a. Capitula 3–7, densely corymbose or compound-corymbose; peduncle becoming thick at apex, 0.5–1.5 cm 3. *T. crassipes*
- 8b. Capitula 5–16, laxly irregularly corymbose; peduncle 1–10 cm.
- 9a. Leaves narrowly elliptic or narrowly linear-elliptic; involucre 7–17 mm in diam. 4. *T. barclayanum*
- 9b. Leaves linear or broadly linear; involucre 4–7 mm in diam. 5. *T. santolina*
- 5b. Ray florets white, pink, red, orange-red, or purplish.
- 10a. Ray florets red, orange-red, or purplish.
- 11a. Plants 25–50 cm tall; basal leaves 2.5–4 cm wide; outer phyllaries ca. 3.5 mm 8. *T. coccineum*
- 11b. Plants 7–35 cm tall; basal leaves 1–2 cm wide; outer phyllaries 5–6 mm.
- 12a. Ray florets orange-red; corona ca. 0.1 mm, divided to base 10. *T. tatsienense*
- 12b. Ray florets red or purple-red; corona 0.3–0.5 mm, divided for half length 16. *T. richterioides*
- 10b. Ray florets white or pink.
- 13a. Small subshrubs; ray florets pink 9. *T. petraeum*
- 13b. Perennial herbs; ray florets white (sometimes pink in *T. kaschgarianum*).
- 14a. Stems and leaves with T-shaped or forked hairs, sometimes mixed with simple hairs.
- 15a. Basal leaves with petiole 6–9 cm, blade ca. 10 × 2.5 cm; stems and leaves green or gray-green; indumentum spreading, hairs a mixture of simple and T-shaped hairs; involucre campanulate 2. *T. tanacetoides*
- 15b. Basal leaves with petiole 10–20 cm, blade 1.5–4 × 1–2 cm; stems and leaves silvery gray; indumentum appressed, all hairs T-shaped or forked; involucre shallowly cup-shaped 7. *T. cinerariifolium*
- 14b. Stems and leaves with simple hairs only, sometimes these glandular.
- 16a. Involucres straw-colored; scarious margins of phyllaries narrowly white; leaves petiolate (cultivated ornamentals).
- 17a. Plants green or deep green; ray floret lamina 7–10 mm; achenes ca. 3 mm *T. partheniifolium* (see comment above)
- 17b. Plants yellow-green; ray floret lamina 3–6 mm; achenes ca. 1.2 mm *T. parthenium* (see comment above)
- 16b. Involucres not straw-colored; scarious margins of phyllaries dark brown or brown; stem leaves sessile or shortly petiolate.
- 18a. Leaf surfaces gray-white; receptacle pilose with easily shed hairs 17. *T. kaschgarianum*
- 18b. Leaf surfaces green; receptacle persistently pilose.
- 19a. Capitula 2–7, very rarely solitary.
- 20a. Indumentum with a mixture of glandular and eglandular hairs; ultimate segments of leaves filiform 14. *T. abrotanoides*
- 20b. Indumentum with glandular hairs only; ultimate segments of leaves linear to obliquely triangular 12. *T. alatavicum*
- 19b. Capitula solitary, very rarely 2 or 3.
- 21a. Basal leaves 1–2 cm wide; achene corona 1–1.2 mm, divided to base 15. *T. pulchrum*
- 21b. Basal leaves 2–5 cm wide; achene corona 0.4–0.7 mm, divided for half length 13. *T. krylovianum*

1. *Tanacetum vulgare* Linnaeus, Sp. Pl. 2: 844. 1753.

菊蒿 ju hao

Chrysanthemum boreale (Fischer ex Candolle) B. Fedtschenko (1915), not Makino (1909); *C. tanacetum* Visiani; *C. vulgare* (Linnaeus) Bernhardt (1800), not (Lamarck) Gaterau (1789); *C. vulgare* subsp. *boreale* (Fischer ex Candolle) Voroschilov; *C. vulgare* var. *boreale* (Fischer ex Candolle) Makino; *Pyrethrum vulgare* (Linnaeus) Boissier; *Tanacetum boreale* Fischer ex Candolle; *T. crispum* Steudel; *T. vulgare* subsp. *boreale* (Fischer ex Candolle) Kuvaev; *T. vulgare* var. *boreale* (Fischer ex Candolle) Trautvetter & C. A. Meyer.

Herbs, perennial, 30–150 cm tall, from creeping, ± branched rhizome; stems solitary or clustered, erect, upper part corymbosely branched, usually glabrous. Basal stem leaves petiolate; leaf blade elliptic or elliptic-ovate, ca. 20 × 8–10 cm, 2-pinnatisect, both surfaces green or pale green; primary lateral segments to 12-paired; ultimate segments ovate, obliquely triangular, or narrowly elliptic; middle and upper stem leaves similar, sessile. Synflorescence a ± dense flat-topped panicle. Capitula (5–)10–70(–100), heterogamous, disciform. Involucre campanulate, 5–13 mm in diam.; phyllaries in 3 rows, scarious margin narrow, white or brown, outer phyllaries ovate-lanceolate, ca. 1.5 mm; middle and inner ones lanceolate, 3–4 mm. All florets yellow, tubular; outer ones female, disk florets bisexual; corolla 1.5–2.4 mm. Achenes 1.2–2 mm. Corona 0.1–0.4 mm, margin dentate. Fl. and fr. Jun–Aug. $2n = 18, 18 + 2B$.

Mountain slopes, grasslands, floodlands, meadows, meadow steppes, hills, forest understories; 200–2400 m. Heilongjiang, Nei Mongol, Xinjiang [Japan, Kazakhstan, Korea, Mongolia, Russia, Turkmenistan; Europe, North America].

The whole plant is used as an insecticide.

2. *Tanacetum tanacetoides* (Candolle) Tzvelev in Schischkin & Bobrov, Fl. URSS 26: 337. 1961.

伞房菊蒿 san fang ju hao

Pyrethrum tanacetoides Candolle, Prodr. 6: 59. 1838; *Chrysanthemum tanacetoides* (Candolle) B. Fedtschenko.

Herbs, perennial, 20–85 cm tall, with branched rhizomes; stems erect, solitary or fascicled, upper parts corymbosely branched, sparsely pilose with T-shaped and simple hairs. Basal leaves: petiole 6–9 cm; leaf blade elliptic, ca. 10 × 2.5 cm, 2-pinnatisect, both surfaces green or gray-green, sparsely pilose; primary lateral segments 10–15-paired; ultimate segments linear or ovate. Stem leaves similar, sessile; uppermost leaves pinnatisect. Synflorescence a lax flat-topped panicle. Capitula 3–10(–18); peduncle slender, 2–5 cm. Involucre campanulate; phyllaries in 4 rows, abaxially villous or pubescent with long or short hairs, outer and middle ones triangular-lanceolate or narrowly lanceolate, 2–4.5 mm, apex scarious-ampliate, inner ones linear-elliptic, ca. 4 mm. Ray florets white, apex 3-denticulate. Achenes ca. 2.5 mm. Corona 0.1–0.3 mm, margin denticulate. Fl. and fr. Jun–Aug.

Rocky slopes; 500–1800 m. Xinjiang (Altay Shan) [Kazakhstan, Russia].

3. *Tanacetum crassipes* (Stscheglejew) Tzvelev in Schischkin & Bobrov, Fl. URSS 26: 338. 1961.

密头菊蒿 mi tou ju hao

Pyrethrum crassipes Stscheglejew, Bull. Soc. Imp. Naturalistes Moscou 27: 172. 1854; *Chrysanthemum crassipes* (Stscheglejew) B. Fedtschenko.

Herbs, perennial, 20–60 cm tall, with branched rhizomes; stems solitary or fascicled, upper parts corymbosely branched, sparsely pilose with T-shaped and simple hairs. Basal leaves: petiole 3–5 cm; leaf blade narrowly elliptic, 8–15 × ca. 2 cm, 2-pinnatisect, green or deep green, appressed pilose; primary lateral segments 10–15-paired; ultimate segments linear-elliptic. Stem leaves similar, few, sessile. Synflorescence a dense flat-topped cyme. Capitula 3–7; peduncle 0.5–1.5 cm, apex thicker. Involucre campanulate, 7–10(–14) mm in diam.; phyllaries in 3 or 4 rows, abaxially with simple hairs, outer and middle phyllaries lanceolate, 2.5–4 mm, apex scarious-ampliate, inner ones narrowly linear-elliptic, ca. 4 mm. Ray florets yellow, apex 3-denticulate. Achenes ca. 2 mm. Corona ca. 0.3 mm, margin denticulate. Fl. and fr. Jun–Aug.

Rocky slopes, forest understories, grasslands; ca. 2100 m. Xinjiang (Altay Shan) [Kazakhstan, Russia].

4. *Tanacetum barclayanum* Candolle, Prodr. 6: 128. 1838.

阿尔泰菊蒿 a er tai ju hao

Pyrethrum achilleifolium M. Bieberstein var. *discoideum* Karelin & Kirilov; *P. turlanicum* Pavlov; *Tanacetum turlanicum* (Pavlov) Tzvelev.

Herbs, perennial, 25–50 cm tall; stems solitary, erect, unbranched or few branched from base, subglabrous. Basal leaves: petiole 2–10 cm; leaf blade ovate or narrowly elliptic, 4–8 × 2.5–4 cm, 2-pinnatisect, both surfaces sparsely pubescent or glabrous; primary lateral segments 5-paired; ultimate segments triangular, elliptic, or narrowly elliptic; stem leaves similar, sessile or shortly petiolate; leaves below capitula small, pinnatifid or undivided. Capitula solitary, terminal; peduncle 1–10 cm. Involucre coryliform, 7–17 mm in diam.; phyllaries in 4 rows, abaxially glabrous or sparsely pubescent, scarious margin brown, outer phyllaries lanceolate, ca. 3.5 mm, middle and inner ones narrowly elliptic or linear-oblongate, ca. 5 mm, abaxially glabrous. Ray florets red; lamina narrowly elliptic, ca. 1.6 cm, apex 2- or 3-denticulate. Achenes ca. 2.5 mm. Corona 0.1–0.2 mm, margin entire or minutely denticulate. Fl. and fr. Jun–Aug.

Thickets; 500–2100 m. Xinjiang (Altay Shan) [Kazakhstan, Russia].

5. *Tanacetum santolina* C. Winkler, Trudy Imp. S.-Peterburgsk. Bot. Sada 11: 375. 1891.

散头菊蒿 san tou ju hao

Chrysanthemum santolina (C. Winkler) B. Fedtschenko; *Pyrethrum kasakhstanicum* Krascheninnikov.

Herbs, perennial, 20–30 cm tall; stems solitary or fascicled, erect, upper parts corymbosely branched. Basal leaves: petiole 6–8 cm; leaf blade linear or broadly linear, 6–8 × 2–3 cm, 2-pinnatisect, both surfaces gray-green, pilose with T-shaped and simple hairs; primary lateral segments 10–12-paired; ultimate segments elliptic to elliptic-ovate. Stem leaves

few, similar to basal leaves, sessile. Synflorescence an irregular flat-topped panicle. Capitula 5–12; peduncle 6–8 cm, not thickened. Involucre campanulate, 4–7 mm in diam.; phyllaries in 4 rows, scarious margin narrow, outer phyllaries lanceolate, ca. 1.5 mm, inner ones narrowly linear-elliptic, 3–5 mm. Ray florets yellow. Achenes ca. 2 mm. Corona 0.2–0.4 mm, lobed or serrate. Fl. and fr. Jun–Aug.

Rocky slopes, moist places on mountain slopes; 1100–2100 m. Xinjiang [Kazakhstan, Russia].

6. *Tanacetum scopulorum* (Krascheninnikov) Tzvelev in Schischkin & Bobrov, Fl. URSS 26: 342. 1961.

岩菊蒿 yan ju hao

Pyrethrum scopulorum Krascheninnikov, Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk S.S.S.R. 9: 164. 1946; *Lepidopsis scopulorum* (Krascheninnikov) Poljakov.

Herbs, perennial, to 35 cm tall, with branched rhizomes; stems solitary or clustered, upper parts shortly corymbosely branched, densely or sparsely pilose with T-shaped and simple hairs. Basal leaves: petioles to 2 cm; leaf blade narrowly elliptic or elliptic, 4–8 × 1–2 cm, inconspicuously 3-pinnatisect, both surfaces green or pale gray-green, pilose; primary lateral segments 8–10-paired; ultimate segments ovate-lanceolate or obliquely triangular. Stem leaves few, sessile. Synflorescence a flat-topped cyme. Capitula 3–6; peduncle 1–8 cm. Involucre campanulate, 7–10 mm in diam.; phyllaries in 4 rows, abaxially villous or pubescent, outer phyllaries lanceolate, ca. 2.5 mm, apex white scarious-ampliate, middle and inner ones elliptic to linear-elliptic, 3–5 mm. Ray florets yellow, apex 3- or 4-denticulate. Achenes 2–2.3 mm. Corona 0.2–0.3 mm, margin serrate. Fl. and fr. Jul–Aug.

Mountain slopes; ca. 700 m. Xinjiang (Altay Shan) [Kazakhstan].

7. *Tanacetum cinerariifolium* (Treviranus) Schultz Bipontinus, Tanaceteeen, 58. 1844.

除虫菊 chu chong ju

Pyrethrum cinerariifolium Treviranus, Index Sem. Hort. Bot. Wratislav. App. 2: 2. 1820; *Chrysanthemum cinerariifolium* (Treviranus) Visiani.

Herbs, perennial; stems 17–60 cm tall, solitary or fascicled, unbranched or branched from base, pubescent with appressed T-shaped or furcate hairs. Basal leaves: petiole 10–20 cm; leaf blade ovate or elliptic, 1.5–4 × 1–2 cm, both surfaces silvery grayish, appressed pubescent with T-shaped and furcate hairs, 2-pinnatisect; primary segments 3–5-paired; ultimate segments linear or oblong-ovate, margin entire or few dentate. Lower and middle leaves similar, large, shortly petiolate. Capitula apically solitary or 3–10 in apical lax corymb. Involucre cup-shaped, 1.2–1.5 cm in diam.; phyllaries in 4 rows, abaxially pubescent especially in outer ones, outer ones lanceolate, ca. 4 mm, middle and inner ones lanceolate to broadly linear, 5–6 mm, margin narrowly white scarious. Ray florets white; lamina 1.2–1.5 cm, apex truncate or emarginate. Achenes 2.5–3.5 mm. Corona 0.8–1.5 mm, margin shallowly lobed. Fl. and fr. May–Aug. $2n = 18^*, 24, 27, 29, 31, 34, 36$.

Widely cultivated. Anhui, Guizhou, Hebei, Liaoning, Zhejiang [native to SE Europe; now widely cultivated].

Tanacetum cinerariifolium is widely cultivated, mainly in tropical upland regions, as a source of pyrethrins, which are extracted from the dried capitula and used as insecticides. Pyrethroids are important insecticides obtained by the chemical modification of pyrethrins.

8. *Tanacetum coccineum* (Willdenow) Grierson, Notes Roy. Bot. Gard. Edinburgh 33: 262. 1974.

红花除虫菊 hong hua chu chong ju

Chrysanthemum coccineum Willdenow, Sp. Pl. 3: 2144. 1803; *C. marschallii* Ascherson; *Pyrethrum coccineum* (Willdenow) Voroschilov.

Herbs, perennial; stems 25–50 cm tall, erect, solitary, unbranched or few branched from base, subglabrous. Basal leaves: petiole 2–10 cm; leaf blade ovate or narrowly elliptic, 4–8 × 2.5–4 cm, 2-pinnatisect, both surfaces sparsely pubescent or glabrous; primary lateral segments 5-paired; ultimate segments triangular, elliptic, or narrowly elliptic. Stem leaves similar, sessile or shortly petiolate; leaves below capitula small, pinnatifid or entire. Capitula solitary, terminal. Involucre cup-shaped, 1–1.5 cm in diam.; phyllaries in 4 rows, scarious margin brown, outer phyllaries lanceolate, ca. 3.5 mm, abaxially glabrous or sparsely pubescent, middle and inner ones narrowly elliptic or linear-oblongate, ca. 5 mm, abaxially glabrous. Ray florets red; lamina narrowly elliptic, ca. 1.6 cm, apex 2- or 3-denticulate. Achenes ca. 2.5 mm. Corona 0.1–0.2 mm, margin shallowly obtusely lobed. Fl. and fr. May–Oct. $2n = 36$.

Cultivated. Anhui, Hebei [native to SW Asia (Caucasus)].

Tanacetum coccineum is used as an insecticide in the same way as *T. cinerariifolium* and is also grown as an ornamental.

9. *Tanacetum petraeum* (C. Shih) K. Bremer & Humphries, Bull. Nat. Hist. Mus. London, Bot. 23: 103. 1993 [*“petraeum”*].

岩匹菊 yan pi ju

Pyrethrum petraeum C. Shih, Bull. Bot. Lab. N. E. Forest. Inst., Harbin 6: 10. 1980 [*“petraeum”*].

Subshrubs, ca. 35 cm tall; old branches gray; young branches turning purple-red, sparsely pubescent or glabrous. Lower leaves: petiole ca. 1.5 cm; leaf blade ovate, obovate, or oblanceolate, 2–4 × 1.4–2.5 cm, 2-pinnatifid, both surfaces glabrous; primary lateral lobes 2- or 3-paired; ultimate lateral lobes 1-paired, obliquely triangular. Distal leaves pinnatifid, small. Synflorescence an irregular flat-topped cyme with 1–3 capitula. Involucre coryliform, 15–20 mm in diam.; phyllaries in 4 rows, abaxially densely pubescent to glabrescent or glabrous, scarious margin dark brown or brown, outer phyllaries narrowly oblanceolate-elliptic, ca. 6 mm, middle and inner ones lanceolate-triangular or elliptic, 7–8 mm, middle ones glabrescent, inner ones glabrous. Ray florets pink; lamina narrowly elliptic, ca. 2 cm, apex 2-denticulate. Achenes ca. 2 mm. Corona 0.1–0.2 mm, divided 1/2 length or to base. Fl. and fr. Aug.

● On rocks of mountain slopes; 1800–2600 m. Xinjiang (Fuyun).

10. *Tanacetum tatsienense* (Bureau & Franchet) K. Bremer & Humphries, Bull. Nat. Hist. Mus. London, Bot. 23: 103. 1993.

川西小黄菊 chuan xi xiao huang ju

Herbs, perennial, 7–25 cm tall; stems solitary or clustered, unbranched, villous with long simple white hairs, especially in upper part and near capitula. Basal leaves: petiole 1–3 cm; leaf blade elliptic or narrowly elliptic, 1.5–7 × 1–1.5 cm, 2-pinnatisect, both surfaces green, sparsely villous or glabrous; primary lateral segments 5–15-paired; ultimate segments linear. Stem leaves similar, sessile. Capitula solitary, terminal. Involucre coryliiform, 10–20 mm in diam.; phyllaries in 4 rows, scarious margin dark brown or brown, outer phyllaries linear-lanceolate, ca. 6 mm, middle and inner ones narrowly lanceolate or broadly linear, 7–8 mm, outer and middle ones abaxially sparsely villous, inner ones abaxially glabrous. Ray florets orange-red or absent; lamina when present linear or broadly linear, ca. 2 cm, apex 3-denticulate. Achenes ca. 3 mm. Corona ca. 0.1 mm, divided to base. Fl. and fr. Jul–Sep.

Alpine meadows, thickets, gravelly places on mountain slopes; 3500–5200 m. Qinghai, Sichuan, Xizang, Yunnan [N Bhutan].

1a. Capitula with ray florets 10a. var. *tatsienense*
1b. Capitula without ray florets 10b. var. *tanacetopsis*

10a. *Tanacetum tatsienense* var. *tatsienense*

川西小黄菊(原变种) chuan xi xiao huang ju (yuan bian zhong)

Chrysanthemum tatsienense Bureau & Franchet, J. Bot. (Morot) 5: 72. 1891; *C. jugorum* W. W. Smith; *Pyrethrum tatsienense* (Bureau & Franchet) Y. Ling ex C. Shih.

Capitula heterogamous. Ray florets present; lamina orange-red or orange abaxially, yellow adaxially, linear or narrowly oblong, ca. 2 cm.

Alpine meadows, thickets, gravelly places on mountain slopes; 3500–5200 m. Qinghai, Sichuan, Xizang, Yunnan [N Bhutan].

The entire plant is used medicinally for promoting blood circulation.

10b. *Tanacetum tatsienense* var. *tanacetopsis* (W. W. Smith) Grierson, Edinburgh J. Bot. 57: 410. 2000.

无舌小黄菊 wu she xiao huang ju

Chrysanthemum jugorum var. *tanacetopsis* W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 10: 173. 1918; *C. pullum* Handel-Mazzetti; *C. tatsienense* var. *tanacetopsis* (W. W. Smith) C. Marquand; *Pyrethrum tatsienense* var. *tanacetopsis* (W. W. Smith) Y. Ling & C. Shih.

Capitula homogamous. All florets tubular, bisexual.

• Alpine meadows, thickets; 3500–5000 m. Xizang, Yunnan.

11. *Tanacetum atkinsonii* (C. B. Clarke) Kitamura in H. Hara et al., Enum. Fl. Pl. Nepal 3: 45. 1982.

藏匹菊 zang pi ju

Chrysanthemum atkinsonii C. B. Clarke, Compos. Ind.

147. 1876; *Pyrethrum atkinsonii* (C. B. Clarke) Y. Ling & C. Shih.

Herbs, perennial, 12–30 cm tall; stems solitary or clustered, villous with long curved simple hairs especially in upper part and below capitula. Basal leaves: petiole ca. 2.4 cm; leaf blade oblanceolate or narrowly elliptic, 4–10 × 1.5–3 cm, 3-pinnatisect, both surfaces pale green, sparsely villous; primary lateral segments 7–12-paired; ultimate segments obliquely triangular, lanceolate, or linear. Stem leaves similar, usually 2-pinnatisect, sessile. Capitula solitary, terminal. Involucre coryliiform, 10–25 mm in diam.; phyllaries in 4 rows, abaxially subglabrous, scarious margin broad, dark brown, outer phyllaries lanceolate, ca. 6 mm, middle and inner ones narrowly elliptic or oblanceolate, 7–9 mm, abaxially glabrous. Ray florets yellow; lamina narrowly elliptic, ca. 1 cm, apex 3-denticulate. Corona shorter than 0.1 mm. Fl. Jul.

Thickets on mountain slopes; 1800–2600 m. Xizang (Yadong) [Bhutan, India (Sikkim), Nepal].

12. *Tanacetum alatavicum* Herder, Bull. Soc. Imp. Naturalistes Moscou 40(3–4): 129. 1867.

新疆匹菊 xin jiang pi ju

Chrysanthemum alatavicum (Herder) Schultz Bipontinus; *Pyrethrum alatavicum* (Herder) O. Fedtschenko & B. Fedtschenko.

Herbs, perennial, 25–100 cm tall; stems solitary and erect or clustered and ascending, upper parts branched, rarely unbranched. Basal leaves: petiole 4–7 cm; leaf blade narrowly elliptic or oblanceolate, 10–18 × 3–4 cm, 2-pinnatisect, both surfaces green, glabrous or sparsely villous, primary lateral segments 5–14-paired; ultimate segments narrowly elliptic, broadly linear, or linear-lanceolate. Middle and distal stem leaves progressively smaller, similar; leaves below capitula pinnately divided or entire. Synflorescence an irregular flat-topped cyme. Capitula (1 or)2–5; peduncle 9–19 cm. Involucre coryliiform, 10–18 mm in diam.; phyllaries in 4 rows, scarious margin dark brown, outer phyllaries narrowly lanceolate or linear-lanceolate, ca. 6 mm, middle and inner ones narrowly elliptic or oblanceolate. Ray florets white; lamina 1.4–1.6 cm, apex entire. Achenes ca. 2.5 mm. Corona 0.5–1 mm, divided from 1/2 to whole of length. Fl. and fr. Jul–Aug.

Mountain slopes; 1800–2500 m. Xinjiang [Kazakhstan, Mongolia, Russia].

13. *Tanacetum krylovianum* (Krascheninnikov) K. Bremer & Humphries, Bull. Nat. Hist. Mus. London, Bot. 23: 102. 1993.

黑苞匹菊 hei bao pi ju

Pyrethrum krylovianum Krascheninnikov, Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk S.S.S.R. 9: 155. 1946; *P. alatavicum* (Herder) O. Fedtschenko & B. Fedtschenko subsp. *krylovianum* (Krascheninnikov) Boldyreva.

Herbs, perennial, 30–70 cm tall; stems solitary or clustered, erect, few branched or not, very sparsely pilose. Basal and lower stem leaves petiolate; leaf blade narrowly elliptic, 5–20 × 2–5 cm, 2-pinnatisect, both surfaces green, very sparsely

pilose or glabrous; primary lateral segments 7–12-paired; ultimate segments obliquely triangular, lanceolate, broadly linear, or linear. Middle and upper stem leaves similar, small, sessile. Synflorescence a ± flat-topped terminal cyme. Capitula 1–3. Involucre coryliform, ca. 16 mm in diam.; phyllaries in 4 rows, scarious margin broad, brown, outer phyllaries ovate, ca. 3 mm, middle and inner ones elliptic or broadly linear, 4–7 mm. Ray florets white; lamina narrowly elliptic, 1.4–2.5 cm, apex 2- or 3-denticulate. Achenes ca. 2.5 mm. Corona 0.4–0.7 mm, lobed for ca. 1/2 length. Fl. and fr. Aug–Sep.

Forest understories, alkaline soils; 2500–3200 m. Xinjiang [Kazakhstan, Mongolia, Russia].

14. *Tanacetum abrotanoides* K. Bremer & Humphries, Bull. Nat. Hist. Mus. London, Bot. 23: 101. 1993.

丝叶匹菊 si ye pi ju

Pyrethrum abrotanifolium Bunge ex Ledebour, Fl. Ross. 2: 549. 1845; *Chrysanthemum abrotanifolium* (Bunge ex Ledebour) Krylov.

Herbs, perennial, 30–60 cm tall, with thick rhizomes; stems solitary, erect, upper parts branched, very sparsely pilose or glabrous. Basal and lower stem leaves: petiole 3–5 cm; leaf blade narrowly elliptic or linear-elliptic, ca. 14 × 2–4 cm, 2-pinnatisect, both surfaces green, sparsely villous with glandular and long, curved, simple hairs; primary lateral segments 7–15-paired; ultimate segments filiform. Middle and upper stem leaves similar, gradually smaller, sessile. Synflorescence an irregular flat-topped panicle. Capitula 3–7, pedunculate. Involucre coryliform, 9–11 mm in diam.; phyllaries in 4 rows, scarious margin brown or dark brown, outer phyllaries lanceolate, ca. 3.5 mm, abaxially sparsely pilose, middle and inner ones narrowly elliptic to linear-elliptic, 4–5 mm, abaxially glabrous. Ray florets white; lamina narrowly elliptic, 8–12 mm. Achenes ca. 2.2 mm. Corona 0.3–0.5 mm, lobed or divided to 1/2 length. Fl. and fr. Jul–Aug.

Mountain slopes; above 2000 m. Xinjiang [Kazakhstan, Mongolia, Russia].

15. *Tanacetum pulchrum* (Ledebour) Schultz Bipontinus, Tanacetum, 49. 1844.

美丽匹菊 mei li pi ju

Pyrethrum pulchrum Ledebour, Icon. Pl. 1: 20. 1829; *Chrysanthemum pulchrum* (Ledebour) C. Winkler; *Tripleurospermum pulchrum* (Ledebour) Ruprecht.

Herbs, perennial, 15–35 cm tall, rhizomatous; stems solitary or clustered, unbranched, villous with long, curved, simple hairs, especially in upper part and near capitula. Basal leaves: petiole to 4 cm; leaf blade linear or linear-oblong, 2–10 × 1–2 cm, 2-pinnatisect, both surfaces green, glabrous or somewhat villous; primary lateral segments 6–12-paired; ultimate segments linear or linear-lanceolate. Stem leaves similar, gradually smaller, sessile. Capitulum solitary, terminal; peduncle villous with rather dense and fluffy curved hairs. Involucre coryliform, 15–25 mm in diam.; phyllaries in 5 rows, scarious margin broad, dark brown, outer phyllaries ovate or broadly ovate, 5–6

mm, middle and inner ones elliptic or broadly linear, 8–10 mm, outer and middle ones abaxially villous with long simple hairs, inner ones abaxially glabrous. Ray florets white; lamina linear, 1.5–3 cm, apex entire. Achenes 2.5–3 mm. Corona 1–1.2 mm, divided to base. Fl. and fr. Aug.

Kobresia meadows, rocky slopes; ca. 2600 m. Xinjiang (Altay Shan) [Kazakhstan, Mongolia, Russia].

16. *Tanacetum richterioides* (C. Winkler) K. Bremer & Humphries, Bull. Nat. Hist. Mus. London, Bot. 23: 103. 1993.

单头匹菊 dan tou pi ju

Chrysanthemum richterioides C. Winkler, Trudy Imp. S.-Peterburgsk. Bot. Sada 10: 86. 1887; *C. merzbacheri* B. Fedtchenko ex Merzbacher; *Pyrethrum karelinii* Krascheninnikov; *P. richterioides* (C. Winkler) Krasnov.

Herbs, perennial, 6–35 cm tall, rhizomatous; stems solitary or clustered, erect or ascending, villous especially in upper part and below capitula, hairs long, curved, and simple. Basal and lower stem leaves: petiole to 4 cm; leaf blade narrowly elliptic, 2.5–6 × 1.5–2 cm, 2-pinnatisect, both surfaces green or pale green, sparsely villous; primary lateral segments 4–10-paired; ultimate segments narrowly elliptic. Middle and upper stem leaves similar, gradually smaller. Capitula solitary, terminal, long or shortly pedunculate. Involucre coryliform, 15–20 mm in diam.; phyllaries in 4 rows, scarious margin broad, dark brown, outer phyllaries lanceolate, 5–6 mm, abaxially sparsely villous, middle and inner ones narrowly elliptic or oblanceolate, 5–6.5 mm, abaxially glabrous. Ray florets red or purple-red; lamina broadly linear, 1.4–2 cm, apex minutely 3-denticulate. Corona 0.3–0.5 mm, divided for 1/2 length. Fl. Aug–Sep.

Mountain slopes, meadows, alluvial places; 2000–3100 m. Xinjiang (Junggar Pendi, Tian Shan) [Kazakhstan].

17. *Tanacetum kaschgarianum* K. Bremer & Humphries, Bull. Nat. Hist. Mus. London, Bot. 23: 102. 1993.

托毛匹菊 tuo mao pi ju

Pyrethrum kaschgharicum Krascheninnikov, Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk S.S.S.R. 9: 158. 1946, not *Tanacetum kaschgaricum* Krascheninnikov (1933).

Herbs, perennial, 15–30 cm tall, with branched rhizomes; stems solitary or clustered, erect or ascending, simple, sparsely villous, hairs long, curved, and simple. Basal and lower stem leaves: petiole to 5.5 cm; leaf blade narrowly elliptic, 3–7 × 1.5–2.5 cm, 2-pinnatisect, both surfaces gray-white, densely hairy; primary lateral segments 4–9-paired; ultimate segments narrowly elliptic or narrowly linear-elliptic. Middle and upper stem leaves similar, sessile; leaves below capitulum pinnatifid. Capitula solitary, terminal. Involucre coryliform, 10–15 mm in diam.; phyllaries in 3 rows, scarious margin broad, dark brown, outer phyllaries triangular-lanceolate, ca. 5 mm, middle and inner ones elliptic or narrowly oblanceolate, ca. 6 mm, outer and middle ones abaxially villous, inner ones abaxially glabrous. Receptacle pilose with easily shed hairs. Ray florets white or red; lamina elliptic, 6–10 mm, apex 2- or 3-denticulate. Achenes 2.5–3 mm. Corona ca. 0.8 mm, divided to base. Fl. and fr. Jun–Aug.

- Mountain slopes; 2000–2200(–2600) m. Xinjiang.

18. *Tanacetum artemisioides* Schultz Bipontinus ex J. D. Hooker, Fl. Brit. India 3: 318. 1881.

艾状菊蒿 ai zhuang ju hao

Herbs, perennial, to 60 cm tall, from woody rootstock; stems several, adpressed hairy, glabrescent. Basal and lower stem leaves petiolate. Middle stem leaves subsessile to sessile; leaf blade oblong, 1–2.5(–3) × 0.8–1.5(–2) cm, ± palmately 1- or 2-pinnatisect; ultimate segments oblong, 2–3 mm, obtuse. Synflorescence a ± lax flat-topped cyme. Capitula 3–10; peduncle short to moderately long. Involucre ± cupuliform, ca. 5 mm in diam.; phyllaries in 3 rows, pubescent, margin membranous; outer phyllaries lanceolate, ca. 3 mm, apex acute; middle and inner ones oblanceolate to narrowly obovate, 4–5 mm, apex obtuse. Receptacle convex, glabrous. All florets yellow; corolla tubular, 3–4 mm, 5-toothed. Achenes light brown.

2400–2700 m. W Xizang [?India, Pakistan].

The type gatherings of this and the following species, *Tanacetum falconeri*, were both collected from the border area between Xizang and

Pakistan. The two species are therefore likely to be found within China. The generic position of these species with homogamous capitula needs more detailed investigation.

19. *Tanacetum falconeri* J. D. Hooker, Fl. Brit. India 3: 320. 1881.

西藏菊蒿 xi zang ju hao

Herbs, perennial or rarely annual, 40–60(–70) cm tall, from woody rootstock; stems sulcate. Basal and lower stem leaves petiolate; leaf blade linear-oblong, 1–9(–13) cm including petiole, 2-pinnatisect, both surfaces silky tomentose; ultimate segments linear, acute. Synflorescence a flat-topped cyme. Capitula 6–10(–12), homogamous, discoid; peduncle 1.5–3 cm. Involucre 2–3(–4) mm; phyllaries in 4 rows, abaxially softly tomentose, lanate, or pubescent, margin membranous. Receptacle convex, rarely flat. All florets yellow; corolla tubular, 2–4 mm, 5-toothed. Achenes light brown, 1–1.5(–3) mm. Corona glandular, entire.

Rocky talus, around lakes, grassy ridges, valley plains; 2000–4000 m. W Xizang [N India (Himachal Pradesh), Pakistan].

170. TRIPLEUROSPERMUM Schultz Bipontinus, Tanacetum, 31. 1844.

三肋果属 san lei guo shu

Shi Zhu (石铸 Shih Chu); Christopher J. Humphries, Michael G. Gilbert

Chamaemelum Visiani (1845), not Miller (1754); *Dibothrospermum* Knaf; *Rhytidosperrum* Schultz Bipontinus.

Herbs, annual or perennial; indumentum absent or of simple, basifixed hairs. Leaves 2- or 3-pinnatisect. Synflorescences cymose; capitula solitary or in ± flat-topped panicles, pedunculate, heterogamous or homogamous, radiate or discoid. Involucres hemispheric; phyllaries in 2–4 rows, scarious margins often narrow, white or pale to dark brown. Receptacle convex to conical, epaleate. Marginal florets in 1 row, female, lamina white or rarely pale pink. Disk florets bisexual; corolla tubular, apex 5-lobed; lobes each usually with resin sac. Anther bases obtuse, apical appendage ovate-triangular or oblong. Style branches with apex truncate. Achenes 3-angled, often wrinkled or tuberculate, with 1 adaxial and 2 lateral, and sometimes 1 or 2 abaxial, white ribs, abaxially and apically with (1 or)2(–5) distinct resin sacs. Corona present, sometimes forming an auricle, or with a few scales, sometimes absent.

Thirty-eight species: Europe and temperate Asia, a few species in N Africa and North America; five species (one endemic) in China.

- 1a. Plants perennial, with rhizome; phyllaries with dark brown scarious margins.
 - 2a. Capitula heterogamous, radiate 1. *T. ambiguum*
 - 2b. Capitula homogamous, discoid 2. *T. homogamum*
- 1b. Plants annual or biennial, without rhizome; phyllaries with white or paler brown scarious margins.
 - 3a. Phyllaries with narrow pale brown scarious margin; achenes tuberculate 3. *T. tetragonospermum*
 - 3b. Phyllaries with white or pale brown scarious margin; achenes wrinkled.
 - 4a. Ray floret lamina ca. 10 × 3.5 mm; corona subentire; leaf blade 2–4 × 1–2.5 cm 4. *T. inodorum*
 - 4b. Ray floret lamina ca. 4 × 1.5 mm; corona 3-toothed; leaf blade 5.5–9.5 × 2.5–3 cm 5. *T. limosum*

1. *Tripleurospermum ambiguum* (Ledebour) Franchet & Savatier, Enum. Pl. Jap. 1: 236. 1875.

褐苞三肋果 he bao san lei guo

Pyrethrum ambiguum Ledebour, Fl. Altaic. 4: 118. 1833; *Chamaemelum ambiguum* (Ledebour) Boissier; *Matricaria ambigua* (Ledebour) Krylov.

Herbs, perennial, 15–50 cm tall, rhizomatous; stems erect, unbranched, striate, scattered pilose below capitula. Basal leaves

with petiole base dilated; leaf blade lanceolate-oblong or oblong, 3–7(–10) × 1–2 cm, 2-pinnatisect, both surfaces glabrous; primary lateral segments many paired; ultimate segments linear, sessile, small. Capitula solitary, terminal, 3–4 cm in diam. Involucre hemispheric, 1–1.5 cm in diam.; phyllaries in 3 rows, abaxially glabrous, scarious margin narrow, dark brown, outer phyllaries lanceolate, 6–6.5 mm, middle ones oblong, inner ones oblanceolate. Ray florets white; lamina ca. 2 × 4.5 mm. Disk florets yellow, 5-lobed; lobes each with red apical resin sac. Achenes deep brown, ca. 2 mm, tuberculate, with 1 adaxial

and 2 lateral thick whitish ribs, sometimes also 1 or 2 thin abaxial ribs, abaxially and apically with 2 distinct resin sacs. Corona with broad obtuse teeth. Fl. and fr. Jun–Aug.

Sunny mountain slopes, grasslands of river valleys; 700–2600 m. Heilongjiang, Xinjiang (Altay Shan, Tian Shan) [Kazakhstan, Mongolia, Russia; SW Asia].

2. Tripleurospermum homogamum G. X. Fu ex Y. Ling & C. Shih, Bull. Bot. Lab. N. E. Forest. Inst., Harbin 6: 9. 1980.

无舌三肋果 *wu she san lei guo*

Herbs, perennial, ca. 40 cm tall, with short rhizomes; stems unbranched, striate, conspicuously pubescent below capitula. Basal leaves: petiole short, dilated basally; leaf blade oblanceolate-oblong, 4–6 × 0.8–1.5 cm, pinnatisect to 2-pinnatisect, both surfaces glabrous or very sparsely pubescent; ultimate segments linear, sessile. Distal stem leaves linear, entire. Capitula solitary, terminal, homogamous, discoid; peduncle to 10 cm. Involucre hemispheric, ca. 1 cm in diam.; phyllaries in 4 rows, abaxially glabrous or sparsely pubescent, scarious margin dark brown, outer and middle phyllaries lanceolate to oblong-lanceolate, ca. 4 mm, inner ones spatulate-oblanceolate, ca. 3.5 mm. Ray florets absent. Disk florets yellow, 5-lobed, lobes each with a resin sac. Achenes pale brown, 3-angled, ca. 2 mm, smooth, with 1 adaxial and 2 lateral thick whitish ribs, sometimes 1 or 2 thin abaxial ribs, abaxially and apically with 2 distinct resin sacs. Corona ca. 0.2 mm, 3-lobed.

• Alpine forest margins; ca. 2500 m. N Xinjiang (Burqin).

3. Tripleurospermum tetragonospermum (F. Schmidt) Pobedimova, Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk S.S.S.R. 21: 346. 1961.

东北三肋果 *dong bei san lei guo*

Chamaemelum tetragonospermum F. Schmidt, Reis. Amur-Land., Bot. 148. 1868; *Matricaria tetragonosperma* (F. Schmidt) H. Hara & Kitamura.

Herbs, annual, 40–50 cm tall; stems usually branched from base, striate, upper parts sparsely pubescent, lower part glabrous. Lower and middle stem leaves sessile; leaf blade oblanceolate-oblong or oblong, 5–15 × 2–5 cm, 2- or 3-pinnatisect, both surfaces glabrous; ultimate segments linear-filiform. Distal stem leaves similar, smaller. Capitula solitary, terminal, several per plant, 2–2.5 cm in diam. Involucre hemispheric, 1.2–1.5 cm in diam.; phyllaries in 4 rows, abaxially glabrous, scarious margin narrow, brown, outer ones ovate-oblong, apex obtuse, middle ones narrowly oblong, apex rounded, inner ones lanceolate-oblong, apex obtuse. Ray florets white; lamina ca. 6.5 mm. Disk florets yellow, 5-lobed. Achenes brownish, triquetrous, ca. 1.5 mm, tuberculate, with 1 adaxial and 2 lateral thick ribs, abaxially and apically with 2 distinct resin sacs. Corona ca. 0.2 mm, entire. Fl. and fr. Jun–Aug.

Roadsides, sandy places by rivers; ca. 300 m. Heilongjiang, Liaoning [Japan, Russia].

4. Tripleurospermum inodorum (Linnaeus) Schultz Bipontinus, Tanacetum, 32. 1844.

新疆三肋果 *xin jiang san lei guo*

Matricaria inodora Linnaeus, Fl. Suec., ed. 2, 297. 1755; *Chamaemelum inodorum* (Linnaeus) Visiani; *Chamomilla inodora* (Linnaeus) K. Koch; *Chrysanthemum inodorum* (Linnaeus) Linnaeus; *C. maritimum* (Linnaeus) Cavanilles var. *inodorum* (Linnaeus) Becherer; *Dibothrospermum agreste* Knaf, nom. illeg. superfl.; *M. maritima* Linnaeus subsp. *inodora* (Linnaeus) Soó; *M. maritima* var. *inodora* (Linnaeus) Soó; *Pyrethrum inodorum* (Linnaeus) Moench; *Rhytidosperrum inodorum* (Linnaeus) Schultz Bipontinus; *Tripleurospermum maritimum* (Linnaeus) W. D. J. Koch subsp. *inodorum* (Linnaeus) Applequist.

Herbs, annual or biennial; stems 30–70 cm tall, erect, striate, glabrous, corymbosely branched in upper 1/2. Middle stem leaves sessile; leaf blade ovate-oblong or oblong, 2–4 × 1–2.5 cm, both surfaces glabrous, 2-pinnatisect; ultimate segments narrowly linear. Distal stem leaves similar, gradually smaller. Capitula several to many, in an apical corymb, 2–3 cm in diam., pedunculate. Involucre hemispheric, 7–10 mm in diam.; phyllaries in 3 or 4 rows, margin narrowly white scarious, outer ones lanceolate, middle and inner ones oblong to oblanceolate. Ray florets white; lamina ca. 1 cm. Disk florets yellow, 5-lobed; lobes each with a resin sac. Achenes brown, triquetrous, ca. 2 mm, wrinkled, with 1 adaxial and 2 lateral thick whitish ribs, abaxially and apically with 2 distinct resin sacs. Corona short, subentire. Fl. and fr. Sep. $2n = 36$.

River valleys; ca. 1100 m. Jiangsu, Jilin, Liaoning, N Xinjiang (Tacheng) [Kazakhstan, Russia, Uzbekistan; Europe].

5. Tripleurospermum limosum (Maximowicz) Pobedimova, Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk S.S.S.R. 21: 352. 1961.

三肋果 *san lei guo*

Chamaemelum limosum Maximowicz, Mém. Acad. Imp. Sci. St.-Petersbourg Divers Savans 9: 156. 1859; *Matricaria limosa* (Maximowicz) Kudô; *M. maritima* Linnaeus subsp. *limosa* (Maximowicz) Kitamura.

Herbs, annual or biennial; stems 10–35 cm tall, striate, glabrous, unbranched or branched from base. Basal leaves withered by anthesis. Lower and middle stem leaves sessile; leaf blade oblanceolate-oblong or oblong, 5.5–9.5 × 2.5–3 cm, both surfaces glabrous, tripinnatisect; ultimate segments filiform. Distal stem leaves gradually smaller, similar to proximal and middle leaves. Capitula few to many, in an apical corymb, 1–1.5 cm in diam., pedunculate. Involucre hemispheric; phyllaries in 2 or 3 rows, margin white or brownish scarious, outer ones broadly lanceolate, inner ones oblong. Ray florets white; lamina 4(–6) mm. Disk florets yellow, 5-lobed; lobes each with a resin sac. Achenes brown, triquetrous, ca. 2.5 mm, wrinkled, with 1 adaxial and 2 lateral whitish ribs, apically and abaxially with 2 distinct resin sacs. Corona ca. 0.5 mm, 3-lobed. Fl. and fr. Jun–Aug.

Sandy places by rivers and lakes, meadows, dry sandy mountain slopes. Hebei, Heilongjiang, Jilin, Liaoning, Nei Mongol [Japan, Kazakhstan, Korea, Mongolia, Russia, Uzbekistan].

171. MATRICARIA Linnaeus, Sp. Pl. 2: 890. 1753, nom. cons.

母菊属 mu ju shu

Shi Zhu (石铸 Shih Chu); Christopher J. Humphries, Michael G. Gilbert

Achylopsis Lehmann; *Chamomilla* Gray; *Lepidanthus* Nuttall (1841), not Nees (1830), nor Nuttall (1835); *Lepidotheca* Nuttall.

Herbs, annual, usually fragrant; indumentum absent or of simple, basifixed hairs. Leaves 1- or 2-pinnatisect. Synflorescences cymose, usually \pm flat-topped, sometimes reduced to solitary capitulum. Capitula heterogamous or homogamous, radiate or discoid. Involucre coryliform; phyllaries in 2 or 3 rows. Receptacle conical to subulate, epaleate. Marginal florets when present in 1 row, female, fertile; lamina white. Disk florets yellow or pale green, bisexual; corolla tubular, apex 4- or 5-lobed. Anther bases obtuse; apical appendage triangular. Style branches linear, apex truncate. Achenes small, terete, slightly dorsiventrally compressed, adaxially with 3–5 thin ribs. Corona small or absent or sometimes represented by an adaxial auricle particularly in ray achenes.

About seven species: N Africa, SW and temperate Asia, Europe, North America; two species in China.

- 1a. Capitula heterogamous, with both marginal ray florets and central disk florets; ray florets white, disk florets yellow; achenes with 5 thin adaxial ribs; corona absent 1. *M. chamomilla*
 1b. Capitula homogamous, florets all bisexual, tubular, pale yellow-green; achenes with 2 or 3 thin adaxial ribs; corona present, white 2. *M. matricarioides*

1. Matricaria chamomilla Linnaeus, Sp. Pl. 2: 891. 1753.

母菊 mu ju

Chamaemelum chamomilla (Linnaeus) E. H. L. Krause; *Chamomilla recutita* (Linnaeus) Rauschert; *C. vulgaris* Gray; *Chrysanthemum chamomilla* (Linnaeus) Bernhardt; *C. suaveolens* (Linnaeus) Cavanilles; *Matricaria chamomilla* var. *recutita* (Linnaeus) Fiori; *M. chamomilla* f. *suaveolens* (Linnaeus) Fiori & Paoletti; *M. recutita* Linnaeus; *M. suaveolens* Linnaeus.

Herbs, annual or short-lived perennial, glabrous. Stems (10–)30–40 cm tall, erect, striate, much branched in upper part. Proximal stem leaves sessile; leaf blade oblong or oblanceolate, (1.5–)3–4(–6) \times (0.5–)1.5–2 cm, 2-pinnatisect; ultimate segments linear, apex mucronulate. Distal stem leaves similar to proximal leaves, ovate or long ovate. Capitula heterogamous, 1–1.5 cm in diam., apically corymbose, pedunculate; peduncle 3–6 cm. Involucre cup-shaped; phyllaries in 2 rows, margin broadly white scarious, apex obtuse. Ray florets white; lamina ca. 6 mm. Disk florets many, yellow, tubular. Achenes 0.8–1 mm, with 5 mainly adaxial thin ribs. Corona absent. Fl. and fr. May–Jul. $2n = 18$.

Near fields, forests, above valleys; 1800–3300 m. Anhui, Hebei, Jiangsu, Liaoning, Shaanxi, Shandong, Sichuan, Xinjiang [Kazakhstan, Mongolia, Russia, Uzbekistan; Europe, North America].

Matricaria chamomilla is cultivated as an ornamental in Beijing

and Shanghai. Capitula of this species are used medicinally to induce sweat and relieve muscular spasms. The entire plant contains large amounts of Vitamins A and C.

2. Matricaria matricarioides (Lessing) Porter ex Britton, Mem. Torrey Bot. Club 5: 341. 1894.

同花母菊 tong hua mu ju

Artemisia matricarioides Lessing, Linnaea 6: 210. 1831; *Matricaria discoidea* Candolle.

Herbs, annual. Stems 5–30 cm tall, erect or ascending, branched in upper part or from base, glabrous or sparsely pubescent below capitula. Stem leaves sessile; leaf blade oblong or oblanceolate, 2–3 \times 0.8–1 cm, 2-pinnatisect; ultimate segments shortly linear, both surfaces glabrous. Capitula homogamous, irregularly corymbose or solitary at apex of branches, pedunculate; peduncle 0.5–1 cm. Involucre cup-shaped; phyllaries in 3 rows, equal, oblong, abaxially glabrous, scarious margin hyaline, apex obtuse. All florets bisexual, pale yellow-green, tubular, 5-lobed. Achenes oblong, somewhat curved, ca. 1.5 mm, apex obliquely truncate, with 2 or 3 adaxial thin white ribs and 1 red thin stripe on each side. Pappus represented by a white corona. Fl. and fr. Jul. $2n = 18$.

Forests, roadsides, near houses. Jilin (Baicheng, Hunchun), Liaoning, Nei Mongol [Bhutan, Japan, Kazakhstan, Korea, Russia; N Asia, Europe, North America].

172. GLEBIONIS Cassini in F. Cuvier, Dict. Sci. Nat. 41: 41. 1826.

茼蒿属 tong hao shu

Shi Zhu (石铸 Shih Chu); Christopher J. Humphries, Michael G. Gilbert

Ismelia Cassini; *Xanthoptalmum* Schultz Bipontinus.

Herbs, annual; indumentum absent or of simple, basifixed hairs. Leaves alternate, pinnatifid or margin dentate. Synflorescences cymose, lax \pm flat-topped or reduced to solitary terminal capitulum. Capitula pedunculate, heterogamous, radiate. Involucre cup-shaped; phyllaries in 4 rows, rigidly herbaceous. Receptacle convex, epaleate. Marginal florets in 1 row, female, fertile; lamina yellow or yellow and white. Disk florets yellow, bisexual; corolla tubular, apex 5-lobed. Anther bases obtuse; apical appendage ovate-elliptic. Style branches linear, apex truncate. Ray achenes 3-angled, laterally winged, adaxially narrowly winged or ribbed; corona absent. Disk achenes prismatic with a narrow adaxial wing or terete; corona absent.

Three species: Mediterranean region, introduced elsewhere as weeds or cultivated as an ornamental or as vegetables; three species (all introduced) in China.

- 1a. Ray achenes narrowly 2-winged; leaves irregularly dentate or rarely pinnatilobed 3. *G. segetum*
 1b. Ray achenes widely 3-winged; leaves bipinnately divided.
 2a. Adaxial wings of ray achenes projected into an apical rostrum 1. *G. carinata*
 2b. Wings of ray achenes not projected into rostrum 2. *G. coronaria*

1. *Glebionis carinata* (Schousboe) Tzvelev, Bot. Zhurn. 84(7): 117. 1999.

蒿子杆 hao zi gan

Chrysanthemum carinatum Schousboe, Iagttag. Vextrig. Marokko, 198. 1800; *Ismelia carinata* (Schousboe) Schultz Bipontinus; *I. versicolor* Cassini, nom. illeg. superfl.

Herbs, annual, 20–70 cm tall, glabrous or nearly so; stems erect, usually branched above middle. Basal leaves withered by anthesis; lower and middle stem leaves sessile; leaf blade obovate or narrowly elliptic, 8–10 × 3–4 cm, 2-pinnatipartite; primary lateral lobes 3–8-paired; ultimate lobes lanceolate, obliquely triangular or linear. Synflorescence a terminal cyme. Capitula (1 or) 2–8, long pedunculate. Involucres cupular, 1.5–2.5 cm in diam.; phyllaries in 4 rows, inner ones ca. 1 cm. Ray achenes broadly 3-winged, wings adaxially projected into an apical rostrum. Disk achenes with 2 elevated ribs. Corona absent.

Cultivated as a vegetable; 500–2200 m. Anhui, Guizhou, Hainan, Hebei, Heilongjiang, Hubei, Hunan, Jiangsu, Jilin, Liaoning, Nei Mongol, Qinghai, Shandong, Xinjiang, Yunnan, Zhejiang [native to NW Africa (Morocco); introduced elsewhere].

2. *Glebionis coronaria* (Linnaeus) Cassini ex Spach, Hist. Nat. Vég. 10: 181. 1841.

茼蒿 tong hao

Chrysanthemum coronarium Linnaeus, Sp. Pl. 2: 890. 1753, nom. cons.; *C. roxburghii* Desfontaines; *Glebionis roxburghii* (Desfontaines) Tzvelev; *Matricaria coronaria* (Linnaeus) Desrousseaux; *Pinardia coronaria* (Linnaeus) Lessing; *Pyrethrum indicum* Sims (1813), not (Linnaeus) Cassini (1826); *Xantophthalmum coronarium* (Linnaeus) P. D. Sell.

Herbs, annual, glabrous or almost so; stems erect, 70 cm tall, unbranched or few branched above middle. Basal leaves withered by anthesis; lower and middle stem leaves sessile; leaf blade narrowly elliptic or elliptic-lanceolate in outline, 8–10 × 3–4 cm, 1 or 2(or 3)-pinnatisect or pinnatifid, primary seg-

ments 2–4-paired, ultimate lobes ovate or linear; upper stem leaves gradually smaller. Capitula terminal, solitary or few, not forming conspicuous panicle; peduncle 15–20 cm. Involucres cup-shaped, 1.5–3 cm in diam.; phyllaries in 4 rows, inner ca. 1 cm, apex widened, scarious. Ray achenes narrowly 3-winged. Disk achenes 1- or 2-ribbed. Fl. and fr. Sep. $2n = 18^*$

Widely cultivated as a vegetable. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hebei, Hunan, Jilin, Shandong, Zhejiang [native to the Mediterranean region].

Glebionis coronaria is grown both for its bright yellow florets and the edible young shoots. Various authors include *Chrysanthemum coronarium* var. *spatiosum* within this species, but it is better placed within the following species, *G. segetum*.

3. *Glebionis segetum* (Linnaeus) Fourreau, Ann. Soc. Linn. Lyon, sér. 2, 17: 90. 1869.

南茼蒿 nan tong hao

Chrysanthemum segetum Linnaeus, Sp. Pl. 2: 889. 1753; *C. coronarium* Linnaeus f. *spatiosum* (L. H. Bailey) Kitamura; *C. coronarium* var. *spatiosum* L. H. Bailey; *C. spatiosum* (L. H. Bailey) L. H. Bailey; *C. umbrosum* Willdenow; *Matricaria segetum* (Linnaeus) Schrenk; *Pyrethrum segetum* (Linnaeus) Moench; *P. umbrosum* (Willdenow) Boissier; *Xantophthalmum segetum* (Linnaeus) Schultz Bipontinus.

Herbs, annual, 20–60 cm tall, glabrous or nearly so; stems erect, fleshy. Basal and lower stem leaves sessile; leaf blade elliptic, obovate-lanceolate, or ovate-elliptic, margin irregularly largely dentate, rarely pinnatilobed. Upper stem leaves gradually smaller. Synflorescence ill-defined, not obviously flat-topped; capitula solitary or few at apices of branches; peduncle ca. 5 cm. Involucres cupular, 1–2 cm in diam.; phyllaries in 4 rows, inner ones scarious, apex enlarged. Ray achenes narrowly 2-winged. Disk achenes with 10 ribs.

Cultivated as a vegetable. Anhui, Beijing, Fujian, Guangdong, Guizhou, Hainan, Hubei, Hunan, Jiangsu, Jiangxi, Yunnan, Zhejiang [native to the Mediterranean region].

173. LEUCANTHEMUM Miller, Gard. Dict. Abr., ed. 4, [769]. 1754.

滨菊属 bin ju shu

Shi Zhu (石铸 Shih Chu); Christopher J. Humphries, Michael G. Gilbert

Herbs, perennial; indumentum absent or of simple basifixed hairs. Leaves alternate, margin entire, serrate, or pinnatifid. Synflorescences cymose, lax, ± flat-topped, sometimes reduced to single capitulum. Capitula pedunculate, heterogamous, radiate. Involucres coryliform; phyllaries in 3 or 4 rows, scarious margins white or brown. Receptacle convex, sometimes conical, epaleate. Marginal florets in 1 row, female, fertile; lamina white or pink, rarely yellow. Disk florets many, yellow, bisexual; corolla tubular, apex 5-lobed. Anther bases obtuse; apical appendage ovate-lanceolate. Style branches linear, apex truncate. Achenes 10-ribbed, ribs projected or not to apical rim. Corona or adaxial auricle present or not.

Thirty-three species: Europe; one species (introduced) in China.

Leucanthemum maximum (Ramond) Candolle (Prodr. 6: 46. 1838; *Chrysanthemum maximum* Ramond, Bull. Sci. Soc. Philom. Paris 2: 140. 1800; 大滨菊 da bin ju), native to SW Europe, is grown in China as an ornamental garden plant. It is closely related to *L. vulgare* but is a larger plant with more acutely toothed leaf margins and wider scarious phyllary margins.

1. *Leucanthemum vulgare* Lamarck, Fl. Franç. 2: 137. 1779.

滨菊 bin ju

Chrysanthemum leucanthemum Linnaeus, Sp. Pl. 2: 888. 1753; *Chamaemelum leucanthemum* (Linnaeus) E. H. L. Krause; *Chrysanthemum vulgare* (Lamarck) Gaterau (1789), not (Linnaeus) Bernhardt (1800); *Leucanthemum irtutianum* Candolle; *Matricaria leucanthemum* (Linnaeus) Desrousseaux; *Pyrethrum leucanthemum* (Linnaeus) Franchet (1885), not Wenderoth (1831); *Tanacetum leucanthemum* (Linnaeus) Schultz Bipontinus.

Herbs, perennial, 15–80 cm tall; stems erect, usually unbranched, tomentose, floccose, or glabrous. Basal leaves: petiole longer than blade; leaf blade narrowly elliptic, oblan-

ceolate, obovate, or ovate, 3–8 × 1.5–2.5 cm, base cuneate-attenuate. Middle and lower stem leaves sessile; leaf blade narrowly elliptic to linear-elliptic, both surfaces glabrous, sometimes pinnatilobed below middle or near base, attenuate toward base, base auriculate- or subauriculate-semiamplexicaul. Distal stem leaves gradually smaller, sometimes pinnatisect. Synflorescence a lax flat-topped cyme; capitula 1–5. Involucre coryliform, 1–2 cm in diam.; phyllaries in 3 or 4 rows, abaxially glabrous, scarious margin white or brown. Ray florets white; lamina 1–2.5 cm. Achenes 2–3 mm, 10-ribbed, ribs projected into an apical rim. Pappus absent. Fl. and fr. May–Oct. $2n = 18$, 36, 36+1B, 54, 72.

Widely cultivated as an ornamental, naturalized in grasslands. Fujian, Gansu, Hebei, Henan, Jiangsu, Jiangxi [native to Europe; introduced and naturalized elsewhere].