

10. Tribe GNAPHALIEAE

鼠麴草族 shu qu cao zu

Chen Yousheng (陈又生), Zhu Shixin (朱世新); Randall J. Bayer

Herbs, subshrubs, or shrubs. Stems generally with fibers in phloem, without resin canals. Leaves alternate, rarely opposite, usually entire and tomentose at least abaxially. Capitula heterogamous disciform or homogamous discoid, rarely heterogamous radiate, solitary or variously grouped. Phyllaries generally papery, generally brightly colored or hyaline and with a thickened, cartilaginous basal portion (stereome) composed of compact sclerenchyma. Receptacles generally epaleate or paleate. Female outer florets generally filiform or often absent. Central florets generally bisexual, sometimes functionally male. Anthers ecalcarate, with tails; endothelial tissue almost always polarized. Pollen with 2-layered ectexine comprising an outer columellate layer and an irregularly interlaced basal layer. Style branches with hairs apically, rarely dorsally; stigmatic rows generally separated. Achenes small, obovoid to obovoid, usually hairy; pericarp generally with 2, 3, or 5 vascular bundles. Pappus generally of plumose or barbellate to scabrid capillary bristles, occasionally of bristles and scales, only scales, or absent.

About 185 genera and 1,240 species: nearly worldwide, with centers of concentration in S Africa and Australia; 12 genera (one endemic, one introduced) and 121 species (63 endemic, four introduced) in China.

- 1a. Receptacle with paleae; outer florets invaginated by paleae 174. *Filago*
- 1b. Receptacle without paleae.
 - 2a. Pappus bristles connate into a ring.
 - 3a. Pappus monomorphic.
 - 4a. Leaf margins revolute 175. *Phagnalon*
 - 4b. Leaf margins flat 176. *Gamochaeta*
 - 3b. Pappus dimorphic.
 - 5a. Capitula subtended by bracteal leaves 177. *Leontopodium*
 - 5b. Capitula not subtended by bracteal leaves.
 - 6a. Plants pulvinate; stolons absent; leaves small, ericoid 178. *Sinoleontopodium*
 - 6b. Plants caespitose; stolons present; leaves larger, non-ericoid 179. *Antennaria*
 - 2b. Pappus bristles free or coherent by patent cilia.
 - 7a. Phyllaries brown or hyaline, inconspicuous.
 - 8a. Stereome divided 180. *Gnomophalium*
 - 8b. Stereome undivided 181. *Gnaphalium*
 - 7b. Phyllaries white, yellow, pink, or reddish, conspicuous.
 - 9a. Pappus dimorphic 182. *Anaphalis*
 - 9b. Pappus monomorphic.
 - 10a. Outer female florets greater in number than central disk florets 183. *Pseudognaphalium*
 - 10b. Outer female florets fewer in number than central disk florets.
 - 11a. Capitula 2–5 cm in diam., solitary; phyllaries broader, inner ones broadly lanceolate, acuminate at apex, nitid, yellow, white, red, or purple 184. *Xerochrysum*
 - 11b. Capitula 4–6 mm in diam., in corymbs or compound corymbs; phyllaries narrower, acute or rounded at apex, yellow or white 185. *Helichrysum*

174. **FILAGO** Linnaeus, Sp. Pl. 2: 927, 1199, [add. post indicem]. 1753, nom. cons.

絮菊属 xu ju shu

Chen Yousheng (陈又生); Randall J. Bayer

Herbs, annual. Stems with fibers in phloem, without resin canals, without pericyclic cambium. Leaves alternate, sessile, tomentose, eglandular. Capitula heterogamous, disciform, few together, surrounded by a ray of leaves. Phyllaries few seriate, cartilaginous or apically minutely papery, monomorphic, monochromous, brownish, transparent, not enclosing florets; stereome entire. Receptacles filiform, fragile; paleae subtending outer female florets, 3–5-seriate, imbricate, scarious. Female florets purple, filiform, outnumbering disk florets. Disk florets bisexual, or functionally male; corolla purple; corolla lobes 4, erect; veins ending below lobes. Anthers ecalcarate, with short tails; endothelial tissue polarized; apical appendage flat, as wide as thecae. Achenes brown, monomorphic, terete to compressed, cylindric to obovoid, with 2 vascular bundles, sparsely hairy with short, clavate, myxogenic twin hairs; epidermis smooth. Pappus monomorphic, of free scabrid capillary bristles in 1 row, basally with patent cilia; apical cells acute. $x = 9, 13, 14$.

About 46 species: N Africa, SW Asia, Atlantic islands, Europe; two species in China.

- 1a. Capitula 2–3 mm, few in dense corymbs; phyllaries 2- or 3-seriate; bracteal leaves slightly longer than synflorescence 1. *F. arvensis*
 1b. Capitula ca. 5 mm, numerous in globose corymbs; phyllaries 3–5-seriate; bracteal leaves shorter than synflorescence 2. *F. spathulata*

1. *Filago arvensis* Linnaeus, Sp. Pl. 2: 856, [1230]. 1753.

絮菊 xu ju

Gnaphalium arvense (Linnaeus) Willdenow; *Logfia arvensis* (Linnaeus) Holub.

Herbs, annual. Stems 5–35 cm tall, erect, paniculately branching, more rarely simple, sometimes forkedly branching in upper portion, with dense whitish or grayish lanate pubescence. Leaves lanceolate or linear-lanceolate, 5–15 × ca. 1.3 mm, with soft lanate pubescence, apex acute. Capitula 2–3 mm, ovate or pyramidal, gathered in 2s–10s into numerous corymbs, arranged at apices of stems and ramuscles and forming paniculate, racemose, more rarely spiciform synflorescences; floral leaves as long as or shorter than capitula. Involucre 2- or 3-seriate; phyllaries stellate-patent after ripening of achenes; outer phyllaries 5–10, closely surrounding female florets, green, in middle scarious, white transparent at margin, linear or lanceolate, cymbiform, 2–3 mm, ecarinate, abaxially with thick continuous gray lanate pubescence, glabrous at apex, slightly acuminate; inner phyllaries 5, becoming green in middle, broadly lanceolate, slightly concave, indistinctly pubescent or glabrous at margin abaxially, acuminate or obtuse. Achenes light brown, oblong-ovate, slightly flattened, 0.8–1 × ca. 0.3 mm, with sparse papillose hairs, larger than in other species of genus. Pappus of female and bisexual florets with 12–15 finely crenate bristles. $2n = 28$.

Dry slopes, dunes; ca. 1000 m. Xinjiang, Xizang [Kazakhstan, Mongolia, Russia; Europe].

2. *Filago spathulata* C. Presl, Delic. Prag. 99. 1822.

匙叶絮菊 shi ye xu ju

Herbs, annual. Stems 5–80 cm tall, generally branching from base, with erect or ascending branches, often slightly sinuate, forkedly branching at apex, gray appressed pubescent. Leaves thin, oblong-spatulate, 1.5–2 cm × 4–6 mm, pubescent with long appressed gray tomentum sparsely on both sides, narrowed to base, apex obtuse or shortly acuminate. Capitula ovate, ca. 5 mm, gathered in 10s–15s into dense ± globose corymbs, 6–12 mm in diam., arranged in bifurcations of stems and at apices of branches; floral leaves slightly exceeding capitula in length. Involucre 3–5-seriate; outer phyllaries lanceolate, cymbiform, 5–5.5 × ca. 1 mm, abaxially with distinct light gray long lanate pubescence, apex straight or slightly unbent, thin, with subulate acumen; inner phyllaries broadly lanceolate, flat, 4–4.5 mm, scarious, becoming green in middle, transparent white at margin, long acuminate at apex; innermost phyllaries lanceolate, shortly acuminate, or oblong-ovate, obtuse, flat, transparent white, glabrous. Bisexual florets 5–7. Achenes oblong-obovate, 0.5–0.8 × 0.2–0.4 mm, finely papillate, outer achenes epappose, inner ones bearing a few bristles. Pappus of bisexual florets with 12–14 bristles.

Dry slopes, dunes. Xinjiang, Xizang [Kazakhstan, Russia; SW Asia (Iran), Europe].

175. PHAGNALON Cassini, Bull. Sci. Soc. Philom. Paris 1819: 174. 1819.

绵毛菊属 mian mao ju shu

Chen Yousheng (陈又生); Randall J. Bayer

Herbs or sometimes subshrubs, perennial. Stem with fibers in phloem, without pericyclic cambium and resin canals. Leaves generally sessile, sparsely hairy, margin often dentate, revolute. Capitula solitary or few together, heterogamous, disciform. Phyllaries generally cartilaginous but often with a papery apical portion, in several rows, outnumbering disk florets. Disk florets bisexual; corolla yellow; corolla lobes erect; veins reaching apex of lobes. Anthers ecalcarate, without tails; endothelial tissue polarized; apical appendages flat, as wide as thecae. Style branches obtuse, dorsally with obtuse sweeping hairs not reaching furcation; stigmatic surface basally separated but apically confluent. Achenes with 2 or 3 vascular bundles, sparsely hairy with elongated, not myxogenic twin hairs; epidermis smooth. Pappus of basally connate, barbellate, capillary bristles in 1 row; apical cells acute.

About 43 species: N Africa, C and SW Asia, Europe, Macaronesia; one species in China.

1. *Phagnalon niveum* Edgeworth, Trans. Linn. Soc. London 20: 68. 1846.

绵毛菊 mian mao ju

Phagnalon denticulatum Decaisne ex C. B. Clarke.

Subshrubs, with erect or decumbent stem, (5–)10–30(–40) cm tall, few to profusely branched, branches and stem densely covered with snow-white cottony wool. Branches densely foliate. Leaves variable in shape and size, lanceolate, oblanceolate, linear-oblong, or spatulate, 8–35(–40) × (2–)4–8 mm, densely

white cottony abaxially, less so or ± glabrous adaxially, sometimes much narrowed into a sessile base, margin entire, undulate, dentate, or shallowly lobed, apex obtuse or subobtuse. Peduncles erect, 20–70(–80) mm, covered with white cottony wool, bearing a single capitulum. Capitula 8–12(–14) mm in diam., multiflorous. Phyllaries many seriate, densely floccose-lanate; outer phyllaries subulate to narrowly lanceolate, 2–2.5 × ca. 0.5 mm; middle phyllaries subulate to narrowly lanceolate, 3–3.5 × ca. 0.5 mm, gradually narrowed into an acicular point with entire margin, apex ± opaque; inner phyllaries subulate, 6–7 × ca. 0.5 mm, long acuminate. Bisexual florets tubular, 5–6

mm, tube ± glabrous, lobes small, ± rounded, ± hairy at tips. Anthers included to subexserted, not at all caudate at base. Style included to subincluded, bifid, stigmas rounded, papillose. Achenes compressed, ca. 1 mm, sparsely hairy. Pappus

setae 5, 4–5 mm, barbellate almost to base. Fl. May–Aug. $2n = 18$.

Valleys; 1800–2700 m. W Xizang [Afghanistan, India, Kashmir, Nepal, Pakistan].

176. GAMOCHAETA Weddell, Chlor. Andina. 1: 151. 1856.

合冠鼠麴草属 he guan shu qu cao shu

Chen Yousheng (陈又生); Randall J. Bayer

Herbs, annual or perennial. Leaves alternate, flat, tomentose on both surfaces, with entire margins. Capitula disciform, usually in glomerules borne in continuous or interrupted spiciform, sometimes paniculiform, arrays. Phyllaries brownish, papery; stereome undivided. Receptacle flat, epaleate. Outer florets purple, filiform. Central florets bisexual, purple. Anthers with flat appendages. Style branches truncate, with hairs apically. Achenes oblong, with globose twin hairs. Pappus bristles capillary, barbellate, connate into a ring.

About 53 species: Caribbean, Central, North, and South America, some species adventive and naturalized in Asia, Australia, Europe, and elsewhere; seven species (one endemic, three introduced) in China.

- 1a. Plants usually branched; basal leaves usually withered at anthesis; upper leaves similar to lower leaves.
 - 2a. Blade of basal and proximal cauline leaves 2–6 mm wide; bracts among capitula linear, oblanceolate, or oblong-oblanceolate, surpassing glomerules or not 1. *G. calviceps*
 - 2b. Blade of basal and proximal cauline leaves 4–18 mm wide; bracts among capitula spatulate to oblanceolate, at least proximal ones surpassing glomerules 2. *G. pensylvanica*
- 1b. Plants usually unbranched; basal leaves usually persistent; upper leaves gradually smaller than lower leaves.
 - 3a. Bracteal leaves short, spatulate to oblong; leaves spatulate-oblong, apex obtuse.
 - 4a. Leaves adaxially glabrous or glabrate; involucre 2.5–3 mm, base glabrous; outer phyllaries elliptic-obovate to broadly ovate-elliptic, apices rounded to obtuse; bisexual florets 2 or 3 3. *G. coarctata*
 - 4b. Leaves adaxially sparsely arachnoid (hairs persistent, evident); involucre 3–4.5(–5) mm, base (imbedded in tomentum) often sparsely arachnoid on proximal 1/5–1/2; outer phyllaries ovate, ovate-triangular, or ovate-lanceolate, apices acute to acuminate; bisexual florets 3 or 4 4. *G. purpurea*
 - 3b. Bracteal leaves distinct, linear; leaves linear, filiform, or linear-lanceolate, apex acute to acuminate.
 - 5a. Leaves usually 3-veined 5. *G. norvegica*
 - 5b. Leaves 1-veined.
 - 6a. Leaves linear or linear-lanceolate, 5–8 mm wide; spikes long and loose; involucre 3–5 mm in diam. 6. *G. sylvatica*
 - 6b. Leaves linear or filiform, 1–3 mm wide; spikes short and dense; involucre 2–3 mm in diam. 7. *G. nanchuanensis*

1. Gamochaeta calviceps (Fernald) Cabrera, Bol. Soc. Argent. Bot. 9: 368. 1961.

直茎合冠鼠麴草 zhi jing he guan shu qu cao

Gnaphalium calviceps Fernald, Rhodora 37: 449. 1935 ["*calvescens*"].

Herbs, annual, erect. Stems branched from base, 2–10(–40) cm tall, gray or dull gray-green villous. Basal leaves short lived, withering at anthesis; cauline leaves dull gray-green silky on both surfaces, linear to narrowly elliptic, 1.5–7 × 0.2–0.4 cm, margin entire or wavy, villous. Capitula initially in continuous or interrupted spiciform arrays 2–4 cm × 8–12 mm, later in loose paniculiform arrays 4–18 cm, lanate at base only; subtending leaves 1–3, 1–6 cm. Outer phyllaries ovate, 2–3 × ca. 1 mm, apex shortly acute to acuminate; inner ones brownish, sometimes tinged purplish, lanceolate, 3–3.2 × ca. 0.8 mm, scarious toward margin, apex obtuse to acute, mucronate. Outer florets many, filiform; corolla 2.1–2.3 mm. Central florets 2 or 3; corolla 1.6–1.7 mm. Achenes elliptic, ca. 0.5 mm. Pappus ca. 2.5 mm, connate at base into a ring. Fl. May–Jul.

Seasides, sandy beaches and waste fields. Introduced in Taiwan [native to South America].

2. Gamochaeta pensylvanica (Willdenow) Cabrera, Bol. Soc. Argent. Bot. 9: 375. 1961.

匙叶合冠鼠麴草 shi ye he guan shu qu cao

Gnaphalium pensylvanicum Willdenow, Enum. Pl. 2: 867. 1809, based on *G. spathulatum* Lamarck, Encycl. 2: 758. 1788, not N. L. Burman (1768); *G. chinense* Gandoger (1918), not *G. sinense* (Hemsley) Franchet (1892); *G. purpureum* Linnaeus subsp. *pensylvanicum* (Willdenow) O. Bolòs & Vigo; *G. purpureum* var. *spathulatum* Baker.

Herbs, annual. Stems erect, simple or more often branching from base, 10–50 cm tall, grayish tomentose. Basal leaves withering at anthesis; cauline leaves remote, scarcely diminishing in size upward, sessile, oblanceolate to spatulate, 2.5–8 × 0.4–1.8 cm, abaxially gray-green and lanate, adaxially greenish and loosely arachnoid, margin entire or slightly wavy, apex rounded to obtuse. Capitula numerous in axillary clusters, forming ± interrupted leafy (leaves 1.5–5.5 cm) spicate panicles, ca. 3 × 1–1.5 mm when dry, densely lanate to 2/3 from base; lower branches usually stalked. Outer phyllaries ovate-lanceolate or lanceolate, 2–2.5 mm, apex long acute; inner ones

linear-oblong, ca. 3 mm, apex rounded to shortly acute. Outer florets ca. 100; corolla ca. 2.25 mm. Central florets 2 or 3; corolla ca. 2.25 mm. Achenes brown, elliptic, ca. 0.5 mm, minutely glandular. Pappus white, ca. 2.3 mm, connate at base into a ring. Fl. Jan–May. $2n = 28$.

Waste fields, roadsides; below 1500 m. Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hunan, Jiangxi, Sichuan, Taiwan, Xizang, Yunnan, Zhejiang [Africa, Asia, Australia, Central and South America, Europe, North America (Mexico)].

3. *Gamochaeta coarctata* (Willdenow) Kerguelen, *Lejeunia* 120: 104. 1987.

里百合冠鼠麴草 li bai he guan shu qu cao

Gnaphalium coarctatum Willdenow, Sp. Pl. 3: 1886. 1803, based on *G. spicatum* Lamarck, Encycl. 2: 757. 1788, not Miller (1768); *Gamochaeta spicata* Cabrera; *Gnaphalium liui* S. S. Ying.

Herbs, winter annual or biennial, 15–35(–50) cm tall, fibrous rooted. Stems ascending, white pannose. Leaves basal and cauline, basal leaves in rosettes, present at anthesis, blades bicolored on both surfaces, spatulate to oblanceolate-obovate, (1.5–)3–8(–12) cm × 6–15(–22) mm, abaxially closely white pannose, adaxially glabrous or glabrate; leaves distally gradually smaller, slightly succulent, margin often crenulate on drying. Capitula initially usually in dense, continuous, pressed spiciform arrays 2–20 cm × 10–14 mm, later branched, interrupted. Involucre cylindric-campanulate, 2.5–3 mm, base glabrous; phyllaries 4- or 5-seriate; outer ones purplish or rosy, elliptic-obovate to broadly ovate-elliptic, 1/4–1/3 as long as inner ones, apices rounded to obtuse; inner ones oblong, laminae brown hyaline, apices rounded to obtuse or blunt, apiculate. Bisexual florets 2 or 3. Corollas of all florets usually purplish distally. Achenes oblong-elliptic, 0.5–0.6 mm. Pappus white, ca. 2.5 mm, connate at base into a ring, deciduous. Fl. Apr–Jun. $2n = 28$.

Waste fields, roadsides, ditches; 400–1400 m. Naturalized in Guizhou and Taiwan [native to South America; widely introduced in Asia, Caribbean, Europe, North America, Oceania, Pacific islands].

The present report of this species is its first record in mainland China.

4. *Gamochaeta purpurea* (Linnaeus) Cabrera, Bol. Soc. Argent. Bot. 9: 377. 1961.

合冠鼠麴草 he guan shu qu cao

Gnaphalium purpureum Linnaeus, Sp. Pl. 2: 854. 1753, nom. cons.; *Gamochaeta rosacea* (I. M. Johnston) Anderberg; *Gnaphalium rosaceum* I. M. Johnston.

Herbs, annual or biennial. Stems erect to decumbent-ascending, unbranched or 1 or 2 branched from base, 10–40 cm tall, densely but loosely pannose or pannose-tomentose. Leaves basal and cauline, basal and proximal cauline in rosettes, withered but persistent at anthesis; blades oblanceolate to spatulate, 1–6 cm × 5–14 mm, upper ones smaller, both surfaces usually bicolored, abaxially closely white pannose, adaxially usually sparsely arachnoid (basal cells of hairs persistent, expanded, glassy), sometimes glabrescent. Capitula initially in continuous

spiciform arrays 1–4(–5) cm × (5–)10–15 mm, later interrupted, glomerules widely separated, bracteate, proximal often on relatively long peduncles. Involucre turbinate-cylindric, 3–4.5 mm, base sparsely arachnoid; phyllaries 4- or 5-seriate, outer ovate-triangular, length 1/3–2/3 of inner, apices acute-acuminate; inner triangular-lanceolate (usually striate), laminae purplish (in bud) to whitish or silvery (in fruit), apices acute (not apiculate). Bisexual florets 3 or 4. Corollas of all florets usually purplish distally. Achenes oblong, 0.6–0.7 mm. Pappus connate into a ring, ca. 2.5 mm. Fl. Apr–May. $2n = 14, 28$.

Waste fields at low elevations. Introduced in Taiwan [native to North America; introduced in Asia, Europe, and South America].

5. *Gamochaeta norvegica* (Gunnerus) Y. S. Chen & R. J. Bayer, **comb. nov.**

挪威合冠鼠麴草 nuo wei he guan shu qu cao

Basionym: *Gnaphalium norvegicum* Gunnerus, Fl. Norveg. 2: 105. 1772; *Omalotheca norvegica* (Gunnerus) Schultz Bipontinus & F. W. Schultz; *Synchaeta norvegica* (Gunnerus) Kirpicznikov.

Herbs, perennial, 10–40 cm tall. Rhizome cylindric, thin, mainly 2–3 mm in diam. Stems solitary, very rarely 2 or several, erect, gray tomentose pubescent, relatively sparsely foliate. Leaves lanceolate, upper ones sessile or subsessile, middle ones with attenuate base, to a long petiole; blade greenish and not densely arachnoid tomentose adaxially, gray-green or more often gray and rather dense arachnoid tomentose or floccose-tomentose abaxially, at least in lower leaves, in which broadest part of lamina usually reaches 8–12 mm in width, 3 veins clearly distinct. Capitula narrowly campanulate, 5–8 × 4–7 mm, aggregated at stem apex to form a dense compact spiciform synflorescence, with apical leaves usually prominent. Phyllaries 20–25, mostly 3-seriate; outer ones ovate, shorter than inner ones; inner ones lanceolate or oblong, abaxially green below, in upper part and at margin brown or fuscous, membranous (scarious). Florets usually 35–45 per capitulum, of which bisexual ones are few (usually 4 or 5). Achenes brown, cylindric, ca. 1.5 mm, distinctly costate, with short white (transparent) hairs. Pappus very thin, basally united into a ring, silky white with slightly crenate hairs, approximately as long as corolla. Fl. Jul–Sep. $2n = 56$.

Alpine meadows. Xinjiang [Russia; Europe, North America].

6. *Gamochaeta sylvatica* (Linnaeus) Fourreau, Ann. Soc. Linn. Lyon, sér. 2, 17: 93. 1869.

林地合冠鼠麴草 lin di he guan shu qu cao

Gnaphalium sylvaticum Linnaeus, Sp. Pl. 2: 856. 1753; *Omalotheca sylvatica* (Linnaeus) Schultz Bipontinus & F. W. Schultz; *Synchaeta sylvatica* (Linnaeus) Kirpicznikov.

Herbs, perennial. Rhizome short. Stems 20–60 cm tall, mainly solitary or a few, whitish or gray tomentose or pubescent. Leaves green or rarely gray-green, linear or linear-lanceolate, 5–8 mm wide, subglabrous or ± appressed pilose adaxially, vein 1. Capitula cylindric or campanulate, 5–7 × 3–5 mm, arranged in axils of leaves and aggregated at apex in compound spiciform synflorescences; upper leaves usually inconspicuous

in uppermost of spiciform synflorescences. Phyllaries 20–25, fuscous or straw-colored, sometimes greenish, distinctly brown spotted on striate upper part; outer phyllaries oval, shorter than inner ones, pubescent. Achenes brownish, oblong-prismatic. Pappus of 25–35 thin, white, crenate hairs, as long as corolla and basally united into a ring. Fl. Jun–Sep. $2n = 56$.

Open woods, boggy woods, rocky slopes, clearings, fields, borders of woods, muddy banks, disturbed sites; below 2000 m. N Xinjiang [Kazakhstan, Mongolia, Russia (Siberia); SW Asia (Caucasus, Iran, Turkey), Europe].

7. *Gamochaeta nanchuanensis* (Y. Ling & Y. Q. Tseng) Y. S. Chen & R. J. Bayer, **comb. nov.**

南川合冠鼠麴草 *nan chuan he guan shu qu cao*

Basionym: *Gnaphalium nanchuanense* Y. Ling & Y. Q. Tseng, Acta Phytotax. Sin. 16(3): 85. 1978; *Omalotheca nanchuanensis* (Y. Ling & Y. Q. Tseng) Holub [“*nanchuensis*”].

Herbs, perennial, 30–40 cm tall. Stems solitary, gray tomentose pubescent, densely foliate. Basal leaves caespitose, withering before anthesis; cauline leaves linear, 4–6 cm × 2–3 mm, abaxially white lanate, adaxially green and sparsely pubescent, vein 1, base narrow, apex acute. Capitula 2–3 mm in diam., aggregated at apex to form a dense compact spiciform synflorescence 3–5(–8) cm; apical leaves prominent. Involucre ca. 5 × 2–3 mm; phyllaries 3- or 4-seriate, yellowish brown, herbaceous, apex toothed; outer ones ovate, ca. 2 mm, apex brown; inner ones oblong, 3–5 mm, apex brown striped, membranous. Florets usually ca. 65 per capitulum. Female florets ca. 60; corolla filiform, 3–4 mm, apex 2- or 3-toothed, glabrous. Bisexual florets ca. 5; corolla tubular, 3–4 mm, limbs 5-toothed. Achenes cylindric, ca. 1 mm, sparsely white pubescent. Pappus white, ca. 3 mm, basally united into a ring, silky white with slightly crenate hairs. Fl. Jul–Sep.

• Grassy slopes; 1800–2200 m. Chongqing, W Hubei.

177. *LEONTOPODIUM* R. Brown ex Cassini, Bull. Sci. Soc. Philom. Paris 1819: 144. 1819.

火绒草属 *huo rong cao shu*

Chen Yousheng (陈又生); Randall J. Bayer

Herbs, rarely subshrubs, perennial. Stem with fibers in phloem, without resin canals, without pericyclic cambium. Leaves alternate, sessile, tomentose to villous, eglandular, margin flat, entire. Capitula heterogamous, disciform, in flat-topped terminal corymbs, surrounded by a whorl of prominent, white lanate leaves. Receptacle flat, epaleate. Phyllaries papery, monomorphic, monochromous, brownish, transparent; stereome undivided. Female florets yellow, filiform, outnumbering disk florets. Disk florets functionally male; corolla yellow; corolla lobes erect, veins reaching apex of lobes. Anthers ecalcarate, with short tails; endothelial tissue polarized; apical appendage flat, as wide as thecae. Pollen gnaphalioid. Style bifid; style branches truncate with obtuse sweeping hairs dorsally, not reaching furcation; stigmatic surface separated. Achene in disk and female florets small, oblong, with 5 vascular bundles, sparsely hairy with short, clavate, not myxogenic, twin hairs; epidermis smooth. Pappus dimorphic, of basally connate, barbellate, capillary bristles in 1 row; apical cells clavate in disk florets, acute in female. $x = 7$.

About 58 species: Asia, Europe; 37 species (17 endemic) in China.

Handel-Mazzetti recorded several putative natural hybrids in *Leontopodium* from China, including *L. ×albo-griseum* Handel-Mazzetti (Verh. Zool.-Bot. Ges. Wien 74–75: 28. 1926), described from Yunnan, *L. ×gracile* (Acta Horti Gothob. 1: 121. 1924), described from W Sichuan, and several others indicated by hybrid formulae (Acta Horti Gothob. 12: 231–237. 1938). It is somewhat difficult to distinguish them according to our present knowledge.

1a. Pappus not white.

2a. Pappus purplish brown; corolla purplish brown at least in upper part; bracteal leaves linear-lanceolate or linear.

3a. Leaves linear-lanceolate or linear-oblong-lanceolate, 3–10 mm wide; pappus purplish brown, but yellow in lower part; corolla purplish brown at upper part; achenes ca. 1.8 mm 1. *L. giraldii*

3b. Leaves linear or linear-lanceolate, 2–4 mm wide; pappus deep purplish brown throughout; corolla purplish brown above; achenes less than 1 mm 2. *L. villosum*

2b. Pappus yellowish brown; corolla yellow or purplish red; bracteal leaves oblong-lanceolate or absent.

4a. Sparse erect herbs; bracteal leaves oblong-lanceolate 3. *L. forrestianum*

4b. Compact pulvinate herbs; bracteal leaves absent 4. *L. aurantiacum*

1b. Pappus white or rarely red.

5a. Compact pulvinate herbs; bracteal leaves absent 5. *L. haastoides*

5b. Erect herbs or subpulvinate herbs; bracteal leaves present.

6a. Pappus and corolla red above 6. *L. roseum*

6b. Pappus white; corolla yellow or white.

7a. Stems and leaves adaxially densely yellow or brown glandular hairy, or leaves with arachnoid pubescence.

8a. Leaf blade linear-lanceolate, basally gradually narrowed, both surfaces with grayish or greenish arachnoid pubescence 7. *L. haplophylloides*

8b. Leaf blade base cordate, auriculate, or narrower, abaxially densely white arachnoid tomentose.

9a. Leaf blade linear or spatulate-lanceolate, veinlets indistinct.

- 10a. Perennial herbs; stems not branched; leaves $10-35 \times 1-3$ mm 8. *L. franchetii*
 10b. Subshrubs; stems many branched; leaves $3-10 \times 0.5-1.5$ mm 9. *L. suffruticosum*
 9b. Leaf blade ovate-lanceolate or lanceolate, margin even or undulate, veinlets distinct.
 11a. Stems herbaceous or subwoody at base; leaf blade base cordate; bracteal leaves ovate-lanceolate ... 10. *L. stracheyi*
 11b. Stems woody; leaf blade base narrowed or slightly auriculate; bracteal leaves lanceolate or long lanceolate 11. *L. artemisiifolium*
 7b. Stems and leaves white, gray, or yellowish arachnoid pubescent, without glandular hairs.
 12a. Leaf base ampliate and cordate, sagittate, or truncate 12. *L. dedekensii*
 12b. Leaf base narrowed or not, or rarely auriculate.
 13a. Subshrubs; stems woody, usually branched 13. *L. sinense*
 13b. Perennial herbs; stems herbaceous or woody at lower part, usually not branched.
 14a. Cauline leaves not sheathing at base.
 15a. Rhizome shortly branched, usually without relicts of old leaves; stems branched or not branched; synflorescence usually in compound corymbs 14. *L. japonicum*
 15b. Rhizome long branched, densely covered with relicts of old leaves above; stems not branched; synflorescence usually solitary.
 16a. Rhizome and suckers sparsely arranged; bracteal leaves subequal but usually broader than cauline leaves.
 17a. Flowering stems 12–42 cm tall; achenes glabrous 15. *L. wilsonii*
 17b. Flowering stems 5–10(–18) cm tall; achenes papillose 16. *L. omeiense*
 16b. Rhizome and suckers densely arranged and tufted; bracteal leaves distinctly broader than cauline leaves.
 18a. Leaves linear or subulate, $8-30 \times 0.8-1.4$ mm, margin reflexed, adaxially usually green and glabrescent 17. *L. andersonii*
 18b. Leaves oblanceolate, $7-12 \times 1.5-2$ mm, margin not reflexed, densely whitish lanate on both surfaces 18. *L. microphyllum*
 14b. Cauline leaves or some of them sheathing at base.
 19a. Bracteal leaves larger than cauline leaves; capitula solitary 19. *L. monocephalum*
 19b. Bracteal leaves subequal to cauline leaves, or slightly wider; capitula usually numerous, very rarely solitary.
 20a. Plants pulvinate; leaves linear-lanceolate, $6-10 \times 0.5-1$ mm 20. *L. muscoides*
 20b. Plants caespitose with long stems, or pulvinate, or stem solitary; leaves linear-lanceolate, linear-spatulate, or spatulate, usually longer and wider.
 21a. Plants caespitose or pulvinate; rhizome stout, with numerous suckers, without sterile rosette stems, or if sterile rosette stems present then leaves spatulate.
 22a. Leaves lanceolate or linear-lanceolate, rarely elliptic; capitula 4–5 mm in diam.; bracteal leaves distinct and forming a star.
 23a. Sheaths as wide as leaf 21. *L. delavayanum*
 23b. Sheath narrower than leaf.
 24a. Leaves oblanceolate-oblong or oblanceolate, $7-15 \times 2-6$ mm; flowering stems 1–7 cm tall 22. *L. fanginense*
 24b. Leaves linear-lanceolate or lanceolate, $6-25 \times 1-3$ mm; flowering stems 6–28 cm tall.
 25a. Plants stoloniferous, stolons slender, elongate, usually branched, terminated by a loose rosette of leaves; achenes pubescent 23. *L. jacotianum*
 25b. Plants not stoloniferous; stems erect, caespitose, usually not branched; achenes glabrous 24. *L. caespitosum*
 22b. Leaves spatulate; capitula 4–13 mm in diam.; bracteal leaves indistinct.
 26a. Bracteal leaves numerous, large, forming an irregular star.
 27a. Stem 1–5 cm; capitula (1–)3–7 25. *L. pusillum*
 27b. Stem 6–10 cm; capitula 3–5 26. *L. brachyactis*
 26b. Bracteal leaves few, smaller, not forming a star.
 28a. Plants pulvinate; capitula 6–15 mm in diam. 27. *L. nanum*
 28b. Plants caespitose; capitula ca. 4 mm in diam. 28. *L. stoloniferum*
 21b. Plants caespitose or stem solitary; rhizome slender, usually with sterile rosette stems.
 29a. Upper cauline leaves base broadened, usually surrounding stem.
 30a. Cauline leaves linear or linguulate-linear, 1–4 cm; bracteal leaves 9–14, $10-20 \times 1.5-3$ mm, forming a star of 2–3 cm in diam. 29. *L. souliei*

- 30b. Cauline leaves lanceolate or linear-lanceolate, 5–15 cm; bracteal leaves 10–18, 20–45 × 3–6 mm, forming a multiradiate star of 5–8 cm in diam. 30. *L. calocephalum*
- 29b. Upper cauline leaves base narrowed or not, not surrounding stem.
- 31a. Bracteal leaves lingulate, usually broader at base, apex acute to acuminate 31. *L. himalayatum*
- 31b. Bracteal leaves lanceolate or ovate, rarely linear, apex acute or obtuse.
- 32a. Leaves adaxially usually green and glabrescent 32. *L. junpeianum*
- 32b. Leaves grayish arachnoid tomentose on both surfaces.
- 33a. Plants usually 5–10 cm tall, usually with dense sterile rosettes; leaves oblong, lingulate, lanceolate, or linear-lanceolate 33. *L. ochroleucum*
- 33b. Plants usually 15–35 cm tall, not forming dense clusters; leaves lanceolate, linear-lanceolate, or oblanceolate.
- 34a. Bracteal leaves ovate-lanceolate, broadened at base, abaxially light green 34. *L. conglobatum*
- 34b. Bracteal leaves oblong or linear, base not broadened, abaxially gray or whitish.
- 35a. Bracteal leaves linear with acuminate apex, forming a distinct star; phyllaries ca. 4 mm 35. *L. campestre*
- 35b. Bracteal leaves oblong, linear-lanceolate, or rarely linear, not forming a regular star; phyllaries 4.5–6 mm.
- 36a. Bracteal leaves few, not forming a star 36. *L. leontopodioides*
- 36b. Bracteal leaves forming an irregular star 37. *L. smithianum*

1. *Leontopodium giraldii* Diels, Bot. Jahrb. Syst. 36(Beibl. 82): 103. 1905.

秦岭火绒草 qin ling huo rong cao

Herbs, perennial. Rhizome stout and branched, densely covered with black-brown rellicts of leaves, forms rather caespitose of several stems and sterile leaf rosettes. Stems erect and firm, 10–28 cm tall, ash-colored arachnoid lanate. Leaves discolored on both sides, abaxially densely white arachnoid lanate, adaxially greenish glabrate; cauline leaves linear-lanceolate or oblong-lanceolate, 30–90 × 3–10 mm, base narrowed, apex obtuse or acute, basal ones usually larger than upper ones; radical rosette leaves oblong-spatulate or narrowly oblong, 20–50 × 5–8 mm, narrowed in sheath. Capitula 5–9, heterogamous, in sparse corymbs, 6–8 mm in diam.; peduncles ca. 1 cm, connate with base of bracteal leaves; bracteal leaves similar to upper cauline leaves in shape, size, and indumentum, but slightly narrower, forming an irregular star of 6–8 cm in diam. Phyllaries 3- or 4-seriate, oblong, ca. 4 mm, abaxially densely white tomentose, apex purplish brown, obtuse or lacerate, glabrous. Corolla ca. 3 mm, purplish brown above. Achenes ca. 1.8 mm, glabrous. Pappus purplish brown, 2–3 mm, serrulate. Fl. May–Aug, fr. Jul–Sep.

• Subalpine stony scree slopes, grasslands; 2000–3200 m. Shaanxi (Taibai Shan).

This is a distinct and very rare species endemic to China.

2. *Leontopodium villosum* Handel-Mazzetti, Oesterr. Bot. Z. 89: 58. 1940.

柔毛火绒草 rou mao huo rong cao

Herbs, perennial. Rhizome short, with dense rosette leaves in upper part and a flowering stem. Stems erect, 20–32 cm tall, grayish arachnoid pubescent. Basal leaves oblong-lanceolate to linear-lanceolate, 1.7–4 × 3–4 mm, abaxially densely grayish arachnoid tomentose, adaxially sparsely grayish arachnoid pubescent; upper leaves longer, linear, 3–4.5 × 2–4 mm, abaxially densely grayish arachnoid tomentose, adaxially green and

sparsely grayish arachnoid pubescent or glabrescent, margin reflexed. Capitula 5–10, densely congested, 4–5 mm in diam.; bracteal leaves 12–15, similar to upper leaves in shape, size, and indumentum. Involucre 4–5 mm, outer side densely grayish arachnoid pubescent; phyllaries 3-seriate, apex red-brown, obtuse and lacerate, glabrous. Corolla ca. 3 mm, upper part purplish brown. Achenes less than 1 mm, glabrous. Pappus purplish brown, ca. 4 mm, serrulate. Fl. Aug.

• Alpine meadows; ca. 4000 m. Sichuan (Baoping).

This is a very rare and distinct species. It is similar to *Leontopodium giraldii* in its purplish brown florets and pappus but differs in its leaves narrower and longer, pappus purplish brown in all parts, and achenes smaller.

3. *Leontopodium forrestianum* Handel-Mazzetti, Anz. Akad. Wiss. Wien, Math.-Naturwiss. Kl. 61: 112. 1924.

鼠麴火绒草 shu qu huo rong cao

Herbs, perennial. Rhizome slender, with numerous flowering and sterile stems. Stems slender, erect, 2–10 cm tall, simple or branching at base, entire plant gray silky or ash-colored lanate and equally leafy. Leaves linear or oblong to oblanceolate, 8–11 × 1.5–2.5 mm, abaxially white or ash-colored lanuginous, adaxially yellowish green and arachnoid, base narrowed, apex obtuse or acute. Capitula 2 or 3(–7), 5–7 mm in diam., in dense corymbs, or solitary; bracteal leaves numerous, as large as upper leaves or broader, abaxially densely white tomentose, adaxially sordid yellow tomentose. Involucre 3-seriate, abaxially yellowish pilose; phyllaries lanceolate, ca. 4 mm, apex brown and acute. Marginal florets female; corolla capillary. Disk florets male; corolla subtubular, ca. 3.5 mm. Achenes papillose. Pappus of capillary bristles, yellowish. Fl. Jul–Sep, fr. Sep–Oct.

Alpine grasslands, gravelly slopes, thickets; 3500–3800 m. NW Yunnan [Myanmar].

This is a very rare and distinct species related to the genus *Gnaphalium*.

4. *Leontopodium aurantiacum* Handel-Mazzetti, Beih. Bot. Centralbl., Abt. 2, 44: 83. 1927.

黄毛火绒草 huang mao huo rong cao

Herbs, perennial, pulvinate, ca. 2 cm tall. Rhizome slender, short and many branched. Stems numerous, usually shortly branched, with several leaves in middle and rosette leaves at apex, forming a mat of 12–60 cm in diam., entire plant densely brownish yellow tomentose. Leaves obovate or spatulate-ovate, 4–5 × 2–2.5 mm, both surfaces densely brownish yellow tomentose, base narrowed, apex acute. Capitula solitary, heterogamous or dioecious, ca. 5 mm in diam.; bracteal leaves 8–12, obovate, similar to cauline leaves in shape and size but densely covered with distinct brownish yellow tomentum, surrounded by rosette of several cauline leaves, apex acute. Phyllaries lanceolate, 4–4.5 × ca. 1.5 mm, abaxially brownish tomentose, with acute, often lacerate apex of dark brown color. Corolla orange-yellow, ca. 3 mm. Achenes ca. 0.5 mm, shortly pilose. Pappus yellow to brownish yellow, 3–4 mm. Fl. Jun–Jul.

Alpine stony meadows, gravelly slopes, cliffs; 3600–4000 m. NW Yunnan [N Myanmar].

This is a very rare and distinct species.

5. *Leontopodium haastioides* Handel-Mazzetti, Beih. Bot. Centralbl., Abt. 2, 44: 84. 1927.

密垫火绒草 mi dian huo rong cao

Leontopodium jacotianum Beauverd var. *haastioides* (Handel-Mazzetti) R. C. Srivastava.

Herbs, perennial, forming dense cushions up to 10 cm in diam. Rhizome slender and many branched. Shoots numerous, 1.5–3 cm tall, shortly columnar, with closely imbricate leaves. Leaves spatulate or oblong, 2–6 × 1–2 mm, basal part appressed, thin, scarios, abaxially sparsely arachnoid, distal part spreading, thickened, herbaceous, thickly grayish tomentose, apex rounded. Capitula solitary, dioecious or predominantly female, 3–4 mm in diam., ebracteate, immersed among leaves. Phyllaries lanceolate to oblanceolate, 4–6 × 0.6–2 mm, apex acute or obtuse, tips scarios, brownish. Corolla 3–4 mm. Achenes ca. 1.2 mm, papillose or glabrous; male ovary glabrous or sparsely pubescent. Pappus white, ca. 4 mm. Fl. Jul–Aug.

Alpine meadows, stony slopes, snow lines; 4300–5300 m. Sichuan (Muli), Xizang [Bhutan, India (Sikkim), Nepal].

6. *Leontopodium roseum* Handel-Mazzetti, Acta Horti Gothob. 1: 112. 1924.

红花火绒草 hong hua huo rong cao

Herbs, perennial, similar to *Antennaria* in habit. Rhizome stout, densely covered with brown decayed leaves with dense radical rosettes of sterile leaves and flowering stems. Stems usually single, erect, 8–35 cm tall, densely white lanuginous. Leaves spatulate to spatulate-lanceolate, 20–50 × 3–12 mm, both surfaces densely white tomentose, apex rounded. Capitula 3–10, heterogamous, in 1 or rarely 2–5 dense corymbs, 5–6 mm in diam.; bracteal leaves 5–8, linear-spatulate, similar to upper cauline leaves, forming a star of 2–5 cm in diam. or rarely com-

pound stars. Involucre ca. 4 mm, white lanate; phyllaries 2- or 3-seriate, inner ones lanceolate, apex light brown or red, acute or obtuse, glabrous. Corolla 3–3.5 mm, upper part usually light red, scurfy pilosulose; corolla of male florets narrowly funnel-shaped in upper part, with narrowly triangular lobes; corolla of female florets filiform. Achenes ca. 1 mm, hairy. Pappus light red or red, longer than corolla, serrulate. Fl. Jun–Aug, fr. Aug–Sep.

• Grassy slopes, thickets, dry riverbeds; 1200–3700 m. W Sichuan.

7. *Leontopodium haplophyloides* Handel-Mazzetti, Acta Horti Gothob. 1: 120. 1924.

香芸火绒草 xiang yun huo rong cao

Herbs, perennial. Rhizome short and densely branched, with numerous flowering stems and sterile stems. Stems erect, not branched, 15–30 cm tall, woody in lower part, ash-colored arachnoid pubescent, equally densely leafy, lower leaves usually withering during anthesis; internodes 5–8 mm. Leaves lanceolate to linear-lanceolate, 10–40 × 1–3.5 mm, both surfaces grayish arachnoid pubescent, basally narrowed, apex acuminate or acute. Capitula 5–7, in dense corymbs, ca. 5 mm in diam.; bracteal leaves numerous, lanceolate, forming a star of 2–5 cm in diam., abaxially concolorous with cauline leaves, adaxially densely white tomentose. Involucre ca. 5 mm, densely grayish arachnoid tomentose; phyllaries 3- or 4-seriate, apex dark brown, acute, glabrous. Corolla ca. 3.5 mm. Achenes papillose. Pappus white, 3–4 mm, serrulate. Fl. Aug–Sep, fr. Sep–Oct.

• Alpine meadows, gravelly slopes, thickets, conifer forest margins; 2400–4000 m. Gansu, Qinghai, W Sichuan.

8. *Leontopodium franchetii* Beauverd, Bull. Soc. Bot. Genève 3: 258. 1911.

竖杆火绒草 jian gan huo rong cao

Herbs, perennial. Rhizome slender, densely with numerous flowering and sterile stems. Stems woody in lower part, yellow glandular hairy and upper part with arachnoid pubescence; internodes 3–5 mm. Leaves densely arranged, linear, 10–35 × 1–3 mm, abaxially with sparse glandular hairs and densely lanate, adaxially densely covered with glandular hairs. Capitula 10–30, 3–5 mm in diam., in dense corymbs; bracteal leaves numerous, linear, 5–10 × 1–2 mm, both surfaces densely lanate. Involucre 2- or 3-seriate, abaxially brown; phyllaries lanceolate, ca. 3 mm, apex brown and acute. Marginal florets female; corolla capillary, 2–3 mm. Disk florets male; corolla light yellow, subtubular, ca. 3.5 mm. Achenes papillose. Pappus of capillary bristles, white. Fl. Jul–Sep, fr. Sep–Oct.

• Dry grasslands, scree slopes, sandy riverbanks; 3000–4000 m. W Sichuan, NW Yunnan.

9. *Leontopodium suffruticosum* Y. L. Chen, Acta Phytotax. Sin. 19: 90. 1981.

亚灌木火绒草 ya guan mu huo rong cao

Subshrubs. Bark yellowish brown, scaly. Stems light brown, woody, erect, 20–30 cm tall, several branched from base and middle, white arachnoid pubescent or sometimes glabres-

cent. Leaves linear-spatulate or linear, 3–10 × 0.5–1.5 mm, both surfaces white arachnoid tomentose and glandular, apex obtuse or acute. Capitula 3–5(–7), heterogamous or dioecious, densely congested; bracteal leaves few, linear, 5–8 mm, forming a star of ca. 1.5 cm in diam. Involucre hemispheric, ca. 3 mm, glandular or sparsely arachnoid tomentose; phyllaries 2- or 3-seriate, apex light brown or dark brown, acute or obtuse, glabrous. Corolla yellow, 2–3 mm. Achenes sparsely pubescent. Pappus white, slightly longer than corollas. Fl. Jun, fr. Aug.

- Dry riverbeds; ca. 3200 m. E Xizang.

This species is similar to *Leontopodium franchetii* but differs by its subshrubby habit; branchlets numerous, old branches woody, covered with white to grayish white tomentose pubescence and remains of withered leaves; leaves and bracteal leaves much shorter, 5–7 mm; and bracteal leaves and capitula fewer.

10. *Leontopodium stracheyi* (J. D. Hooker) C. B. Clarke ex Hemsley, J. Linn. Soc., Bot. 30: 136. 1894.

毛香火绒草 mao xiang huo rong cao

Leontopodium alpinum Cassini var. *stracheyi* J. D. Hooker, Fl. Brit. India 3: 279. 1881; *L. stracheyi* var. *tenuicaule* Beauverd.

Herbs, perennial. Rhizome stout, branched, with numerous flowering and sterile stems. Stems subwoody, erect, usually not branched, (5–)12–60 cm tall, glandular and sometimes arachnoid pubescent; internodes (3–)5–10 mm. Leaves narrowly oblong to oblong-lanceolate, 20–50 × 3–12 mm, abaxially densely white tomentose, adaxially green, glandular and sometimes arachnoid pubescent, base almost auriculate, apex acute or acuminate. Capitula 3–11, usually dioecious, crowded; bracteal leaves 7–12, similar to upper leaves in shape and size, forming a star of 2–6 cm in diam. or compound stars, both surfaces white arachnoid tomentose, more densely so above. Involucre 4–5 mm, pilose; phyllaries 2- or 3-seriate, ovate to oblanceolate, 4–4.5 × 1–2 mm, with dark brown scarious margin. Corollas 3.5–4 mm. Achenes 0.75–1 mm, pubescent; male ovary pubescent. Pappus white. Fl. Jul–Sep, fr. Sep–Oct.

Grasslands, thickets, sparse forests, gravelly slopes; 2000–4700 m. Qinghai, Sichuan, Xizang, NW Yunnan [Bhutan, N India, Nepal].

11. *Leontopodium artemisiifolium* (H. Léveillé) Beauverd, Bull. Soc. Bot. Genève 5: 142. Apr 1913.

艾叶火绒草 ai ye huo rong cao

Gnaphalium artemisiifolium H. Léveillé, Repert. Spec. Nov. Regni Veg. 11: 492. Jan 1913.

Herbs, perennial. Stems several, woody, erect, not branched, 25–60(–100) cm tall, sparsely covered with brown decayed leaves in lower part, entire stem glandular pilose, upper part usually covered with arachnoid hairs. Cauline leaves 19–35, oblong-lanceolate, 20–50 × 5–8 mm, abaxially pale white and densely tomentose, adaxially green and covered with sparse short glandular hairs, base narrowed, apex acute with a short mucro. Capitula usually 6–12 mm in diam., in dense corymbs at ends of stems or in sparsely compound corymbs; bracteal leaves 11–13, lanceolate, 10–30 × 2.5–6 mm, densely white

tomentose. Involucre subglobose, 4–6 mm wide; phyllaries 3-seriate, abaxially densely tomentose, apex acute, glabrous and naked. Marginal florets female; corolla capillary, 3–4 mm; achenes ca. 1 mm, ± papillose. Disk florets bisexual; corolla subtubular, 3–4 mm, sterile. Pappus white, ca. 3 mm, serrulate. Fl. Aug–Sep, fr. Sep–Oct.

- Grasslands, forest margins, riverbanks; 2100–3200 m. Sichuan, N Yunnan.

12. *Leontopodium dedekensii* (Bureau & Franchet) Beauverd, Bull. Soc. Bot. Genève 1: 193. 1909.

戟叶火绒草 ji ye huo rong cao

Gnaphalium dedekensii Bureau & Franchet, J. Bot. (Morot) 5: 70. 1891; *G. leontopodium* Linnaeus var. *foliosa* Franchet; *Leontopodium dedekensii* var. *microcalathinum* Y. Ling; *L. foliosum* Beauverd; *L. futtereri* Diels; *L. hastatum* Beauverd; *L. micranthum* Y. Ling.

Herbs, perennial. Rhizome short and stout, with several to numerous stems. Stems 10–45 cm tall, not branched or rarely slightly branched, entire plant densely grayish arachnoid pubescent, equally and densely leafy. Leaves: lower ones usually larger than upper ones; blade linear-lanceolate, 10–40 × 1.3–6.5 mm, both surfaces densely grayish arachnoid pubescent, base cordate, sagittate, or truncate, apex obtuse. Capitula 5–30, heterogamous or dioecious, closely aggregated, 4–5 mm in diam.; bracteal leaves 14–20, 5–30 × 2–4 mm, forming a star of 2–5 cm in diam., densely whitish to yellowish arachnoid pubescent. Involucre 3–4 mm; phyllaries 3-seriate, spatulate-oblong, 3–4 mm, apex acute or rounded, glabrous, dry membranous. Corolla ca. 3 mm. Achenes papillose. Pappus white, 3–4 mm, serrulate. Fl. Jun–Jul, fr. Jul–Sep.

Grasslands, thickets, conifer forests; 1400–4100 m. Gansu, Qinghai, Sichuan, Xizang, Yunnan [Myanmar].

13. *Leontopodium sinense* Hemsley, J. Linn. Soc., Bot. 23: 424. 1888.

华火绒草 hua huo rong cao

Gnaphalium nobile Bureau & Franchet; *G. sinense* (Hemsley) Franchet (1892), not *G. chinense* Gandoger (1918); *Leontopodium arbusculum* Beauverd; *L. niveum* Handel-Mazzetti; *L. nobile* (Bureau & Franchet) Beauverd; *L. rosmarinoides* Handel-Mazzetti; *L. stoechas* Handel-Mazzetti; *L. stoechas* var. *minus* Y. Ling.

Subshrubs. Rhizome stout, woody. Stems woody, numerous, 30–70 cm tall, usually branched, densely white tomentose. Leaves oblong, (7–)15–65 × 2–7 mm, both surfaces densely yellowish tomentose, base sheathed, apex acute. Capitula 7–20, heterogamous, in 1 or usually 2–5 corymbs, 3–8 mm in diam.; bracteal leaves 5–9, similar to cauline leaves but usually much larger, sparsely arranged, forming an irregular star of 2.5–7.5 cm in diam. or usually in compound stars. Involucre 3–4 mm, white lanate; phyllaries 3-seriate, inner ones oblong, apex light brown, obtuse, glabrous. Corolla 2.5–3 mm. Achenes ca. 1 mm, papillose. Pappus white, longer than corolla, serrulate. Fl. Jul–Sep, fr. Sep–Nov.

• Grassy slopes, thickets, riverbeds, dry mountain slopes; (700–)1300–3600 m. Guizhou, W Hubei, Sichuan, SE Xizang, Yunnan.

14. *Leontopodium japonicum* Miquel, Ann. Mus. Bot. Lugduno-Batavi 2: 178. 1866 [“*iaponicum*”].

薄雪火绒草 *bao xue huo rong cao*

Herbs, perennial, from tufted rhizomes. Stems slender to rather stout, leafy throughout or only at apex, erect, 10–55 cm tall, 1–3 mm in diam.; internodes 4–20(–40) mm. Leaves (10–)20–30, mainly cauline; middle leaves ovate to linear, 15–80 × 3–15 mm, abaxially whitish lanate, adaxially green and glabrous or thinly lanate, base abruptly narrowed, apex acute to acuminate. Capitula several, arranged in dense or sparse terminal corymbs, 3–4.5 mm in diam.; bracteal leaves 5–8, loosely arranged, ovate to oblong-lanceolate, 10–30 × 3–8 mm, smaller than upper leaves, adaxially sordid yellow tomentose. Involucre subglobose, 4–5 × 3.5–4.5 mm; phyllaries 3-seriate, densely hairy abaxially, apex acute or acuminate. Marginal florets female; corolla capillary, ca. 2 mm; achenes ca. 1 mm, ± papillose. Disk florets bisexual; corolla subtubular, ca. 3 mm, sterile. Pappus white, ca. 3.5 mm. Fl. Jun–Sep, fr. Sep–Oct.

Forests, thickets, grassy, pebbly, or dry slopes, gravelly areas, open rocks; 700–2300 m. Anhui, Gansu, Henan, Hubei, Jiangsu, Shaanxi, Shanxi, Sichuan, Zhejiang [Japan].

- 1a. Leaves ovate to oblong-ovate; bracteal leaves ovate; internodes 4–8 mm 14c. var. *saxatile*
 1b. Leaves obovate-lanceolate to lanceolate to linear; bracteal leaves oblong-lanceolate; internodes 5–20(–40) mm.
 2a. Stems stout, 2–3 mm in diam., usually densely leafy only at apex; leaves obovate-lanceolate to lanceolate, 4–15 mm wide, apex acute; capitula arranged in sparse corymbs, 3.5–4.5 mm in diam. 14a. var. *japonicum*
 2b. Stems slender, ca. 1 mm in diam., densely leafy throughout; leaves linear-lanceolate to linear, 3–4 mm wide, apex acuminate; capitula arranged in dense corymbs, ca. 3 mm in diam. 14b. var. *microcephalum*

14a. *Leontopodium japonicum* var. *japonicum*

薄雪火绒草(原变种) *bao xue huo rong cao* (yuan bian zhong)

Leontopodium japonicum var. *xerogenes* Handel-Mazzetti.

Stems rather stout, 2–3 mm in diam., usually densely leafy only at apex; internodes 10–20(–40) mm. Leaves obovate-lanceolate to lanceolate, 25–80 × 4–15 mm, apex acute. Capitula arranged in sparse corymbs, 3.5–4.5 mm in diam.; bracteal leaves oblong-lanceolate, 10–30 × 3–8 mm. Fl. Jun–Sep, fr. Sep–Oct.

Forests, thickets, grassy or pebbly slopes; 700–2300 m. Anhui, Gansu, Henan, Hubei, Jiangsu, Shaanxi, Shanxi, Sichuan, Zhejiang [Japan].

14b. *Leontopodium japonicum* var. *microcephalum* Handel-Mazzetti, Beih. Bot. Centralbl., Abt. 2, 44: 67. 1927.

小头薄雪火绒草 *xiao tou bao xue huo rong cao*

Leontopodium microcephalum (Handel-Mazzetti) Y. Ling.

Stems slender, ca. 1 mm in diam., densely leafy throughout; internodes 5–15 mm. Leaves linear-lanceolate to linear, 15–45 × 3–4 mm, apex acuminate. Capitula arranged in dense corymbs, ca. 3 mm in diam.; bracteal leaves oblong-lanceolate, 13–25 × 3–6 mm. Fl. Jun–Aug, fr. Sep–Oct.

• Dry slopes, gravelly areas; 800–1700 m. Henan, Shaanxi, Shanxi.

14c. *Leontopodium japonicum* var. *saxatile* Y. S. Chen, var. nov.

岩生薄雪火绒草 *yan sheng bao xue huo rong cao*

Haec varietas a Leontopodio japonico var. japonico caulibus subgracilibus 1–2 mm in diametro omnino dense foliatis, internodiis 4–8 mm longis, foliis ovatis usque oblongo-ovatis 20–30 mm longis 6–11 mm latis, capitulis in corymbos densos dispositis atque foliis bractealibus ovatis 10–12 mm longis 5–7 mm latis differt.

Type: China. Zhejiang: Lin'an Xian, Changhua, Longtang Shan, Qingliang Feng, on rocks, alt. 1750 m, 8 Sep 1959, *Zhejiang Plant Resources Expedition 29803* (holotype, PE).

Paratypes: Anhui: Huang Shan, on rocks, *Anonymous s.n.* (PE-00503277). Zhejiang: Lin'an Xian, Changhua, Longtang Shan, *Zhejiang Plant Resources Expedition 29703* (PE); Tiantai Xian, Tiantai Shan, 5 Oct 1921, *K. K. Tsoong 3940* (PE).

Stems somewhat slender, 1–2 mm in diam., densely leafy throughout; internodes 4–8 mm. Leaves ovate to oblong-ovate, 20–30 × 6–11 mm, apex acute. Capitula arranged in dense corymbs, 3.5–4.5 mm in diam.; bracteal leaves ovate, 10–12 × 5–7 mm. Fl. Aug–Sep, fr. Sep–Oct.

• Open rocks; 1000–1800 m. S Anhui (Huang Shan), Zhejiang (Lin'an, Tiantai).

15. *Leontopodium wilsonii* Beauverd, Bull. Soc. Bot. Genève 4: 28. 1912.

川西火绒草 *chuan xi huo rong cao*

Leontopodium chui Handel-Mazzetti; *L. wilsonii* var. *majus* Beauverd.

Herbs, perennial. Stems woody, erect, not branched, 12–42 cm tall, entire plant light gray tomentose, densely arranged with leaves in upper part, densely covered with brown decayed leaves in lower part. Leaves linear-lanceolate, 24–35 × 2–2.8 mm, abaxially densely covered with light gray tomentum, adaxially green, light gray pilose, lateral veins indistinct, base narrowed, apex acute. Capitula 7–11, dioecious or heterogamous, 4–5 cm in diam.; bracteal leaves 15–20, densely arranged, oblong, larger than upper leaves, forming a star of 4–5.5 cm in diam., both surfaces densely grayish white tomentose, apex acute. Phyllaries 2- or 3-seriate, ovate, ca. 4 mm, apex obtuse, abaxially white tomentose, black-brown adaxially. Corolla ca. 3 mm. Achenes oblong, ca. 1 mm, glabrous. Pappus white, ca. 3 mm, serrulate. Fl. Jun–Aug, fr. Sep–Oct.

- Grasslands, thickets, rocks; 2000–2500 m. S Gansu, Sichuan.

Specimens from Gansu identified as *Leontopodium jacotianum* var. *minus* (Beauverd) Handel-Mazzetti are referable to this species.

16. *Leontopodium omeiense* Y. Ling, Acta Phytotax. Sin. 10: 172. 1965.

峨眉火绒草 e mei huo rong cao

Herbs, perennial. Rhizome slender and usually branched, subwoody, erect or procumbent, densely covered with brown decayed leaves with dense radical rosettes of sterile leaves and numerous filiform radicals. Stems solitary or 3 or 4, usually 5–10(–18) cm tall, not branched, with 5–15(–30) leaves, entire plant light gray tomentose, but subglabrous on abaxial surface of leaves; stems sometimes not developed and plant forming sessile heads, not exceeding ca. 3 cm in height. Leaves lanceolate, lanceolate-oblong, or oblong-spatulate, 20–25 × 2.5–4.5 mm, abaxially white and densely covered with light gray tomentum, adaxially covered with sparse light gray tomentum and appearing greenish, lateral veins indistinct, base narrowed, apex obtuse or acute. Capitula 5–9, unisexual, dioecious, or heterogamous, 4.5–5.5 mm in diam.; bracteal leaves 9–12, densely arranged, oblong, larger than upper leaves, forming a star of 3–5.5 cm in diam., both surfaces densely grayish white tomentose, apex acute or obtuse. Phyllaries ca. 3-seriate, ovate, ca. 4 mm, apex obtuse, abaxially often green, brown to almost black adaxially. Corolla ca. 3 mm; corolla of male floret funnelliform; corolla of female floret filiform. Achenes papillose. Pappus white, longer than corolla, serrulate. Fl. May–Jun, fr. Jun–Aug.

- Moist rocks; 1800–2800 m. SE Gansu, W Sichuan.

17. *Leontopodium andersonii* C. B. Clarke, Compos. Ind. 100. 1876.

松毛火绒草 song mao huo rong cao

Gnaphalium andersonii (C. B. Clarke) Franchet; *G. subulatum* Franchet; *Leontopodium bonatii* Beauverd; *L. subulatum* (Franchet) Beauverd; *L. subulatum* var. *bonatii* (Beauverd) Handel-Mazzetti.

Herbs, perennial. Rhizome short and stout, branched, densely covered with black-brown relicts of leaves. Stems 5–30 cm tall, erect, 1–3 mm in diam., usually not branched, white sericeous, with leaves densely arranged; leaves much denser in sterile young stems. Leaves linear to subulate-linear, 8–30 × 0.8–1.4 mm, abaxially densely white tomentose, adaxially green and sparsely arachnoid or subglabrous, margin reflexed, apex acute or obtuse. Capitula 10–40, 3–4 mm in diam., in dense corymbs; bracteal leaves numerous, equal to or longer than cauline leaves, oblong-lanceolate to lanceolate, both surfaces densely covered with white to yellowish tomentum, apex acute. Involucre 3–4 mm, abaxially densely tomentose; phyllaries 3-seriate, abaxially yellowish tomentose. Marginal florets female; corolla capillary. Disk florets male; corolla subtubular, 2.5–3 mm. Achenes papillose. Pappus of capillary bristles, white. Fl. Aug–Sep, fr. Sep–Oct.

Dry grasslands, sparse forests, gravelly slopes, waste fields; 1000–3600 m. Guizhou, Sichuan, Yunnan [Laos, Myanmar].

18. *Leontopodium microphyllum* Hayata, J. Coll. Sci. Imp. Univ. Tokyo 25(19): 127. 1908.

小叶火绒草 xiao ye huo rong cao

Herbs, perennial. Stems slender, slightly woody, branched; branches procumbent at base, densely lanate. Cauline leaves oblanceolate, 7–12 × 1.5–2 mm, both surfaces densely whitish lanate, base abruptly narrowed, apex acute. Capitula 4–9; bracteal leaves 7–10, radiate, generally unequal, linear-lanceolate, 6–12 × 1.5–2 mm, densely white lanate. Involucre hemispheric, ca. 3 × 4 mm; phyllaries 3-seriate, subequal, oblong, apex acute to obtuse. Corolla of outer florets ca. 2.5 mm; corolla of central florets tubular, ca. 2.5 mm. Achenes oblong, ca. 1 mm, glabrous or papillose. Pappus bristles white, ca. 2.5 mm. Fl. Jul–Sep.

- Rocky slopes; 3200–3800 m. Taiwan.

19. *Leontopodium monocephalum* Edgeworth, Trans. Linn. Soc. London 20: 73. 1846.

单头火绒草 dan tou huo rong cao

Leontopodium evax Beauverd var. *fimbrilligerum* (J. R. Drummond) Beauverd; *L. fimbrilligerum* J. R. Drummond.

Plants stoloniferous, forming mats, 4–10 cm; stolons slender, with scattered recurved scales or small nonsheathing leaves, ± prostrate, terminated by a loose rosette of leaves. Leaves spatulate to oblong-oblanceolate, 7–18 × 2–3.3 mm, yellowish, rarely grayish, tomentose, base dilated, apex obtuse, rarely brown apiculate. Flowering stems 0.5–6 cm. Capitula 1–10, dioecious (in our specimens), central one 5–7 mm wide; bracteal leaves oblanceolate or spatulate, to 14 × 3(–4) mm, grayish yellow to brown villous (or sericeous) adaxially, sometimes with concealed apiculum. Phyllaries oblanceolate, rarely ovate-oblanceolate, 4–6.2 × 1–2 mm, with blackish, scarios, deeply lacerate margin. Corollas 3.3–4.2 mm. Achenes pubescent; male ovary sparsely pubescent.

Alpine gravelly slopes, meadows; 4000–5000 m. Xizang [Bhutan, India, Nepal, Pakistan].

20. *Leontopodium muscoides* Handel-Mazzetti, Anz. Akad. Wiss. Wien, Math.-Naturwiss. Kl. 59: 252. 1922.

藓状火绒草 xian zhuang huo rong cao

Herbs, perennial, subpulvinate. Rhizome slender, many branched, covered with withered petioles. Suckers numerous, erect, somewhat rigid and densely covered with withered leaves at base, or with dense leaves forming rosette at apex. Stems slender, 1–8 cm tall, with 4–8 cauline leaves, entire plant grayish or yellowish lanuginous. Leaves linear-lanceolate, 6–10 × 0.5–1 mm, both surfaces grayish or yellowish lanuginous, base forming a sheath, apex acute or obtuse. Capitula (1–)3–6, ca. 4 mm, densely congested; bracteal leaves 6–10, similar to cauline leaves, forming a star of 1.7–2.5 cm in diam. Involucre subglobose, 4–5 mm, abaxially lanate; phyllaries 2- or 3-seriate, apex dark brown, acute, naked. Corolla 3–4 mm. Achenes oblong, ca. 1 mm, glabrous. Pappus white, 4–5 mm. Fl. Jul–Aug, fr. Sep.

- Alpine meadows, thickets, *Abies* forests, rocky places; 4000–4200 m. SE Xizang, NW Yunnan.

This is a very rare species in China.

21. *Leontopodium delavayanum* Handel-Mazzetti, Beih. Bot. Centralbl., Abt. 2, 44: 85. 1927.

云岭火绒草 *yun ling huo rong cao*

Herbs, perennial, pulvinate. Rhizome stout, prostrate, usually many branched, densely covered with brown relicts of leaves. Stems numerous, erect, not branched, 6–13 cm tall, equally leafy, whitish arachnoid pubescent. Leaves lanceolate or oblong-lanceolate, 20–45 × 3–6 mm, both surfaces whitish arachnoid pubescent, more sparse adaxially, with 2 distinct lateral veins subparallel to midvein, base forming sparse sheaths surrounding stem, apex acute. Capitula 6–20, heterogamous or diclinous, closely aggregated, ca. 5 mm in diam.; bracteal leaves 11–16, linear-oblong, 10–25 × 3–7.5 mm, forming a multiradiate star of 4–6.5 cm in diam., both surfaces densely white or yellowish tomentose, base broad, apex acuminate. Involucre ca. 4 mm, white tomentose; phyllaries 3-seriate, margin membranous, apex dark brown, acute or lacerate, glabrous. Corolla ca. 3 mm. Achenes sparsely pilose. Pappus white, ca. 4 mm, serrulate. Fl. Jul–Aug, fr. Sep–Oct.

Alpine gravelly slopes, rocky places; 3400–4000 m. W Yunnan [Myanmar].

22. *Leontopodium fangingense* Y. Ling, Acta Phytotax. Sin. 10: 175. 1965.

梵净火绒草 *fan jing huo rong cao*

Herbs, perennial, subpulvinate. Rhizome slender, prostrate, usually many branched, densely covered with brown relicts of leaves. Stems numerous, erect, usually not branched, 1–7 cm tall, equally leafy, whitish arachnoid pubescent. Leaves oblanceolate-oblong or oblanceolate, 7–15 × 2–6 mm, abaxially whitish arachnoid tomentose, adaxially whitish arachnoid pubescent or subglabrescent, base narrowed, apex acute. Capitula (1–)3–7, heterogamous or dioecious, closely aggregated, 4–5 mm in diam.; bracteal leaves 6–8, similar to cauline leaves in shape and size, forming a multiradiate star of 2.5–3.5 cm in diam., both surfaces densely white or yellowish tomentose. Involucre subglobose, ca. 4 mm, white tomentose; phyllaries 3-seriate, margin membranous, apex dark brown, acute, glabrous. Corolla ca. 3.5 mm. Achenes glabrous. Pappus white, ca. 4 mm, serrulate. Fl. May–Jul, fr. Jul–Aug.

• Moist rocky places on mountain peaks; 2100–2300 m. Guizhou (Fanjing Shan).

23. *Leontopodium jacotianum* Beauverd, Bull. Soc. Bot. Genève 1: 190. 1909.

雅谷火绒草 *ya gu huo rong cao*

Leontopodium jacotianum var. *paradoxum* (J. R. Drummond) Beauverd; *L. paradoxum* J. R. Drummond.

Herbs, perennial, stoloniferous, forming mats, 6–28 cm, grayish tomentose; stolons slender, elongate, usually branched, terminated by a loose rosette of leaves. Leaves lanceolate or oblong-lanceolate, 6–25 × 1–2 mm, apex acute to acuminate, usually brown apiculate; rosette leaves linear, lingulate-spatulate, or oblanceolate, 1–3 mm wide; cauline leaves lanceolate to lin-

gulate or linear with margin recurved, 1–3 mm wide. Flowering stems 2–25 cm. Capitula 4–9(–18), all female or predominantly male or female, usually densely crowded; bracteal leaves lanceolate to oblong-elliptic, 8–25 × 2.2–7 mm, more densely whitish (rarely yellowish, brownish, or grayish) tomentose than cauline leaves, apex often long acuminate. Phyllaries lanceolate to oblanceolate, 3–5 mm, brown scarious adaxially. Corolla 3–3.5 mm. Achenes pubescent; male ovaries pubescent or subglabrous, ca. 1 mm. Pappus white, plumose. Fl. Jul–Aug, fr. Aug–Oct.

Alpine meadows, gravelly slopes; 2200–4400 m. S Xizang [Bhutan, India, Kashmir, Myanmar, Nepal, Pakistan].

24. *Leontopodium caespitosum* Diels, Notes Roy. Bot. Gard. Edinburgh 5: 189. 1912.

丛生火绒草 *cong sheng huo rong cao*

Leontopodium jacotianum Beauverd var. *caespitosum* (Diels) Handel-Mazzetti; *L. jacotianum* var. *minus* (Beauverd) Handel-Mazzetti; *L. wilsonii* Beauverd var. *minus* Beauverd.

Herbs, perennial. Rhizome stout, long, usually branched, with numerous flowering stems and sterile stems. Stems woody, erect, branched or not branched, 12–25 cm, entire plant light gray arachnoid pubescent, densely arranged with leaves in upper part, densely covered with brown decayed leaves in lower part. Leaves lanceolate, 10–25 × 1.5–3 mm, abaxially densely covered with light gray tomentum, adaxially green and glabrous, lateral veins indistinct, base narrowed, apex acute. Capitula 6–10, 4–5 cm in diam.; bracteal leaves 6–10, oblong, 14–30 × 2–4.5 mm, forming a star of 3–4.5 cm in diam., both surfaces densely grayish white tomentose, apex acute. Phyllaries 2- or 3-seriate, lanceolate, ca. 4 mm, apex black-brown and obtuse, abaxially white tomentose. Corolla ca. 3 mm. Achenes oblong, ca. 1 mm, glabrous. Pappus white, ca. 3.5 mm, serrulate. Fl. Jul–Aug, fr. Sep–Oct.

Moist grasslands, alpine meadows, gravelly places; 3300–3600 m. SW Sichuan, NW Yunnan [Myanmar].

25. *Leontopodium pusillum* (Beauverd) Handel-Mazzetti, Beih. Bot. Centralbl., Abt. 2, 44: 97. 1927.

弱小火绒草 *ruo xiao huo rong cao*

Leontopodium alpinum Cassini var. *pusillum* Beauverd, Bull. Soc. Bot. Genève 2: 251. 1910; *L. alpinum* var. *frigidum* Beauverd.

Herbs, perennial, subpulvinate. Rhizome slender and many branched, with dense radical rosettes of sterile leaves and numerous flowering stems. Stems 2–7 cm tall, densely leafy, densely white tomentose. Leaves spatulate to oblong-spatulate; radical leaves 10–25 × 2–4 mm, cauline leaves 10–20 × 2–3 mm, both surfaces densely white tomentose, base narrowed, apex obtuse. Capitula (1–)3–7, densely congested, 5–6 mm in diam.; bracteal leaves numerous, similar to cauline leaves, congested, forming star of 1.5–2.5 cm in diam. Involucre 3–4 mm, abaxially white lanate; phyllaries 3-seriate, apex usually dark brown, acute, glabrous. Corolla 2.5–3 mm. Achenes glabrous or slightly papillose. Pappus white, serrulate. Fl. Jul–Aug, fr. Aug–Sep.

Alpine grasslands, rocky screes, gravelly slopes, salt lake banks and shores; 3500–5600 m. Qinghai, W Sichuan, Xinjiang, Xizang [India (Sikkim), Kashmir].

26. *Leontopodium brachyactis* Gandoger, Bull. Soc. Bot. France 46: 420. 1900.

短星火绒草 duan xing huo rong cao

Herbs, perennial, stoloniferous, tomentose or somewhat glabrous; stolons ca. 10 mm, covered with dense brown scaly leaves. Stems many. Basal leaves in dense rosettes, spatulate, 30–40 × 3–5 mm, usually thickish, apex obtuse to subacute; cauline leaves (20–)30–40 × 3–4 mm, usually densely lanate-tomentose, 1-veined, apex shortly mucronate. Capitula 3–5, laxly arranged, 6–8 mm in diam., subtended by bracteal leaves similar to cauline leaves in color and pubescence, but forming a distinct star, obtusely lanceolate. Phyllaries dark brownish, ca. 5 × 1.5–1.7 mm, scarious with a lower greenish part, long pilose hairy, apex acuminate. Achenes of female florets larger than sterile ones of bisexual florets, ca. 1.5 mm, papillose. Pappus setae 4.5–5 mm, barbellate, deciduous as a unit. Fl. Jun–Aug.

Among rocks, open stony ground; 2200–4100 m. W Xizang [India, Kashmir, Nepal, Pakistan].

This is a relatively rare species in China; it is recorded as fairly common in Kashmir.

27. *Leontopodium nanum* (J. D. Hooker & Thomson ex C. B. Clarke) Handel-Mazzetti, Beih. Bot. Centralbl., Abt. 2, 44: 111. 1927.

矮火绒草 ai huo rong cao

Antennaria nana J. D. Hooker & Thomson ex C. B. Clarke, Compos. Ind. 100. 1876.

Herbs, perennial, pulvinate, forming small clusters. Rhizome short, to 2 cm, densely covered with brown decayed leaves with dense radical rosettes of sterile leaves and numerous filiform radicals, rhizome emitting 1–5 creeping and branching brown scaly stolons up to 10 cm. Stems solitary, more rarely 2 or 3, usually to 5 cm tall, rarely higher, with 3–7 leaves, entire plant covered with light gray lax tomentum and violet below; stems often not developed at all and plant forming sessile heads, not exceeding 1.5–2 cm in height. Leaves long spatulate to spatulate-oblong; radical leaves to 20 × ca. 5 mm; cauline leaves erect, to 1.5 cm and narrower, equally pubescent on both sides. Capitula (1–)3–5, dioecious or heterogamous, very compact, 6–15 mm in diam.; bracteal leaves not different from cauline ones, erect, not exceeding capitulum, but more often shorter, not forming a star. Phyllaries lanceolate, ca. 6 mm, thinly acute and scarious at apex, brown to almost black, abaxially often green. Male florets with corolla ca. 4 mm, pappus ca. 6 mm; female florets with corolla ca. 6 mm, pappus 8–9 mm. Pappus white, slightly exceeding corollas and phyllaries and forming a prominent compact white cap. Fl. May–Jun, fr. Jun–Aug.

Alpine meadows, thickets, marshes; 2100–5000 m. Gansu, Shaanxi, Sichuan, Xinjiang, Xizang [Afghanistan, India, Kashmir, Kazakhstan, Nepal, Pakistan].

28. *Leontopodium stoloniferum* Handel-Mazzetti, Acta Horti Gothob. 12: 235. 1938.

匍枝火绒草 pu zhi huo rong cao

Herbs, perennial, caespitose. Rhizome branched, with stolons up to 7 cm, with rosette suckers and flowering stems. Stems erect, 3–14 cm tall, usually solitary and not branched, white tomentose; internodes 3–10 mm. Leaves on suckers spatulate-lanceolate, 10–20(–30) × 2.5–4.5 mm, both surfaces with dense white tomentum, apex obtuse; cauline leaves spatulate or spatulate-linear, 10–20 × 2–5 mm, both surfaces with dense white tomentum, apex obtuse. Capitula 3–6, densely congested, ca. 4 mm in diam.; bracteal leaves 6–10, similar to upper cauline leaves in shape, size, and indumentum, forming a star of 1.2–2.5 cm in diam. Involucre 4–5 mm, densely white arachnoid tomentose; phyllaries 2- or 3-seriate, obovate-lanceolate, apex dark brown, obtuse or lacerate, glabrous. Corolla ca. 3 mm. Achenes pubescent. Pappus white. Fl. Sep, fr. Oct.

• Moist streambanks; 2900–3600 m. W Sichuan (Dawu).

29. *Leontopodium souliei* Beauverd, Bull. Soc. Bot. Genève 1: 191. 1909.

银叶火绒草 yin ye huo rong cao

Herbs, perennial. Rhizome prostrate, with 1 to several flowering stems and several sterile rosette suckers. Flowering stems slender, 6–25 cm tall, not branched, white arachnoid pubescent. Leaves on rosette suckers linear-lanceolate, usually larger than cauline ones, 15–40 × 1–3 mm, abaxially white arachnoid pubescent, adaxially green and glabrescent, apex acute; cauline leaves linear or lingulate-lanceolate, 10–40 × 1–3 mm, both surfaces white arachnoid pubescent, apex acute. Capitula 4–15(–20), 5–7 mm in diam.; bracteal leaves 9–14, oblong to oblong-lanceolate, 10–20 × 1.5–3 mm, both surfaces densely white arachnoid tomentose, forming a star of 2–3 cm in diam. Phyllaries 3-seriate, 3.5–4 mm, abaxially densely yellowish lanate, apex dark brown, obtuse, glabrous. Corolla 3–4 mm. Achenes pubescent or glabrous. Pappus white, ca. 4 mm, serrulate. Fl. Jul–Aug, fr. Sep.

• Grasslands, thickets, sparse forests; 2700–4500 m. Sichuan, Xizang, NW Yunnan.

30. *Leontopodium calocephalum* (Franchet) Beauverd, Bull. Soc. Bot. Genève 1: 189. 1909.

美头火绒草 mei tou huo rong cao

Gnaphalium leontopodium Linnaeus var. *calocephalum* Franchet, Bull. Soc. Bot. France 39: 131. 1892; *Leontopodium calocephalum* var. *depauperatum* Y. Ling; *L. calocephalum* var. *uliginosum* Beauverd.

Herbs, perennial. Rhizome slender, prostrate, usually branched. Stems erect, not branched, 10–50 cm tall, arachnoid pilose. Leaves lanceolate or linear-lanceolate, 50–150 × 2–12 mm, abaxially white tomentose, adaxially green and glabrous or sparsely pilose, lateral veins 2, distinct, subparallel to midvein, base forming sparse sheath around stem, apex acuminate. Capitula 5–20, heterogamous or diclinous-dioecious, closely aggregated, 5–10 mm in diam.; bracteal leaves 10–18, linear, 20–45 × 3–6 mm, forming a multiradiate star of 5–8 cm in diam., both surfaces densely white or yellowish tomentose, base broader, apex acuminate. Involucre 4–6 mm, white tomentose; phyllaries 4-seriate, apex dark brown, acute or rounded, gla-

brous. Corolla 3–4 mm. Achenes pilose. Pappus white, ca. 4 mm, serrulate. Fl. Jul–Sep, fr. Sep–Oct.

• Alpine meadows, grasslands, thickets, marshes, conifer forests, gravelly slopes, lake banks; 2600–4200 m. Gansu, Qinghai, Sichuan, Yunnan.

31. *Leontopodium himalayana* Candolle, Prodr. 6: 276. 1838.

珠峰火绒草 zhu feng huo rong cao

Leontopodium himalayana var. *pumilum* Y. Ling.

Plant densely tufted, (3–)7–32 cm; offsets sheathed below by many old leaf bases, terminated by loose tuft of few leaves. Offset leaves linear-spatulate, sometimes brown apiculate; cauline leaves linear to linear-lanceolate, 18–70 × 1–4 mm, grayish tomentose, apex acute or subobtusate, less often apiculate. Capitula crowded, (4–)7–12(–20), discoid or disciform; disciform capitula usually all similar, sometimes central one predominantly male and remainder predominantly or entirely female; bracteal leaves lingulate, usually dilated at or near base or sometimes linear-lanceolate, basal half at least of upper surface more densely white or yellowish gray tomentose than leaves or very rarely villous, apex acute to acuminate, outer ones 12–40 × 2–7.5 mm. Synflorescence 3–7 cm in diam. Involucre 5–7 mm in diam.; phyllaries oblong, 3.5–6 × 1–2.5 mm, with black-brown scarious margin. Corolla 3.3–4 mm. Achenes 1.5–2 mm, glabrous or sparsely pubescent; male ovaries always glabrous. Pappus white, ca. 4 mm. Fl. Jul–Aug.

Alpine gravelly slopes, meadows; 3000–5100 m. Xizang, NW Yunnan [Bhutan, India, Kashmir, Myanmar, Nepal, Pakistan].

32. *Leontopodium junpeianum* Kitamura, Acta Phytotax. Geobot. 4: 102. 1935.

长叶火绒草 chang ye huo rong cao

Leontopodium linearifolium Handel-Mazzetti, Acta Horti Gothob. 1: 115. 1924, not (Weddell) Benth & J. D. Hooker (1873); *L. longifolium* Y. Ling; *L. longifolium* f. *angustifolium* Y. Ling.

Herbs, perennial. Rhizome short, with flowering and sterile stems. Flowering stems erect, 2–25 cm tall, not branched, gray silky or ash-colored lanate. Leaves in lower part usually larger than those in upper part; blade linear or spatulate-linear, 20–130 × 1.5–9 mm, both surfaces densely gray silky or ash-colored lanate, sometimes adaxially subglabrous and green, base narrowed and indistinctly sheathed, apex obtuse. Capitula 3–30, aggregated in corymbs, 6–9 mm in diam.; bracteal leaves 6–10, oblong to lanceolate, 10–20 × 3–6 mm, forming a star of 3.5–5 cm in diam., both surfaces densely gray silky or ash-colored lanate, apex acute. Phyllaries ovate-lanceolate, ca. 5 mm, white lanate outside, apex usually dark brown, acute. Corolla ca. 4 mm. Achenes glabrous or papillose. Pappus white, slightly longer than corolla, serrulate. Fl. Jul–Aug, fr. Sep–Oct.

Grassy slopes, thickets, rocks; 1100–4800 m. Gansu, Hebei, Nei Mongol, Qinghai, Shaanxi, Shanxi, Sichuan, Xizang [Kashmir].

The name *Leontopodium junpeianum* never appeared in other literature after its publication. When Kitamura published this name in

1935, he cited “*Leontopodium linearifolium* Handel-Mazzetti in Beih. Bot. Centrb. XLIV (1928) p. 100 non Benth & J. D. Hooker (1873), pro parte ?” and noted the only difference with *L. linearifolium* Handel-Mazzetti is its cauline leaves with ± narrow base. When Y. Ling (Acta Phytotax. Sin. 10: 177. 1965) published the name *L. longifolium*, he similarly cited “*Leontopodium linearifolium* Handel-Mazzetti, Acta Horti Gothob. 1: 115. 1924, non (Wedd.) Benth & Hook. f. (1873).” Obviously these two names represent the same species, so we use the older name here.

33. *Leontopodium ochroleucum* Beauverd, Bull. Soc. Bot. Genève 6: 146. 1914.

黄白火绒草 huang bai huo rong cao

Antennaria leontopodina Candolle; *Leontopodium alpinum* Cassini var. *debile* Beauverd; *L. alpinum* var. *hedinianum* Beauverd; *L. fischerianum* Beauverd; *L. leontopodinum* (Candolle) Handel-Mazzetti; *L. melanolepis* Y. Ling.

Herbs, perennial. Rhizome shortly branching, densely covered with black-brown relicts of leaves, forming tufts of numerous stems and sterile leaf rosettes, sometimes elongating into stolons up to 10 cm, often branching, and herbaceous brown scaly. Stems erect and firm, 5–15 cm tall, with 4–8 remote leaves, ash-colored arachnoid lanate or tomentose in upper half, sometimes glabrescent in lower half. Leaves concolorous, ash-colored lanate on both surfaces, sometimes greenish glabrate abaxially, without a distinct vein; cauline leaves oblong, lingulate, lanceolate, or linear-lanceolate, 10–250 × 2–4 mm, apex obtuse or acute; radical rosette leaves oblong-spatulate or narrowly oblong, 20–40 × 2–4.5 mm, narrowed to sheath. Capitula 5–7(–12), heterogamous and unisexual-dioecious, densely aggregated, 5–7 mm in diam.; bracteal leaves distinct, oblong-elliptic or lanceolate, forming rather regular multiradiate star of 1.5–2(–2.5) cm in diam., abaxially ash-colored lanate, adaxially loosely tomentose, pallid yellow, sometimes even ash- to sulfur-colored in dried plant. Phyllaries lanceolate, 4–5 mm, abaxially yellowish lanate or greenish, with prominent brown or almost black shiny apex. Corolla 3–4 mm. Achenes glabrous or papillose. Pappus dirty white, in sterile bisexual florets 3–5 mm, in female florets 4–5 mm. Fl. May–Aug, fr. Jul–Sep.

Mountain tundra, humid or dry meadows, stony fields of slopes; 2200–5000 m. Qinghai, Xinjiang, Xizang [India, Kazakhstan, Mongolia, Russia].

34. *Leontopodium conglobatum* (Turczaninow) Handel-Mazzetti, Acta Horti Gothob. 1: 114. 1924.

团球火绒草 tuan qiu huo rong cao

Leontopodium sibiricum Cassini var. *conglobatum* Turczaninow, Bull. Soc. Imp. Naturalistes Moscou 20: 9. 1847; *L. ochroleucum* Beauverd subsp. *conglobatum* (Turczaninow) Khanminchun; *L. ochroleucum* var. *conglobatum* (Turczaninow) Grubov.

Herbs, perennial. Rhizome short, with solitary stem or multicapital without stolons, with bundle of filiform radicals, forming small fasciculate clusters of 2 or 3 stems and sterile bundles of leaves. Stems erect and firm, (10–)15–30(–45) cm tall, ash-colored to grayish arachnoid pubescent, often subglabrous, violet or red-brown, equally and rather densely leafy.

Leaves linear-lanceolate to narrowly lanceolate and linear-spatulate; cauline leaves 2–6 cm × 2–10 mm, erect, lower ones long narrowed at base and often early marcescent; radical leaves in a rosette, green, linear, to 10 cm × 13 mm, pubescent to subglabrous. Synflorescence usually large, compact, corymbiform, often complexly branched, with a few separate capitula and more than 30 capitula closely aggregated into a group to 3 cm in diam., individual capitula homogeneous, 6–8 mm in diam.; bracteal leaves light green abaxially, more often greenish yellow to yellowish and light ash-colored adaxially, ovate-lanceolate or oblong, flat, to 3 cm × 10 mm, forming a star of to 7 cm in diam., densely tomentose. Capitula heterogamous or dichinous-dioecious. Fl. Jun–Aug, fr. Jul–Sep.

Dry meadows of riverbanks, steppes, limestone slopes of mountains, dry *Larix* forests and *Pinus* forests, forest margins; 400–1700 m. Heilongjiang, Nei Mongol [Mongolia, Russia].

35. *Leontopodium campestre* (Ledebour) Handel-Mazzetti in Schröter, Pfl.-Leb. Alpen, ed. 2, 2: 505. 1924.

山野火绒草 shan ye huo rong cao

Leontopodium alpinum Cassini var. *campestre* Ledebour, Fl. Ross. 2: 614. 1845; *L. fedtschenkoanum* Beauverd; *L. ochroleucum* Beauverd subsp. *campestre* (Ledebour) Khanminchun; *L. ochroleucum* var. *campestre* (Ledebour) Grubov.

Herbs, perennial. Rhizome simple, shortened, with solitary stem or multicapital, to 10 cm, densely covered with brown relicts of leaf sheaths and beset with thinly filiform radicals, usually without stolons, forming small lax fasciculate clusters of a few stems and sterile bundles of leaves. Stems (5–)15–30(–50) cm tall, erect or ascending, herbaceous, firm sometimes subflexuous ash-colored to gray arachnoid tomentose or arachnoid, violet flocculent (as well as on leaves), usually glabrescent, at least in lower half up to anthesis, equally leafy, with 5–20 leaves. Leaves oblong, linear, linear-spatulate, or linear-lanceolate; cauline leaves 2.5–4.5 cm × 2–5 mm, usually corrugated and dropping at anthesis; radical rosette leaves more often narrowly lanceolate, narrowed into a long petiole, ca. 15 cm × 9 mm, both surfaces equally or subequally ash-colored to gray arachnoid tomentose. Synflorescence usually simple, loose, but sometimes corymbiform, to 7 cm in diam., of 3–7 separate groups of capitula. Capitula 7–12(–20), heterogamous or unisexual, dioecious, closely aggregated, 4–6 mm in diam.; bracteal leaves linear or linear-lanceolate, of very unequal lengths, forming irregular multiradiate star of 4–5 cm in diam., yellowish or almost white, to pallid yellow (in dried plants), densely tomentose, margin convolute, apex acuminate. Phyllaries ca. 4 mm, apex almost transparent to almost black, somewhat prominently tomentose. Fl. May–Sep, fr. Jun–Sep.

Steppes, dry or marshy meadows, dry pebbly and stony hills, herb communities on sands, forests; (700–)1400–4500 m. Qinghai, Xinjiang [Kazakhstan, Mongolia, Russia].

178. *SINOLEONTOPODIUM* Y. L. Chen, Acta Phytotax. Sin. 23: 457. 1985.

君范菊属 jun fan ju shu

Chen Yousheng (陈又生); Randall J. Bayer

Plants perennial, compact, pulvinate, dioecious. Stem without pericyclic cambium, neither with resin canals, nor with fibers in phloem. Leaves alternate, very densely set, concave, hairy with a distal hair tuft adaxially, eglandular, margin entire. Capitula soli-

36. *Leontopodium leontopodioides* (Willdenow) Beauverd, Bull. Soc. Bot. Genève 1: 371. 1909.

火绒草 huo rong cao

Filago leontopodioides Willdenow, Phytographia, 12. 1794; *Gnaphalium leontopodioides* (Willdenow) Willdenow; *Leontopodium sibiricum* Cassini; *L. sibiricum* var. *depauperatum* Turczaninow.

Herbs, perennial. Rhizome short, lignose, multicapital, with numerous flowering and sterile stems, but without sterile rosettes of leaves, forming a fine but dense cluster. Stems erect, firm, in lower part often somewhat lignose, thin, sometimes subflexuous, (10–)20–25(–40) cm tall, simple, or sometimes branching in synflorescence, entire plant gray silky or ash-colored lanate, sometimes flocculent, very leafy. Leaves erect, often appressed to stem, ash-colored, greenish adaxially or almost equally colored, or yellowish abaxially, linear-lanceolate to narrowly lanceolate, 15–45 × 2–5 mm, both sides equally or more densely abaxially pubescent, with prominent vein abaxially, base rounded, solid, margin often involute, apex acute, with large hydathode. Synflorescence depauperate, of 3 or 4(–7) aggregated capitula or capitulum solitary, or in corymb; capitula dioecious, very rarely heterogamous, 6–7 × 7–10 mm, each on a separate peduncle to 2.5 cm; bracteal leaves 1–4 per capitulum, almost indistinguishable from upper leaves, linear to narrowly lanceolate, erect, not forming a star. Phyllaries lanceolate, 5–6 mm, white lanate outside, with acute, colorless or light brown apex. Florets dichinous; corolla of male florets 3.5–4.5 mm. Pappus dirty white, 4.5–6.5 mm. Fl. Jun–Sep, fr. Aug–Oct.

Steppes, dry meadows, dry stony and rocky slopes, sandy places, shrubby thickets; 100–3800 m. Gansu, Hebei, Nei Mongol, Qinghai, Shaanxi, Shandong, Shanxi, Xinjiang [Japan, Korea, Mongolia, Russia].

37. *Leontopodium smithianum* Handel-Mazzetti, Acta Horti Gothob. 1: 115. 1924.

绢茸火绒草 juan rong huo rong cao

Herbs, perennial. Rhizome short, stout, with several sterile stems and flowering stems. Stems erect, 10–45 cm tall, densely grayish or white tomentose, densely and equally leafy; internodes 0.5–2 cm. Leaves linear-lanceolate, 20–55 × 4–8 mm, both surfaces densely grayish or white tomentose, base narrowed, apex obtuse or acute. Capitula (1–)3–25, heterogamous, 6–9 mm in diam.; bracteal leaves 3–10, oblong or linear-lanceolate, similar to upper leaves in size, shape, and indumentum, forming an irregular star or compound stars. Involucre 4–6 mm, white lanate; phyllaries 3- or 4-seriate, apex dark brown, acute, glabrous. Corolla 3–4 mm. Achenes papillose. Pappus white, ca. 4 mm, serrulate. Fl. Jun–Aug, fr. Aug–Oct.

• Subalpine meadows or dry grasslands; 1600–2900 m. Gansu, Hebei, Qinghai, Nei Mongol, Shaanxi, Shanxi.

tary, sessile, unisexual. Phyllaries few seriate, with brown papery lamina; stereome undivided. Receptacle flat, epaleate. Female florets yellow, filiform, with long apical hairs. Achenes as in disk florets. Disk florets functionally male with long apical hairs. Corolla yellow; corolla lobes erect, veins reaching apex of lobes. Anthers ecalcarate, with short tails; endothelial tissue polarized; apical appendage flat, as wide as thecae. Pollen gnaphalioid. Style bifid; style branches obtuse with obtuse sweeping hairs dorsally, reaching to furcation; stigmatic surface separated. Achenes glabrous, slightly angular, with 5 vascular bundles; epidermis smooth. Pappus dimorphic, barbellate, capillary bristles in 1 row, basally without patent cilia; apical cells clavate in disk florets, acute in female.

- One species: China.

1. *Sinoleontopodium lingianum* Y. L. Chen, *Novon* 19: 24. 2009.

君范菊 *jun fan ju*

Plants perennial, pulvinate, 4–5 cm tall, densely white or yellowish lanate. Rhizome slender, woody, ascending or erect, with numerous flowering and sterile stems densely congested. Stems 2–3 cm tall, simple or 2- or 3(–5)-branched above. Leaves sessile, alternate and very densely set, ovate-oblong, elliptic-oblong, or oblanceolate, 2–8 × 1–2.5 mm, both surfaces white or grayish lanate with a distinct distal hair tuft adaxially, base narrowed, margin entire, apex obtuse. Capitula usually solitary, dioecious. Involucre 6–8 × 4–5 mm; phyllaries 5- or 6(or

7)-seriate, pallid brown; outer ones ovate or ovate-lanceolate, 3–5 × 1.5–2 mm, apex obtuse; middle ones oblong-lanceolate or oblanceolate, 7–8 × 2–3 mm, apex acute; inner ones linear-lanceolate or oblanceolate, 4–5 × ca. 1 mm, apex fimbriate lacinate. Florets 44–55 per capitulum; corolla yellow, ca. 3 mm, densely white villous in upper part; style slightly exerted, lobes ca. 0.3 mm; ovary ca. 0.5 mm, glabrous. Achenes ca. 1 mm, 1-veined, sparsely glandular-papillose. Pappus white, serrulate. Fl. Jul.

- Alpine glacial and gravelly slopes or rocky places; 4500–4900 m. Xizang (Mainling).

This species is characterized by the pulvinate habit, homogeneous florets, and corolla rather densely white villous in the upper part.

179. ANTENNARIA Gaertner, *Fruct. Sem. Pl.* 2: 410. 1791, nom. cons.

蝶须属 *die xu shu*

Chen Yousheng (陈又生); Randall J. Bayer

Herbs or subshrubs, perennial, dioecious. Leaves alternate, flat, with entire margins, usually tomentose on both surfaces. Capitula solitary, only a few together, or many in corymbs. Phyllaries papery or membranous, colored; stereome undivided. Receptacle flat, foveolate, epaleate. Disk florets functionally male or female; male florets white or purplish, tubular; female florets white or purplish, filiform. Anthers with flat appendages. Style branches truncate, with hairs dorsally and apically. Achenes oblong, with short clavate twin hairs. Pappus bristles capillary, barbellate, connate into a ring.

About 40 species: temperate and arctic/alpine regions, mainly in Asia, Europe, and North America, a few taxa in South America; one species in China.

1. *Antennaria dioica* (Linnaeus) Gaertner, *Fruct. Sem. Pl.* 2: 410. 1791.

蝶须 *die xu*

Gnaphalium dioicum Linnaeus, *Sp. Pl.* 2: 850. 1753; *Antennaria hyperborea* D. Don; *A. insularis* Greene.

Herbs, perennial, dioecious, 3–10 cm tall. Stolons 2–5 cm. Basal leaves spatulate or rhombic-spatulate, 3–18 × 3–6 mm, abaxially gray tomentose, adaxially green glabrous and distally

pink or white, vein 1, apex mucronate; cauline leaves linear, 7–13 mm, not flagged, apex acute. Capitula 3–7 in corymbiform arrays. Involucre 5–6.5 mm in male florets, 5–7 mm in female florets; phyllaries distally dark pink to light pink or white. Corollas 3–4 mm in male florets, 4–5 mm in female florets. Achenes 0.5–1 mm, papillate. Pappus 3.5–4.5 mm in male florets, 5–6 mm in female florets. Fl. May–Aug. $2n = 28$.

Dry slopes on tundra, meadows, conifer forests; 600–2700 m. Gansu, Heilongjiang, Xinjiang [Japan, Kazakhstan, Mongolia, Russia; Europe, North America (Alaska)].

180. GNOMOPHALIUM Greuter, *Willdenowia* 33: 242. 2003.

垫头鼠麴草属 *dian tou shu qu cao shu*

Chen Yousheng (陈又生); Randall J. Bayer

Herbs, annual. Leaves alternate, flat, with entire margins, tomentose on both surfaces. Capitula many in dense clusters among a group of leaves. Phyllaries papery, hyaline; stereome divided. Receptacle flat, epaleate. Outer florets yellow, filiform. Central florets bisexual, yellow. Anthers with flat appendages. Style branches truncate, with hairs apically. Achenes oblong, with short clavate twin hairs. Pappus bristles capillary, scabrid, not united into a ring.

- One species: N Africa, Asia.

1. *Gnomophalium pulvinatum* (Delile) Greuter, Willdenowia 33: 242. 2003.

垫头鼠麴草 dian tou shu qu cao

Gnaphalium pulvinatum Delile, Descr. Égypte, Hist. Nat. 266. 1813–1814; *Homognaphalium pulvinatum* (Delile) Fayed & Zareh.

Herbs, annual, prostrate, densely whitish to grayish lanate tomentose. Stems 5–15 cm, many from base, much branched. Leaves sessile, spatulate or obovate-spatulate, 5–15 × 1.5–4 mm, densely white lanate abaxially, hairy adaxially, 1-veined,

base narrowly attenuate, apex mucronate; upper leaves densely crowded. Capitula campanulate, 3–4 mm wide, congested in terminal clusters, surrounded by terminal leaves. Phyllaries 2- or 3-seriate, greenish tinged, narrowly elliptic or linear to lanceolate, apex acute, hyaline at tip. Disk florets 4 or 5, bisexual; female florets numerous. Corolla ca. 1 mm, minutely papillose. Pappus setae white, 6 or 7 in female florets and 3 or 4 in bisexual ones, not united into a ring; apical cell subclavate. Fl. Nov–May.

A weed of arid and semiarid areas; ca. 4000 m. SE Xizang [Afghanistan, India, Nepal, Pakistan; Africa (Egypt, Sudan), SW Asia].

181. GNAPHALIUM Linnaeus, Sp. Pl. 2: 850. 1753.

鼠麴草属 shu qu cao shu

Chen Yousheng (陈又生); Randall J. Bayer

Herbs, annual or perennial. Leaves alternate, flat with entire margins, tomentose on both surfaces. Capitula solitary or only a few together. Phyllaries papery, brownish; stereome undivided. Receptacle flat, epaleate. Outer florets purple, filiform. Central florets bisexual, purple. Anthers with flat appendages. Style branches truncate, with hairs apically. Achenes oblong, with short clavate twin hairs. Pappus bristles capillary, scabrid, free.

About 80 species: cosmopolitan; six species in China.

- 1a. Capitula in racemes or spikes, rarely solitary.
 - 2a. Capitula numerous, in spikes; plants 8–25 cm tall 1. *G. polycaulon*
 - 2b. Capitula in racemes, panicles, spikes, or solitary; plants usually 2–10 cm tall.
 - 3a. Capitula in racemes; outer phyllaries obovate 2. *G. stewartii*
 - 3b. Capitula in spikes, panicles, or solitary; outer phyllaries ovate to ovate-oblong 3. *G. supinum*
- 1b. Capitula in dense globose or glomerulate synflorescences, or compound synflorescences.
 - 4a. Capitula pedunculate, in dense globose or glomerulate synflorescences; leaves white lanate on both surfaces; synflorescences with unequal leaves in irregular arrangement; phyllaries pale yellow, green, or yellowish brown 4. *G. uliginosum*
 - 4b. Capitula sessile, in dense compound synflorescences; leaves adaxially sparsely pubescent, abaxially densely white lanate; compound synflorescences with equal leaves in radiate or stellate arrangement; phyllaries reddish brown.
 - 5a. Basal leaves withering before anthesis 5. *G. involucreatum*
 - 5b. Basal leaves persistent at anthesis, rosette 6. *G. japonicum*

1. *Gnaphalium polycaulon* Persoon, Syn. Pl. 2: 421. 1807.

多茎鼠麴草 duo jing shu qu cao

Gnaphalium multicaule Willdenow, Sp. Pl. 3: 1888. 1803, not Lamarck (1788); *G. strictum* Roxburgh.

Herbs, annual, dwarf, erect to decumbent, densely white lanate-tomentose, especially in upper part. Stems slender, simple or more commonly much branched, 8–25 cm tall, 0.5–1.5 mm in diam. Leaves sessile, grayish green, spatulate or oblanceolate-oblong, 1.5–4.5 cm × 3–8 mm, thinly appressed tomentose on both surfaces, margin and lower midribs sometimes flushed with purple, base narrowed, petioliform, margin wavy, apex obtuse and apiculate. Capitula 2–5, arranged in a spike to 2 cm, at tips of stems and branches, campanulate, 2.5–3 × 2–2.5 mm, densely lanate to 2/3 from base. Phyllaries 3-seriate, loosely imbricate, gradate, with pale brown apex, red-purple middle, and green base, these becoming brown when dry, elliptic-ovate or elliptic to linear-oblong, 1.6–2.2 × 0.5–0.8 mm, scarious, apex acute. Receptacle ca. 1.3 mm in diam., pitted. Outer florets many; corolla greenish yellow, filiform, ca. 1.2

mm, apex minutely 2- or 3-lobed, flushed with purple. Central florets 5 or 6, greenish yellow, tubular, ca. 1.5 × 0.5 mm, 5-toothed at apex, teeth flushed with purple. Stamens yellow, ca. 0.6 mm; anthers sagittate at base, connate into a tube around style. Style white, ca. 1.6 mm; style branches linear, flushed with orange-yellow; ovary olivaceous, cylindric, ca. 0.5 mm. Achenes pale brown, oblong-rectangular, ca. 0.5 mm, minutely punctuate. Pappus whitish, ca. 1.2 mm, bristles 5–8, distinct, falling separately. Fl. Jan–Apr. $2n = 14$.

A pantropical weed, in moist sunny places at roadsides, in grasslands, and also in and around cultivated fields. Fujian, Guangdong, Guizhou, Hainan, Taiwan, Yunnan, Zhejiang [India, Japan, Pakistan, Thailand; tropical and subtropical Africa, tropical America, Australia].

Similar to *Gamochaeta pennsylvanica*, this species differs by its more compact habit, oblanceolate leaves, and free, separately deciduous pappus bristles more dilated at apex.

2. *Gnaphalium stewartii* C. B. Clarke ex J. D. Hooker, Fl. Brit. India 3: 289. 1881.

矮鼠麴草 ai shu qu cao

Omalotheca stewartii (C. B. Clarke ex J. D. Hooker) Holub.

Herbs. Stems erect, 5–10 cm tall, base tufted and lanate, upper part unbranched. Basal leaves tufted and in rosette, persistent at anthesis, sessile, linear, 10–30 × 1–2 mm, densely white tomentose abaxially, less so adaxially; cauline leaves few, linear, ca. 10 × 1 mm, both surfaces white lanate. Capitula few, 2–3 mm in diam., pedunculate, in racemes. Involucre ca. 6 × 5 mm; phyllaries 2- or 3-seriate, brown or only apex brown; outer ones obovate, 2–3 × ca. 2 mm, abaxially lanate, apex obtuse; inner ones linear-oblong, 5–6 × 1–1.5 mm, abaxially sparsely pubescent or glabrous, apex acute. Female florets: corolla filiform, 3–4 mm, apex 3-toothed, glabrous. Bisexual florets few; corolla tubular, ca. 4 mm, limbs 5-toothed, glabrous. Achenes cylindrical, 1–2 mm, sparsely pubescent. Pappus white, ca. 4 mm, sericeous, distinct, falling separately. Fl. Jun–Sep.

Alpine meadows; 2500–4000 m. N Xinjiang, W Xizang [Afghanistan, India, Pakistan; SW Asia (Caucasus, Turkey)].

3. *Gnaphalium supinum* Linnaeus, Syst. Nat., ed. 12, 3: 234. 1768.

平卧鼠麴草 ping wo shu qu cao

Homalotheca supina (Linnaeus) Fourreau; *Omalotheca supina* (Linnaeus) Candolle.

Herbs, perennial. Stems 2–8(–12) cm tall. Leaves mostly basal, in persistent rosettes, both surfaces concolorous, gray-green, linear to linear-oblancoolate, 5–25 × ca. 3 mm, cauline similar, thinly lanate, 1-veined. Capitula usually 1–7, in subcapitate to loose, spiciform arrangement. Involucre campanulate, 5–6 mm; phyllaries light green to tan, oblong to lanceolate, outer obtuse, inner mostly acute, margins and tips dark brown. Achenes obovoid, strigose. Pappus bristles distinct, falling separately. Fl. Jun–Sep. $2n = 28$.

Meadows; 200–1300 m. Xinjiang [Kazakhstan, Russia; SW Asia (Caucasus, Iran), Europe, North America (Greenland)].

4. *Gnaphalium uliginosum* Linnaeus, Sp. Pl. 2: 856. 1753.

湿生鼠麴草 shi sheng shu qu cao

Filaginnella uliginosa (Linnaeus) Opiz; *Gnaphalium baicalense* Kirpicznikov & Kuprianova; *G. kasachstanicum* Kirpicznikov & Kuprianova; *G. mandshuricum* Kirpicznikov & Kuprianova; *G. thomsonii* J. D. Hooker; *G. tranzschelii* Kirpicznikov.

Herbs, annual. Stems erect, 12–35 cm tall, usually branched from bases, sometimes simple, densely to loosely white lanate. Leaves radical and cauline, white lanate; radical and lower cauline leaves withering before anthesis; median cauline leaves numerous, linear or oblanceolate, 2–5 cm × 1.5–3(–5) mm, base attenuate, sessile, apex obtuse. Capitula glomerate in numerous clusters in axils and apex of branches, overtopped by subtending leaves. Involucre subglobose, 2–4 mm in diam., lanate at base; phyllaries brownish or green, often paler at tip; outer phyllaries obtuse. Marginal florets female; corolla filiform, ca. 1.5 mm. Disk florets ca. 1.5 mm. Achenes oblong, 0.5–0.7 mm, papillate or smooth. Pappus of distinct,

capillary bristles, white, falling separately. Fl. Jul–Oct. $2n = 14, 56$.

Marshes, riversides, moist grasslands, saline soils, roadsides, *Larix* forests. N Hebei, Heilongjiang, Jilin, Liaoning, Nei Mongol, Xinjiang, Xizang [Japan, Kazakhstan, Korea, Mongolia, Pakistan, Russia; Europe, North America].

According to Fl. Pakistan (210: 118. 2003), *Gnaphalium thomsonii* is distributed in China. After comparing the description with *G. uliginosum*, it seems these two names represent the same species. The Russian botanist Kirpicznikov recognized many names that are closely related to *G. uliginosum*. Some of them are combined herein.

5. *Gnaphalium involucratum* G. Forster, Fl. Ins. Austr. 55. 1786.

星芒鼠麴草 xing mang shu qu cao

Gnaphalium involucratum var. *ramosum* Candolle; *G. lineare* Hayata (1908), not (Candolle) Schultz Bipontinus (1845); *G. morii* Hayata; *G. sphaericum* Willdenow.

Herbs, biennial or perennial, fibrous rooted; stolons usually absent [reportedly present in Australia and New Zealand]. Aerial stems ascending or erect, 30–40 cm tall, slender or rigid, simple to much branched, thinly and persistently white tomentose to densely lanate. Leaves leathery; basal leaves shortly linear, smaller than cauline ones, withering before anthesis; cauline leaves 6 to numerous, sessile, blade linear to linear-oblancoolate or linear-lanceolate, 1–10 × 0.2–0.5 cm (largest at mid-stem), abaxially silvery, tomentose or lanate, adaxially green, glabrate, and shiny, or sparsely lanate, 1-veined, base subclasping (not ampliate) or narrowed, margin entire, revolute, apex acute, mucronulate. Bracts subtending capitula 3–5, 10–15 mm, surpassing capitula, plus some shorter. Capitula in terminal or axillary, dense, hemispheric cymes 1–2 cm in diam. Involucre campanulate, 3–4.5 × 2.5–4 mm; phyllaries 3-seriate, tawny, rosy tinged, or brownish purple, shiny, scarious, outer ones shorter, oblong or obovate, apex rounded or obtuse, inner ones linear or oblong, apex obtuse or acute. Female florets 80–150. Bisexual florets 3–5(–7). Corolla of outer florets 2.5–3 mm; style of central florets 2.5–3.5 mm. Achenes oblong, compressed, 0.5–0.6 mm, papillose or minutely gland-dotted. Pappus white, 2.5–3.5 mm; bristles distinct or basally coherent, slender. Fl. Feb–Mar, Aug–Dec.

Slopes at middle elevations and on high mountains. Taiwan [Indonesia, Malaysia, Philippines; Australia, Pacific islands (Hawaii, New Zealand)].

6. *Gnaphalium japonicum* Thunberg in Murray, Syst. Veg., ed. 14, 749. 1784.

细叶鼠麴草 xi ye shu qu cao

Herbs, perennial, from creeping rhizomes; flowering stems tufted, 8–25 cm tall, simple, white lanate. Leaves chiefly radical, few cauline; radical leaves rosulate, linear-oblancoolate, 2.5–10 cm × 4–7 mm, adaxially green, thinly lanate; median cauline leaves linear, 2–2.5 cm × 2–4 mm; uppermost leaves subtending synflorescence, lanceolate. Capitula 10 to numerous, in a dense headlike corymb. Involucre campanulate, ca. 5 × 4–5 mm; phyllaries reddish brown, imbricate, 3-seriate, obtuse,

outer ones broadly elliptic, inner ones narrowly oblong. Marginal florets female; corolla filiform, ca. 3.5 mm, shorter than style. Disk florets ca. 3.5 mm, apex pinkish. Achenes oblong, ca. 1 mm. Pappus of capillary bristles, white, ca. 3 mm. Fl.

May–Oct. $2n = 28$.

Grasslands, waste fields; 200–1800 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Shaanxi, Sichuan, Taiwan, Yunnan, Zhejiang [Japan, Korea; Oceania].

182. ANAPHALIS Candolle, Prodr. 6: 271. 1838.

香青属 *xiang qing shu*

Zhu Shixin (朱世新); Randall J. Bayer

Herbs, perennial, rarely annual or biennial, or subshrubs with somewhat woody rhizome. Stems erect or rosette-forming, simple or branching, densely white or ash-gray cottony tomentose. Leaves simple, alternate, rarely subopposite to opposite, sessile or petiole or decurrent, oblong or lanceolate, entire. Capitula with many florets, 3–15 mm in diam., subglobose campanulate or subfunneliform, arranged in corymbiform or paniculate-corymbiform branched synflorescences, rarely solitary or 2 or 3 per synflorescence. Plants dioecious or heterogamous, having different types of florets: bisexual sterile florets with predominance of female florets arranged in many marginal rows and 1 to few central male florets, or many marginal rows of male florets and a few central female florets. Involucre campanulate, turbinate, or semispherical, base tomentose; phyllaries many seriate, imbricate, erect or expanding, scarious, lower parts brown, 1-veined, upper parts usually scarious, white or yellowish white or rarely pinkish. Receptacle subconvex or flat, alveolate, without squamules. Male florets: corolla tubular, 5-denticulate; stamens basally arrow-shaped with acrose tail; stigma with 2 short lobes, apex truncate. Female florets: corolla filiform, basally slightly dilated, 2–4-denticulate; style branches long, apex subrounded. Achene oblong or subrounded, with glandular hairs or mammilla or almost glabrous, in predominantly female capitula; achenes of male florets vestigial and usually absent in predominantly male capitula. Pappus in both florets consisting of 1 row of free deciduous white hairs, almost equal to corolla, scabrid, pinnate-incrassate at tip of apex in male florets, filiform and almost smooth or slightly scabrid at tip in female florets.

About 110 species: mainly in tropical and subtropical Asia, but a few species also in temperate Asia, Europe, and North America; 54 species (40 endemic) in China; one additional species (endemic, not included in the key) is of uncertain position.

- 1a. Involucre 8–12(–15) mm, spherical or broadly campanulate; capitula usually few, arranged in sparse to compound corymbiform synflorescences, or sometimes solitary.
- 2a. Leaves not decurrent on stems; involucre spherical, capitula usually lax.
- 3a. Rhizome thickish; cauline middle leaves linear-lanceolate, cinereous or yellowish lanate; capitula congested, densely corymbiform 54. *A. acutifolia*
- 3b. Rhizome slender, sarmentose; cauline leaves oblong, oblanceolate, or spatulate; capitula usually lax corymbiform or solitary.
- 4a. Phyllaries white or yellowish white, base reddish brown; both surfaces of leaves gray lanate; Taiwan 53. *A. nagasawae*
- 4b. Phyllaries white, base dark brown; leaves adaxially arachnoid, abaxially densely gray lanate.
- 5a. Stems slender, lower parts 1–2 mm in diam.; leaf base not obviously amplexicaul, 3-veined, occasionally 1-veined; capitula few (or many) or solitary 51. *A. nepalensis*
- 5b. Stems thickish, lower parts up to 4 mm in diam.; leaves broad and large, base amplexicaul, 3- or 5-veined 52. *A. triplinervis*
- 2b. Leaves somewhat decurrent and winglike on stems; capitula densely congested forming globose corymbs, or solitary.
- 6a. Perennial herbs, rhizome slender; involucre broadly campanulate or semispherical, 8–11 mm.
- 7a. Phyllaries yellowish white, yellow, or sulfureous, rarely reddish; leaves gray or yellowish white arachnoid tomentose on both surfaces 49. *A. flavescens*
- 7b. Phyllaries white; leaves somewhat green, both surfaces with capitate glandular hairs and canescent arachnoid tomentum on margin 50. *A. hancockii*
- 6b. Small or pulvinate subshrubs; involucre spherical.
- 8a. Stems and both surfaces of leaves grayish, tangled-cottony, felty-papery tomentose 45. *A. chlamydophylla*
- 8b. Stems and both surfaces of leaves usually without above indumentum.
- 9a. Stems and both surfaces of leaves yellowish brown long lanate; phyllaries wax-yellow or dark yellow; stems 6–20 cm 46. *A. pannosa*
- 9b. Stems and both surfaces of leaves yellowish or grayish white lanate; stems 3–8 cm or acaulescent.
- 10a. Both surfaces of leaves yellowish green, grayish white, or yellowish white tomentose; phyllaries white or yellowish white, base brown 48. *A. viridis*
- 10b. Both surfaces of leaves cinereous or grayish white lanate; phyllaries white, base dark brown 47. *A. cinerascens*
- 1b. Involucre 4–8 mm, obovate, campanulate, or semispherical; phyllaries obtuse or rounded at apex, rarely acuminate, usually expanding after flowering; capitula usually numerous, rarely few, congested to compound corymbiform or corymbiform at apex of stems or branches.

- 11a. Leaves not or scarcely decurrent on stems.
- 12a. Leaf base cordate or auriculate, semiamplexicaul, margin recurved, thin or submembranous.
- 13a. Plants tall, stems thickish, lower parts 2–4 mm in diam.; leaves large, 1.5–6 cm, arachnoid or glabrous adaxially 8. *A. contorta*
- 13b. Plants short, stems slender, lower parts ca. 1 mm in diam.; leaves 0.5–1.5 cm, lanate on both surfaces 9. *A. hondae*
- 12b. Leaf base attenuate, not obviously amplexicaul, margin flat or recurved, thick.
- 14a. Multibranched subshrubs, usually fastigiate; leaves narrowly linear, margin recurved, densely white tomentose on both surfaces 10. *A. virgata*
- 14b. Perennial herbs, or stem base woody, or subshrubs, unbranched or branched but not fastigiate; leaves not linear, margin flat or recurved.
- 15a. Leaves gradually larger upward from middle, densely arranged to radiate under synflorescences, usually longer than compound corymb or corymb.
- 16a. Upper leaves elliptic, apex acuminate; phyllaries white 32. *A. oxyphylla*
- 16b. Upper leaves oblong-lanceolate, apex acute; phyllaries purple-red or margin white 33. *A. porphyrolepis*
- 15b. Leaves gradually smaller upward from middle, not dense under synflorescences, upper ones shorter than compound corymb or corymb.
- 17a. Stems gray tangled papery tomentose; leaves white cottony tomentose 7. *A. contortiformis*
- 17b. Stems gray tomentose; leaves arachnoid or later glabrous adaxially, densely gray to rufous tomentose abaxially, or both surfaces white tomentose.
- 18a. Leaves densely white tomentose, 0.8–1 cm, margin recurved; middle phyllaries with longitudinal corrugation, apex rounded 6. *A. plicata*
- 18b. Leaves arachnoid or later glabrous adaxially, densely gray to rufous tomentose abaxially, 1.5–10 cm; middle phyllaries without longitudinal corrugation.
- 19a. Leaves linear or linear-lanceolate, 5–10 cm, margin flat, base not decurrent on stems; phyllaries milky white, apex obtuse or rounded, rarely acuminate 3. *A. margaritacea*
- 19b. Leaves usually linear or linear-oblong, 1.5–3.5 cm, base slightly decurrent on stems; phyllaries snow white or yellowish white.
- 20a. Involucre 5–7 mm, phyllaries snow white; Xizang 4. *A. royleana*
- 20b. Involucre ca. 5 mm, phyllaries yellowish white; Taiwan 5. *A. morrisonicola*
- 11b. Leaves decurrent to broadly or narrowly winged on stems.
- 21a. Stems, leaves, and involucre base with rust-colored stalked adhesive hairs; involucre obovate, phyllaries beige, membranous, translucent, not expanding 1. *A. bulleyana*
- 21b. Stems, leaves, and involucre base gray, white, or yellowish brown lanate, with squarrose or capitate-stalked glandular hairs, or arachnoid, or somewhat glabrous; involucre campanulate or semispherical, phyllaries white or reddish, usually scarious, opaque, rarely membranous, somewhat expanding.
- 22a. Biennial herbs with thickish taproot 2. *A. busua*
- 22b. Perennial herbs with rhizome, or multibranched subshrubs or small subshrubs.
- 23a. Both surfaces of leaves arachnoid at first, later glabrous except midvein and margin, without glandular hairs, dark green when dry; perennial herbs 11. *A. delavayi*
- 23b. Both surfaces of leaves or only abaxially tomentose, or both surfaces or adaxially with squarrose or capitate-stalked glandular hairs, or adaxially glabrous and green when dry; subshrubs or perennial herbs.
- 24a. Subshrubs or small subshrubs, stems multibranched.
- 25a. Involucre 6–8 mm, broadly campanulate; both surfaces of leaves arachnoid tomentose or adaxially glabrous.
- 26a. Phyllaries dark yellow or adaxially wax-yellow; leaves spatulate or oblong-spatulate, margin flat, both surfaces tomentose 34. *A. yunnanensis*
- 26b. Phyllaries white or pale reddish white; leaves obovate or ovate-oblong, adaxially arachnoid tomentose or glabrous, abaxially tomentose 35. *A. muliensis*
- 25b. Involucre 4–5 mm, narrowly campanulate or campanulate, very rarely up to 6 mm in male plants; leaves tomentose or adaxially glandular or squarrose tomentose.
- 27a. Leaves spatulate-obovate; phyllaries white or pale red 36. *A. suffruticosa*
- 27b. Leaves narrower, not spatulate-obovate; phyllaries white.
- 28a. Leaves narrowly oblong or linear-oblong, both surfaces arachnoid tomentose or abaxially densely white or yellowish white tomentose 37. *A. stenocephala*
- 28b. Leaves linear or linear-lanceolate, adaxially arachnoid or capitate glandular or squarrose tomentose, abaxially densely gray tomentose 38. *A. gracilis*
- 24b. Perennial herbs with rhizome, sometimes with taproot, stems unbranched or lower part woody and with developing axillary buds or short branches.
- 29a. Phyllary claw with glandular dots at apex; both surfaces of leaves gray or yellowish white tomentose, or only with capitate-stalked glandular hairs 12. *A. latialata*

- 29b. Phyllary claw without glandular dots at apex.
- 30a. Stem slender, 1–2 mm in diam., densely many clustered; leaves narrowly linear, margin undulate recurved 29. *A. tibetica*
- 30b. Stems slender or thickish, not densely many clustered; leaf margin flat or slightly reflexed or recurved and blade not narrowly linear.
- 31a. Leaves adaxially at first arachnoid, later glabrous, without glandular hairs, or with appressed thick hairs, abaxially usually white tomentose.
- 32a. Involucre 4–5 mm, campanulate; leaves 3-veined 27. *A. corymbifera*
- 32b. Involucre 6–8 mm, broadly or narrowly campanulate; leaves 1- or 3-veined.
- 33a. Middle leaves oblong-lanceolate, 2–3 × 0.4–1 cm, margin usually reflexed or slightly recurved, obviously 3-veined 15. *A. likiangensis*
- 33b. Leaves oblanceolate or narrowly winged, 0.4–1.3 × 0.2–0.25 cm, margin flat, 1-veined 16. *A. tenuissima*
- 31b. Leaves adaxially with lanate or squarrose or capitate-stalked glandular hairs, not glabrous.
- 34a. Phyllaries scarious at upper parts or apex, white, opaque, middle and lower parts membranous, somewhat transparent, apex obtuse or slightly acuminate.
- 35a. Leaves oblanceolate or linear-oblong, 2.5–4.5 × 0.5–2 cm; involucre 6–7 mm 14. *A. hymenolepis*
- 35b. Leaves linear-spatulate, 2.5–5 × 0.2–0.5 cm; involucre 4–5 mm 26. *A. flaccida*
- 34b. Phyllaries all scarious, opaque.
- 36a. Stems 50–100 cm, lower parts woody, persistent, usually with developing axillary buds or branches 30. *A. surculosa*
- 36b. Stems 3–50 cm, herbaceous, unbranched, rarely lower parts slightly woody, with developing axillary buds or branches.
- 37a. Both surfaces of leaves tangled to cottony-papery tomentose; phyllaries wax-yellow when dry 28. *A. pachylaena*
- 37b. Both surfaces of leaves or abaxially white, gray, or yellowish white tomentose or arachnoid, or adaxially with squarrose or capitate-stalked glandular hairs.
- 38a. Plants with thickish woody roots or rhizome; stems unbranched.
- 39a. Both surfaces of leaves white, gray, or cinereous tomentose, without obvious capitate glandular hairs.
- 40a. Involucre ca. 5 mm, phyllaries white, apex obtuse or subrounded 43. *A. szechuanensis*
- 40b. Involucre 6–8 mm, rarely only ca. 5 mm, phyllaries white, reddish, or red-purple.
- 41a. Phyllaries purple-red or white, usually yellowish white when dry, inner ones with apex acute; leaves cinereous tomentose; flowering and sterile stems congested to pulvinate 42. *A. rhododactyla*
- 41b. Phyllaries milky white or somewhat red, apex obtuse or rounded; leaves densely white or gray tomentose; flowering stems and rosette leaves usually caespitose.
- 42a. Involucre (5–)6(–7) × 5–7 mm; capitula numerous, densely compound corymbiform 39. *A. lactea*
- 42b. Involucre ca. 7 × 8 mm; capitula 4–8, densely corymbiform or headlike 40. *A. batangensis*
- 39b. Both surfaces of leaves with obvious capitate glandular hairs or arachnoid, or margin and abaxially or rosette leaves tomentose.
- 43a. Leaves (dried) thin, yellowish green, cauline leaves with glandular hairs, only arachnoid along veins; phyllaries yellowish white, apex obtuse or rounded 18. *A. virens*
- 43b. Leaves thick, both surfaces with arachnoid and glandular hairs; phyllaries white or sometimes pale red.
- 44a. Stems 3–7 cm, rarely taller; flowering stems and rosette leaves somewhat congested to pulvinate 44. *A. xylorhiza*
- 44b. Stems 15–50 cm, rarely shorter; flowering stems and rosette leaves somewhat clustered.
- 45a. Lower stems woody, persistent; middle leaves elliptic or oblong-lanceolate, margin and midvein abaxially arachnoid tomentose; involucre 6–7 mm, phyllaries ivory white or somewhat reddish 19. *A. elegans*
- 45b. Stems herbaceous; middle leaves oblanceolate-oblong or linear, both surfaces arachnoid tomentose; involucre 5–7 mm, phyllaries white 41. *A. souliei*
- 38b. Plants with long slender rhizome.

- 46a. Lower stem slightly woody, with tomentose axillary buds or short branches; leaves adaxially arachnoid, later glabrous, abaxially thinly arachnoid tomentose and glandular, upper leaves usually tomentose on both surfaces 17. *A. deserti*
- 46b. Stems unbranched, or sometimes branched from broken stems; leaves adaxially tomentose, or with squarrose or glandular hairs.
- 47a. Involucre 6–8 mm; both surfaces of leaves gray, yellowish white, or rarely yellowish brown tomentose or lanate.
- 48a. Both surfaces of leaves gray tomentose, or upper stems and leaves fulvous tomentose 13. *A. bicolor*
- 48b. Both surfaces of leaves yellowish white lanate or arachnoid lanate, 3-veined.
- 49a. Leaves lingulate or linear-oblong, gradually smaller upward 20. *A. chungtienensis*
- 49b. Leaves oblanceolate, gradually larger upward 31. *A. larium*
- 47b. Involucre 4–5 mm or to 6 mm; both surfaces of leaves or abaxially white or gray tomentose.
- 50a. Both surfaces of leaves dark cinereous, densely tomentose and with capitate glandular hairs.
- 51a. Leaves obovate or oblanceolate-spatulate; capitula numerous, congested in compound corymb 22. *A. spodiophylla*
- 51b. Leaves broadly elliptic or subrounded; capitula few, arranged in compound corymb 23. *A. yangii*
- 50b. Leaves adaxially with squarrose or capitate glandular hairs, abaxially or both surfaces white or gray tomentose.
- 52a. Involucre semispherical; stems 10–18 cm; Taiwan 24. *A. transnokoensis*
- 52b. Involucre campanulate or subobconic; stems 20–60 cm.
- 53a. Involucre 4–5 mm, phyllaries white or sometimes pale red; stems densely leafy, internode 0.5–2 cm; leaves 1- or 3-veined 21. *A. sinica*
- 53b. Involucre 5–6 mm or more, phyllaries white or yellowish white; upper stems sparsely leafy, internode 4–10 cm; leaves 3- or 5-veined 25. *A. aureopunctata*

1. *Anaphalis bulleyana* (Jeffrey) C. C. Chang, *Sinensia* 6: 549. 1935.

粘毛香青 nian mao xiang qing

Pluchea bulleyana Jeffrey, *Notes Roy. Bot. Gard. Edinburgh* 5: 183. 1912; *Conyza mollis* H. Léveillé (1912), not Willdenow (1803).

Herbs, annual or biennial, with thickish taproot, rosette leaves, and solitary or a few caespitose flowering stems, all arachnoid long cottony tomentose and with rusty brown adhesive stalked glandular hairs. Stems erect, 30–80 cm, channeled, usually branched, lower parts usually glabrous, upper parts densely hairy. Rosette leaves obovate, ca. 9 × 5.5 cm, long cottony tomentose, base attenuate and becoming a short winged petiole; lower leaves often caducous and withered by anthesis; middle and upper leaves oblanceolate or obovate-spatulate, 3.5–10 × 1–2.5 cm, both surfaces pilose glandular, long cottony tomentose along veins, 3-veined and with lateral veins, base decurrent on stems and becoming a cuneate broad wing, margin flat, apex acute; uppermost leaves smaller, linear-lanceolate. Capitula numerous, congested in compound corymbiform synflorescences terminal on stems and branches; peduncle ca. 6 mm. Involucre obovate, 5–6 × 4–7 mm; phyllaries 4- or 5-seriate, erect, light brown, hyaline, base light lutescent, not expanding; outer phyllaries short, ovate-oblong, apex obtuse, arachnoid hairy; middle ones narrowly spatulate, 5–6 mm; innermost ones broadly linear, with a claw ca. 2/3 of full length. Receptacle alveolate. Capitulum with many florets, with 4 or 5 or 30 central male florets and many or few rows of marginal

female florets. Corolla 3–5 mm. Pappus slightly exerted from corolla; male florets pappus somewhat incrassate at tip of apex, serrulate. Achene oblong, 0.6–0.7 mm, glandular. Fl. Aug–Sep, fr. Sep–Oct.

• Subalpine wet slopes, low hill grasslands; 1100–3300 m. Guizhou, W Sichuan, N and NW Yunnan.

The species is unique in the genus for its color and structure of phyllaries.

2. *Anaphalis busua* (Buchanan-Hamilton ex D. Don) Candolle, *Prodr.* 6: 275. 1838.

蛛毛香青 zhu mao xiang qing

Gnaphalium busua Buchanan-Hamilton ex D. Don, *Prodr. Fl. Nepal.* 173. 1825; *Anaphalis araneosa* Candolle; *A. semidecurrrens* (Wallich ex Candolle) Candolle; *G. semidecurrrens* Wallich ex Candolle.

Herbs, ?biennial, with thickish taproots or usually adventitious roots at base of stems. Stems erect, (2–)5–6(–13) cm, with ascending or expanding branches, lower parts glabrous or later brownish glandular hairy, upper parts arachnoid tomentose; internode 0.5–2.5 cm. Lower cauline leaves often caducous and lost by anthesis; middle leaves linear or linear-lanceolate, 3–10 × 0.4–1 cm, base almost equilateral, decurrent on stems forming a cuneate attenuate long wing, margin flat or somewhat undulate, apex apiculate; upper leaves smaller, linear or subulate; all leaves thin, gray-green with yellow spot and squarrose hairy abaxially, green and squarrose hairy adaxially,

arachnoid tomentose along veins on both surfaces and/or margin arachnoid cottony tomentose abaxially, midvein exerted abaxially, lateral veins somewhat conspicuous. Capitula numerous, compound corymbiform, terminal on branches; peduncle ca. 4 mm. Involucre broadly campanulate, 4–5 × 5–7 mm; phyllaries 4- or 5-seriate, white, somewhat brownish abaxially; outer phyllaries elliptic, ca. 4 mm; middle ones oval, ca. 4.5 × 1.8–2 mm, 1.3–1.5 mm in female florets, apex arcuate; innermost ones spatulate, ca. 3.5 mm, with a claw ca. 1/3 of full length. Receptacle alveolate. Predominantly female capitula with many florets, with 4–10 or more central male florets and many rows of marginal female florets; predominantly male capitula with many florets, with few rows of marginal female florets and many rows of central male florets. Corolla ca. 2.5 mm, almost as long as pappus; male florets pappus incrassate at tip of apex, serrulate. Achene elliptic, only 0.4–0.8 mm, glandular. Fl. Sep–Oct, fr. Oct. $2n = 42$.

Low hill valleys, slopes, woodlands, grasslands; 1500–2800 m. SW Sichuan (Dechang, Miyi), S Xizang (Zhufeng), NW and W Yunnan [Bhutan, N India, Kashmir, Nepal].

3. *Anaphalis margaritacea* (Linnaeus) Benth & J. D. Hooker, Gen. Pl. 2: 303. 1873.

珠光香青 *zhu guang xiang qing*

Herbs, perennial. Rhizome repent, woody, with short brown squamate runners. Stems solitary or a few caespitose, erect or ascending, 30–60(–100) cm, usually thickish, unbranched, rarely branching on broken or normal stems, ash-gray cottony tomentose, base woody. Lower leaves withered by anthesis, apex obtuse; middle leaves expanding, linear or linear-lanceolate, 5–10 cm × 3–12 mm, rarely wider, base attenuate or sharply narrowed, somewhat amplexicaul, margin flat, apex acuminate with small tip; upper leaves gradually smaller with long tip; all leaves slightly leathery, abaxially densely ash-gray to reddish brown lanuginous, adaxially arachnoid or later glabrous, 1-veined, or 3- or 5-veined. Capitula numerous, arranged in compound corymbiform (or corymbiform) synflorescences; peduncle 4–17 mm. Involucre broadly campanulate or semi-spherical, 5–8 × 8–13 mm; phyllaries 5–7-seriate, somewhat expanding, upper parts white; outer phyllaries up to 1/3 of involucre, ovate, cottony tomentose; middle ones ovate to oblong, ca. 5 × 2.5 mm, up to 3 mm wide in male plants, apex rounded or acuminate; innermost ones linear-lanceolate, ca. 0.5 mm wide, with a claw up to 3/4 of full length. Receptacle alveolate. Predominantly female capitula with many florets, with 3–20 central male florets and many rows of marginal female florets. Predominantly male capitula with many florets, with all central male florets or few rows of marginal female florets. Corolla 3–5 mm. Pappus slightly exerted from corolla, filiform in female florets, incrassate at tip of apex, serrulate in male florets. Achene oblong, ca. 0.7 mm, with glandular dots. Fl. and fr. Jul–Nov. $2n = 28^*$, 42, 56*.

Conifer and *Betula* forests, dry soils, subalpine or low mountain grasslands or shrublands, rocky valleys and roadsides, slopes, banks; 300–3400 m. E, S, and W Gansu, Guangdong, Guangxi, Guizhou, Hebei, Henan, E and W Hubei, Hunan, Jiangxi, Qinghai, S Shanxi, Sichuan, Taiwan, Xizang, Yunnan [Bhutan, India, Japan, Korea, Myan-

mar, Nepal, Russia (Far East), N Thailand, Vietnam; North America; widely introduced in Europe].

- 1a. Leaves 3- or 5-veined or with 2 veinlets between veins, oblong or linear-lanceolate, 7–12 mm wide 3c. var. *cinnamomea*
- 1b. Leaves 1-veined or with 2 veinlets on margin, linear or linear-lanceolate, 3–8 mm wide.
 - 2a. Leaves linear-lanceolate, 3–8 mm wide 3a. var. *margaritacea*
 - 2b. Leaves linear, 3–6 mm wide 3b. var. *angustifolia*

3a. *Anaphalis margaritacea* var. *margaritacea*

珠光香青(原变种) *zhu guang xiang qing* (yuan bian zhong)

Gnaphalium margaritaceum Linnaeus, Sp. Pl. 2: 850. 1753; *Anaphalis cinnamomea* (Candolle) C. B. Clarke var. *angustior* (Miquel) Nakai; *A. margaritacea* subsp. *angustior* (Miquel) Kitamura; *A. margaritacea* var. *angustior* (Miquel) Nakai; *Antennaria cinnamomea* Candolle var. *angustior* Miquel; *A. margaritacea* (Linnaeus) R. Brown; *A. timmia* D. Don; *G. margaritaceum* var. *timmia* (D. Don) Kuntze; *G. timmia* (D. Don) Sprengel; *Helichrysum margaritaceum* (Linnaeus) Moench.

Stems 30–60 cm, sometimes to 100 cm. Leaves linear-lanceolate, 5–9 cm × 3–8 mm, abaxially densely gray or light brown lanuginous, adaxially arachnoid or later glabrous, midvein raised, always with 2 veinlets on margin, base attenuate. Involucre 6–8 × 8–13 mm. $2n = 28^*$, 56*.

Subalpine or low mountain grasslands, rocky valleys and roadsides; 300–3400 m. S Gansu, N Guangxi, W Hubei, S Hunan, E Qinghai, S Shanxi (Qin Ling), Sichuan, Xizang, Yunnan [India, Japan, Nepal, Russia (Far East); North America; widely introduced in Europe].

This taxon is extremely variable.

3b. *Anaphalis margaritacea* var. *angustifolia* (Franchet & Savatier) Hayata, J. Coll. Sci. Imp. Univ. Tokyo 25(19): 128. 1908.

线叶珠光香青 *xian ye zhu guang xiang qing*

Gnaphalium margaritaceum var. *angustifolium* Franchet & Savatier, Enum. Pl. Jap. 1: 242. 1875, based on *Antennaria japonica* Miquel, Ann. Mus. Bot. Lugduno-Batavi 2: 178. 1866 [“*iaponica*”], not Turczaninow (1851); *Anaphalis margaritacea* subsp. *japonica* Kitamura; *A. margaritacea* var. *japonica* Makino, nom. illeg. superfl.; *A. margaritacea* var. *tsoongiana* Y. Ling.

Stems 30–60 cm. Leaves linear, 3–10 cm × 3–6 mm, acuminate; lower leaves obtuse or rounded, abaxially densely light brown or yellowish brown lanuginous, adaxially arachnoid or glabrous. Involucre sometimes small, ca. 5 mm. Corolla ca. 3 mm.

Subalpine or low mountain grasslands, rocky valleys and roadsides; 300–3400 m. S and W Gansu, Guizhou, Henan, E Hubei, Qinghai, S Shanxi, Sichuan, Xizang (Bomi, Zayü), Yunnan [Japan, Korea].

This taxon is extremely variable in length, width of leaves, and length of internode.

3c. *Anaphalis margaritacea* var. *cinnamomea* (Candolle) Herder ex Maximowicz, Bull. Acad. Imp. Sci. Saint-Petersbourg 27: 481. 1882.

黄褐珠光香青 huang he zhu guang xiang qing

Antennaria cinnamomea Candolle, Prodr. 6: 270. 1838;
Anaphalis cinnamomea (Candolle) C. B. Clarke.

Stems 50–100 cm. Leaves oblong or linear-lanceolate, 4–9 cm × 7–12 mm, sometimes to 25 mm, abaxially densely yellowish brown or reddish brown lanuginous, adaxially gray arachnoid lanuginous, raised 3- or 5-veined, base weakly auriculate, apex acuminate. Involucre same as var. *angustifolia*. $2n = 42$.

Low mountain or subalpine shrublands, grasslands, slopes, banks; 500–2800 m. E and S Gansu (Tianshui, Yuzhong), Guangdong, Guangxi, Guizhou, W Hubei (Enshi), Hunan, Jiangxi, S Shanxi, Sichuan, Xizang, Yunnan [Bhutan, India, Myanmar, Nepal].

4. *Anaphalis royleana* Candolle, Prodr. 6: 272. 1838.

须弥香青 xu mi xiang qing

Anaphalis polylepis Candolle.

Herbs or subshrubs, base ± woody, branched. Branches erect or unbranched, white tomentose. Leaves dense, sessile, somewhat adnate to stem, linear-oblong or oblong-lanceolate, 2–3 cm, 1-veined, abaxially white arachnoid tomentose or gray or reddish brown lanuginous, adaxially subglabrous, base weakly decurrent, margin entire, apex obtuse or acute, with short cusp. Capitula 7–9, densely arranged in corymbiform synflorescences; peduncle ash-gray cottony tomentose, as long as synflorescence. Involucre 5–7 mm; phyllaries snow white, glabrous, apex obtuse or acuminate; outer phyllaries ovate, shorter; middle ones ovate-oblong, longer than florets; innermost ones linear-oblong, as long as disk. $2n = 28^*$.

Xizang [Bhutan, India, Kashmir, Nepal].

5. *Anaphalis morrisonicola* Hayata, Icon. Pl. Formosan. 8: 56. 1919.

玉山香青 yu shan xiang qing

Anaphalis buisanensis Hayata; *A. contorta* (D. Don) J. D. Hooker var. *morrisonicola* (Hayata) Yamamoto; *A. margaritacea* (Linnaeus) Benth & J. D. Hooker f. *morrisonicola* Hayata; *A. margaritacea* subsp. *morrisonicola* (Hayata) Kitamura; *A. margaritacea* f. *nana* Hayata.

Rhizome repent, somewhat woody, usually sarmentose. Stems usually caespitose, erect or ascending, 15–40 cm, slender, much branched or unbranched, densely ash-gray cottony tomentose; internodes short. Lower leaves persistent or caducous and lost by anthesis, smaller, apex obtuse; middle leaves expanding, linear, oblong, or oblanceolate-linear, 1.5–3.5 × 0.2–0.4(–0.7) cm, base attenuate, semiamplexicaul and somewhat decurrent, margin flat, apex acute or obtuse, with small cusp; upper leaves stenophyllous; all leaves slightly leathery, abaxially densely ash-gray or fulvous cottony tomentose, adaxially glabrous or arachnoid tomentose, 1- or 3-veined. Capitula 5 or more, arranged in corymbiform synflorescence terminal on

stems; peduncle 2–6 mm. Involucre broadly campanulate or semispherical, ca. 5 × 5–6 mm; phyllaries 7- or 8-seriate; outer phyllaries ovate, 1–2 mm, cottony tomentose; middle ones yellowish white, elliptic, ca. 4.3 × 1.5 mm; innermost ones narrower, spatulate, with a claw ca. 2/3 of full length. Receptacle alveolate. Predominantly female capitula with outer florets female, with 3 or 4 male florets present in center; predominantly male capitula with male florets only. Corolla ca. 3 mm. Pappus as long as corolla; male florets pappus somewhat incrassate at tip of apex, serrulate. Achene oblong, 0.5–0.7 mm, with lax glandular spots. Fl. and fr. Jul–Oct. $2n = 28^*$.

Low hills, subalpine grasslands, rocks; 1600–3500 m. Taiwan [Philippines].

6. *Anaphalis plicata* Kitamura, Acta Phytotax. Geobot. 15: 37. 1953.

褶苞香青 zhe bao xiang qing

Herbs, perennial. Stems ca. 10 cm, woody, 1–2 mm in diam., branched; branches ascending or arcuate-ascending, densely cottony tomentose, densely leafy, bi-corymbiform branched at apex of flowering stems, compound corymbiform, 1.5–2 mm in diam. Rosette leaves at apex of sterile branches, linear-lanceolate, 8–10 mm; lower leaves small, 4–5 mm wide, both surfaces densely white cottony tomentose, margin flat, apex obtuse; middle leaves sessile, expanding, linear-lanceolate, 8–10 × 1.5–2 mm, both surfaces densely white cottony tomentose, base somewhat decurrent, margin recurved, apex obtuse, with small cusp; leaves 5–8 mm in synflorescence. Capitula 20–30, arranged in compound corymbiform synflorescences, globose, ca. 5 × 6 mm when dry; peduncle 0–2 mm. Involucre base densely cottony tomentose; phyllaries 4- or 5-seriate; outer phyllaries opaque, somewhat brownish abaxially, ovate or oblong, 2–2.5 mm, apex obtuse; middle ones expanding, middle to apex white, lower parts hyaline, oblanceolate-oblong, sometimes lanceolate, 4–4.5 mm, margin flat, apex rounded, with longitudinal corrugation. Receptacle alveolate. All florets male, sterile; corolla tubular, ca. 2.5 mm. Pappus white, ca. 3.2 mm, with hairs of apex slender and scabrid and easily deciduous. Fl. Sep. $2n = 56^*$.

• E and S Xizang (Lhasa, Markam).

No specimens of this species were seen by the second author.

7. *Anaphalis contortiformis* Handel-Mazzetti, Acta Horti Gothob. 12: 245. 1938.

银衣香青 yin yi xiang qing

Subshrubs. Rhizome thickish. Sobols densely white cottony tomentose, usually with large leaves, caespitose with flowering stems. Stems erect, 30–60 cm, slightly slender, ash-gray silky tangled papery tomentose, virgate, base woody, usually densely leafy. Leaves expanding, 2–6 cm × 2–5 mm; lower leaves usually caducous and lost by anthesis; middle leaves linear or oblong-linear, broad or somewhat narrow at base, base decurrent on stems and becoming a short and narrow wing, apex acute or acuminate, with short cusp; upper leaves narrow and small, linear or subulate; all leaves white cottony tomentose, margin flat or somewhat recurved, midvein somewhat ex-

serted abaxially. Capitula 10 to numerous, densely arranged in compound corymbiform synflorescence; peduncle 1–2 mm; common peduncle of synflorescence ca. 2 cm. Involucre campanulate, ca. 5 × 5–6 mm; phyllaries ca. 5-seriate; outer phyllaries fulvous, ovate, ca. 3 mm, cottony tomentose; middle ones white, oblanceolate-oblong, ca. 4.3 mm, ca. 1 mm wide in female florets, ca. 1.5 mm wide in male florets; innermost ones narrowly oblong, with a claw ca. 2/3 of full length. Receptacle with fimbriate appendage. Predominantly female capitula with many florets, with 1–5 central male florets and many rows of marginal female florets; predominantly male capitula with many florets, with all central male florets or 1–10 marginal female florets. Corolla ca. 3 mm. Pappus slightly longer than corolla; male florets pappus somewhat incrassate at tip of apex, serrulate. Achene oblong, ca. 1 mm, puberulent and glandular. Fl. Jul–Oct, fr. Sep–Dec.

- Slopes, grasslands; 1500–2800 m. Xizang, Yunnan.

8. *Anaphalis contorta* (D. Don) J. D. Hooker, Fl. Brit. India 3: 284. 1881.

旋叶香青 xuan ye xiang qing

Antennaria contorta D. Don, Bot. Reg. 7: t. 605. 1822; *Anaphalis contorta* var. *pellucida* (Franchet) Y. Ling; *A. falconeri* C. B. Clarke; *A. franchetiana* Diels; *A. tenella* Candolle; *Gnaphalium contortum* (D. Don) Buchanan-Hamilton; *G. pellucidum* Franchet.

Rhizome woody, with solitary or caespitose sobols and flowering stems. Stems erect or ascending, 15–80 cm, somewhat slender, woody at base, virgate, densely white cottony tomentose, lower parts sometimes glabrous or with cottony tomentose axillary buds, rather densely leafy. Lower leaves caducous and lost by anthesis; leaves expanding or explanate, linear, 1.5–6 × 0.4–0.5 cm, larger upward, base cordate and auriculate-clasping, margin revolute, apex acuminate, sometimes with black tip; uppermost leaves small and narrow; all leaves densely whitish tomentose abaxially, arachnoid hairy or glabrous adaxially, midvein somewhat exerted abaxially; leaves oblong-lanceolate or oblanceolate in sobols, long cottony tomentose. Capitula rather numerous, dense, compound corymbiform, terminal on stems and branches; peduncle ca. 3 cm or absent. Involucre campanulate, 5–6 × 4–6 mm; phyllaries 5- or 6-seriate; outer phyllaries slightly fulvous or purple-red, ovate, ca. 2.5 mm, cottony tomentose; middle ones obovate-oblong, ca. 4 mm, rounded at apex, white and ca. 1.2 mm wide in female florets, milky or rarely somewhat red and ca. 1.5 mm wide in male florets; innermost ones spatulate, with a claw ca. 2/3 of full length. Receptacle alveolate. Predominantly female capitula with many florets, with 1–4 central male florets and many rows of marginal female florets; predominantly male capitula with many florets, with all central male florets. Corolla 2.3–3 mm. Pappus almost as long as corolla; male florets pappus somewhat incrassate at tip of apex. Achene oblong, with small glands. Fl. and fr. Aug–Oct. $2n = 28$.

Slopes, grasslands; 1700–3500 m. W Guizhou (Huangcaoba), Hunan, Sichuan, Xizang, Yunnan [Afghanistan, Bhutan, India, Kashmir, Nepal].

9. *Anaphalis hondae* Kitamura, Acta Phytotax. Geobot. 15: 78. 1953.

多茎香青 duo jing xiang qing

Rhizome repent, woody, with dense slender roots. Flowering stems and sterile stems numerous and caespitose. Stems erect or ascending, 5–10 cm, slender, woody at base, white or ash-gray cottony tomentose, lower parts later glabrous, usually unbranched, developed axillary buds at lower parts, all plants densely leafy. Leaves expanding, lower leaves usually caducous and lost by anthesis, linear, 5–10 × ca. 1 mm, base equilateral, semiamplexicaul; middle and upper leaves lanceolate-linear, 10–15 mm, base slightly ampliate, auriculate, amplexicaul, margin recurved, apex acute, with small tip; all leaves ash-gray cottony tomentose, midvein somewhat exerted abaxially and densely white lanate. Sterile stems relatively shorter, 2–4 mm, leaves dense, upper leaves relatively broader and shorter, obovate or spatulate, margin flat. Capitula numerous, arranged in corymbiform or compound-corymbiform synflorescences, terminal on stems and branches; peduncle 1–3 mm. Involucre broadly campanulate, 4–5 × 5–6 mm, lanate at base; phyllaries ca. 4-seriate, brownish at base, apex light yellow; outer phyllaries ovate, ca. 2 mm; middle ones oblong; innermost ones oblanceolate, with a claw ca. 2/3 of full length. Receptacle alveolate. Predominantly male capitula with male florets only. Corolla 3–3.5 mm. Pappus slightly shorter than corolla, slightly incrassate at tip of apex, serrulate. Female florets unknown. Fl. Jul–Oct.

Riverside sands. Xizang (Lhasa, Yadong) [Nepal].

No specimens of this species were seen by the second author.

10. *Anaphalis virgata* Thomson in C. B. Clarke, Compos. Ind. 107. 1876.

帚枝香青 zhou zhi xiang qing

Herbs, perennial, or subshrubs, woody at base; rootstock thickish, woody. Stems numerous, virgate, erect or ascending, thin, densely leafy, white tomentose, floriferous, branching in upper parts, 20–40(–50) cm; sterile shoots numerous and considerably less high. Leaves sessile, linear, 1–25 cm, both surfaces pubescent, apex acute, with very short cusp (mucronulate) or without cusp. Capitula dense, corymbiform or paniculate-corymbiform, terminal, often with elongate lower branches, 3–4 mm in diam., upper capitula short, lower ones elongate pedunculate, or globose-campanulate, numerous. Involucre: outer phyllaries oblong, others lanceolate-oblong, from base to middle tomentose, brown or brownish, toward apex glabrous, whitish, and obtuse, 3–4 mm. Receptacle lacunose, glabrous. Female florets ca. 3 mm, thinly tubular; stigma exerted, bipartite; pappus of thin hairs as long as corolla. Center of capitulum with 2–4 sterile bisexual broadly tubular florets, glandular at apex; pappus of hairs shortly pinnate at apex and somewhat exceeding corolla. Male florets ca. 3.5 mm, narrowly campanulate-tubular; corolla limb 5-partite, glandular at apex; pappus of short, pinnate hairs slightly shorter than corolla. Achenes brownish, oblong, ca. 0.75 mm. Fl. Jul–Oct.

3000–4000 m. Xinjiang, W Xizang [Kashmir, Nepal, Pakistan; C Asia, SW Asia (Iran)].

No Chinese specimens of this species were seen by the present authors. The above description was based on specimens from Kashmir.

11. *Anaphalis delavayi* (Franchet) Diels, Notes Roy. Bot. Gard. Edinburgh 7: 337. 1912.

苍山香青 *cang shan xiang qing*

Gnaphalium delavayi Franchet, J. Bot. (Morot) 10: 409. 1896.

Herbs, perennial. Rhizome thickish, somewhat woody, with withered leaves and sobols or runners bearing squamiform leaves. Stems erect, 5–35 cm, somewhat thickish, lower parts glabrous, upper parts ash-gray arachnoid, all plants with sparse leaves. Rosette leaves obovate-spatulate, 1.5–3.5 × 1–1.5 cm; lower leaves usually caducous and lost by anthesis; middle leaves erect or somewhat expanding, obovate-oblong or oblong, 4–6 × 1–2 cm, base decurrent and becoming cuneate or a narrow wing, margin flat, apex obtuse or rounded, with small cusp; upper leaves narrow and small, apex acute; all leaves densely arachnoid abaxially, sparsely arachnoid hairy adaxially, later glabrous except for midvein and margin, midvein somewhat exserted abaxially, with 3 conspicuous veins or another pair of lateral veins. Capitula numerous, corymbiform, dense, terminal on stems; peduncle 2–5 mm. Involucre campanulate, ca. 7 × 5 mm; phyllaries 5-seriate; outer phyllaries red-brown or puce, ovate, ca. 4.5 mm, arachnoid tomentose, apex acute; middle ones puce abaxially, white or yellow-white adaxially, ovate-lanceolate, ca. 7 × 2 mm, apex acute; innermost ones oblong-linear, with a claw ca. 2/3 of full length. Receptacle fimbriate. Center of capitulum with female florets and a few bisexual sterile florets; predominantly male capitula with male florets only. Corolla 3.5–4 mm. Pappus ca. 4.5 mm; male florets pappus somewhat incrassate at tip of apex, dentate. Achene oblong, ca. 1.2 mm, glabrous. Fl. May–Aug, fr. Aug–Sep.

• Alpine grasslands, forest margins; 3000–4000 m. NW Yunnan.

12. *Anaphalis latialata* Y. Ling & Y. L. Chen, Acta Phytotax. Sin. 11: 98. 1966.

宽翅香青 *kuan chi xiang qing*

Anaphalis alata Maximowicz var. *viridis* Handel-Mazzetti; *A. latialata* var. *viridis* (Handel-Mazzetti) Y. Ling & Y. L. Chen.

Rhizome usually woody, with short reddish brown lepidoid runners of squamiform leaves, with somewhat caespitose sterile stems and flowering stems. Stems erect, 30–50 cm, slightly slender, white arachnoid hairy and with tentacles, unbranched or with synflorescence branches at upper parts, rather densely leafy at lower parts. Lower leaves usually short and small, often caducous and lost by anthesis; middle leaves expanding, linear-lanceolate or linear-oblong, 3–5 × 0.2–0.8 cm, base equilateral, decurrent on stems and becoming a narrow or cuneiform wing, margin flat, apex acuminate, with short cusp; upper leaves small, somewhat erect, apiculate, with withered scarious long cusp; all leaves arachnoid cottony tomentose, densely lanate, or only with capitate-stalked glandular hairs, midvein exserted abaxially, lateral veins not conspicuous. Capit-

ula numerous, compound corymbiform, dense, terminal on stems and branches; peduncle 1–3 mm; common peduncle of synflorescence ca. 2 cm. Involucre campanulate, 6–7 × 6–8 mm; phyllaries 6- or 7-seriate; outer phyllaries ovate, ca. 2.5 mm, sparsely cottony tomentose; middle ones white or lurid, oblong, ca. 6 × 2.5 mm, apex somewhat obtuse, with gland at top of claw; innermost ones oblong-linear, with a claw ca. 2/5 of full length. Receptacle with fimbriate short hairs. Outer rows of predominantly female capitula female, with 1 or 2 male florets present in center; predominantly male capitula with male florets only. Corolla 3.2–3.5 mm. Pappus almost equaling corolla, male florets pappus incrassate at tip of apex, serrulate. Achene ca. 1 mm, with sparse glandular spots. Fl. and fr. Jul–Oct.

• Alpine and subalpine slopes or mountainous regions exposed to sun. W Gansu, E Qinghai, W Sichuan, Yunnan.

13. *Anaphalis bicolor* (Franchet) Diels, Notes Roy. Bot. Gard. Edinburgh 7: 337. 1912.

二色香青 *er se xiang qing*

Rhizome slender or thickish, somewhat woody; sobols short, with brown scales, terminal and white tomentose rosette leaves, caespitose with flowering stems. Stems erect from geniculate base, 20–45 cm, lower parts usually glabrous, upper parts white or ash-gray or whitish yellow cottony tomentose and capitate-stalked glandular hairy, rather densely leafy. Lower leaves often caducous and lost by anthesis, middle and upper leaves somewhat erect or spreading, linear or oblong-linear, 1.5–4(–7) × 0.2–0.8 cm, densely whitish yellow cottony tomentose and capitate-stalked glandular hairy, base decurrent on stems and forming a narrow wing, somewhat thickish, margin somewhat recurved or flat, sometimes undulate, apex obtuse or acuminate, with long subula; midvein exserted abaxially, lateral veins not conspicuous. Capitula numerous (rarely few to 5), compound corymbiform, dense, terminal on stems and branches; peduncle short; common peduncle of synflorescence ca. 3 cm, with subulate-linear bract. Involucre campanulate, 6–8 × 6–8 mm; phyllaries 5- or 6-seriate; outer phyllaries tomentose, ca. 2 mm; middle ones somewhat yellow or dirty white, light brownish at base, oblanceolate-elliptic, ca. 5 mm, ca. 2 mm wide in male florets, ca. 1.5 mm wide in female florets, apex obtuse or rounded; innermost ones linear-oblong, with a claw ca. 2/3 of full length. Receptacle shallowly alveolate. Outer rows of predominantly female capitula female, 1 or 2 male florets present in center; predominantly male capitula with male florets only. Corolla ca. 4 mm. Pappus almost equaling corolla, relatively thick and flat in male florets, dentate. Achene oblong, ca. 1 mm, rarely longer, almost glabrous. Fl. Jul–Oct, fr. Sep–Nov.

• Alpine to low hill grasslands, deserts, under shrubs, conifer forests; 2000–3800 m. E and W Gansu, Qinghai, SW and W Sichuan, E Xizang, N and W Yunnan.

1a. Upper parts of plants yellow or whitish yellow cottony tomentose, lower parts ash-gray cottony tomentose, capitate glandular hairs with long stalk under lanate hairs.

- 2a. Leaves dense, internodes usually 2–5 mm; upper leaves somewhat erect or adnate to stems, leaves 1.5–4 cm × 2–4 mm, linear or oblong-linear, apex acuminate; involucre 6–6.5 mm 13a. var. *bicolor*
- 2b. Leaves sparse, internodes usually 5–10 mm; upper leaves somewhat expanding, 6–7 cm × 4–8 mm, oblong-linear, apex obtuse; involucre 7–8 mm 13b. var. *longifolia*
- 1b. All plants gray or white lanate, and leaves adaxially arachnoid hairy or glandular hairy.
- 3a. Leaves adaxially arachnoid hairy and with capitate glandular hairs with long stalk, margin usually undulate, expanding 13c. var. *undulata*
- 3b. All plants gray or white lanate, leaf margin not undulate.
- 4a. Leaves dense, internodes 2–5 mm; upper leaves erect or weakly expanding, 1.5–4 cm × 2–4 mm, apex acuminate; involucre ca. 6 mm 13c. var. *subconcolor*
- 4b. Leaves sparse, internodes 4–10 mm; upper leaves expanding, 2.5–5 cm × 3–7 mm, apex rounded or obtuse; involucre ca. 7 mm 13d. var. *kokonorica*

13a. *Anaphalis bicolor* var. *bicolor*

二色香青(原变种) *er se xiang qing* (yuan bian zhong)

Gnaphalium bicolor Franchet, J. Bot. (Morot) 10: 411. 1896.

Upper parts of plants yellow or whitish yellow cottony tomentose, lower parts ash-gray cottony tomentose, capitate glandular hairs with long stalk under lanate hairs. Leaves dense; internodes usually 2–5 mm. Upper leaves somewhat erect or adnate to stems; leaves linear or oblong-linear, 1.5–4 cm × 2–4 mm, apex acuminate. Involucre 6–6.5 mm.

- 2000–3500 m. SW and W Sichuan, N and W Yunnan.

13b. *Anaphalis bicolor* var. *longifolia* C. C. Chang, Sinensia 6: 548. 1935.

长叶二色香青 *chang ye er se xiang qing*

Upper parts of plants yellow or whitish yellow cottony tomentose, lower parts ash-gray cottony tomentose, capitate glandular hairs with long stalk under lanate hairs. Leaves sparse; internodes usually 5–10 mm. Upper leaves somewhat expanding, oblong-linear, 6–7 cm × 4–8 mm, apex obtuse. Involucre 7–8 mm.

- 3400–3800 m. SW and W Sichuan, NW Yunnan (Lijiang).

13c. *Anaphalis bicolor* var. *subconcolor* Handel-Mazzetti, Acta Horti Gothob. 12: 245. 1938.

同色二色香青 *tong se er se xiang qing*

All plants gray or white lanate. Leaves dense; internodes 2–5 mm. Upper leaves erect or weakly expanding, 1.5–4 cm × 2–4 mm, apex acuminate. Involucre ca. 6 mm; phyllaries whitish yellow.

- 3100–3600 m. E Gansu (Lintan), SW and W Sichuan, E Xizang (Bagong, Qamdo).

13d. *Anaphalis bicolor* var. *kokonorica* Y. Ling, Acta Phytotax. Sin. 11: 99. 1966.

青海二色香青 *qing hai er se xiang qing*

All plants gray or white lanate. Leaves sparse; internodes 4–10 mm. Upper leaves expanding, 2.5–5 cm × 3–7 mm, apex rounded or obtuse. Involucre ca. 7 mm; phyllaries white or whitish yellow. Corolla 4–4.5 mm. Achene ca. 1.5 mm.

- 3000–3800 m. W Gansu (Xiahe), E Qinghai (Menyuan, Xinghai).

13e. *Anaphalis bicolor* var. *undulata* (Handel-Mazzetti) Y. Ling, Acta Phytotax. Sin. 11: 99. 1966.

波缘二色香青 *bo yuan er se xiang qing*

Anaphalis undulata Handel-Mazzetti, Symb. Sin. 7: 1104. 1936.

Leaves obovate-linear, 2–4 cm × 4–5 mm, adaxially arachnoid hairy and with capitate glandular hairs with long stalk, margin usually undulate, expanding.

- About 2200 m. SW Sichuan (Xiangcheng), NW Yunnan (Zhongdian).

14. *Anaphalis hymenolepis* Y. Ling, Acta Phytotax. Sin. 11: 99. 1966.

膜苞香青 *mo bao xiang qing*

Rhizome slender, somewhat woody; stolons ca. 12 cm, with brown squamiform leaves and terminal rosette leaves. Stems caespitose, erect, 15–45 cm, slender, unbranched, white or pallid arachnoid tomentose, rather sparsely leafy. Basal and lower leaves relatively small, caducous and lost by anthesis; middle leaves erect or somewhat expanding, oblanceolate-oblong or linear-oblong, 2.5–4.5 × 0.5–2 cm, base attenuate, decurrent on stem and becoming a narrow or cuneate wing, margin flat, apex obtuse or acute; upper leaves small, linear or linear-lanceolate, with small or withered cusp; all leaves thin, both surfaces tomentose or abaxially densely pallid arachnoid and mixed with tentacles, inconspicuously 3-veined. Capitula 7–10 or more, corymbiform, terminal on stems; peduncle 1–5 mm. Involucre campanulate, 6–7 × 5–6 mm; phyllaries 5- or 6-seriate, thin, base hyaline, apex white, not hyaline; outer phyllaries light brownish, ovate, ca. 3.5 mm, apex obtuse; middle ones elliptic-lanceolate, ca. 6 mm, apex acute; innermost ones lanceolate-linear, ca. 5.8 mm, with a claw ca. 1/3 or 1/2 of full length. Receptacle with fimbriate appendage. Center of predominantly female capitula with female florets and a few male florets; pre-

dominantly male capitula with male florets only. Corolla ca. 4 mm. Pappus ca. 5 mm, male florets pappus relatively incrassate at tip of apex, dentate. Achene oblong, ca. 0.7 mm, with dense mammilla. Fl. Jul.

• Alpine hillside grasslands; 2500–2800 m. W Gansu (Qingshui, Xiahe), N Sichuan (Aba, Songpan).

No specimens of this species were seen by the second author.

15. *Anaphalis likiangensis* (Franchet) Y. Ling, Fl. Reipubl. Popularis Sin. 75: 168. 1979.

丽江香青 *li jiang xiang qing*

Gnaphalium likiangense Franchet, J. Bot. (Morot) 10: 410. 1896; *Anaphalis nervosa* Y. Ling.

Rhizome relatively thickish, woody. Sobols and stolons with dense scalelike withered leaves and terminal rosette leaves, caespitose with flowering stems. Stems erect, 15–25 cm, slender, unbranched, densely ash-gray lanate, rather densely leafy. Basal and lower leaves caducous and lost by anthesis, small, spatulate-oblong; middle leaves dense, erect or spreading, oblong-lanceolate, 2–3 × 0.4–1 cm, base acute, decurrent on stems and becoming a narrow or cuneate wing, usually semiamplexicaul, margin recurved when dry, apex acute, with small cusp; upper leaves linear-lanceolate; all leaves pallid or white lanate abaxially, dark green adaxially, appressed or arachnoid tomentose, sometimes glabrate, lustrous, midvein exerted abaxially, midvein and 3 veins flat or somewhat excavated adaxially, apical leaves 1-veined. Capitula 10–30, dense, corymbiform; peduncle 1–3 mm. Involucre campanulate, 6–8 × 5–6 mm; phyllaries 5- or 6-seriate; outer phyllaries dark brownish, oval-lanceolate, ca. 3.5 mm, arachnoid tomentose; middle ones oblong-lanceolate, 5–6 mm, ca. 2 mm wide in male florets, ca. 1.5 mm wide in female florets, white except for base (yellow when dried), apex obtuse or acute; innermost ones lingulate or lanceolate-linear, ca. 4 mm, with a claw ca. 2/3 of full length. Receptacle with fimbriate short hairs. Center of predominantly female capitula with female florets and 1–3 male florets; predominantly male capitula with male florets only. Corolla 3.5–4 mm. Pappus longer than corolla; upper part of pappus of male florets thickish and flat, dentate. Ovary 0.8–1 mm, almost glabrous. Achene oblong, ca. 0.7 mm, with dense mammilla. Fl. Aug–Sep.

• Valleys, ditchsides, grasslands, under *Picea* forests; 3100–3400 m. NW Yunnan (Heqing, Lijiang, Zhongdian).

16. *Anaphalis tenuissima* C. C. Chang, Sinensia 6: 542. 1935.

细弱香青 *xi ruo xiang qing*

Rhizome woody. Stems erect or ascending, ca. 14 cm tall, ca. 1 mm in diam., white arachnoid tomentose, upper parts brownish pilose, unbranched, slender; internodes 7–11 mm. Leaves oblanceolate or narrowly spatulate, abaxially arachnoid tomentose, adaxially green, glabrous, almost lustrous, 1-veined, base long cuneate, decurrent along stems and becoming a narrow wing, apex obtuse to truncate; lower leaves usually caducous and lost by anthesis, 4–13 × 2–2.5 mm, base slightly larger, erect to expanding; uppermost leaves linear, apex usually brownish scarious piliform. Capitula 4–6, terminal, corymbiform, dense, ca. 2 cm in diam.; peduncle absent or to 3 mm,

white arachnoid tomentose. Involucre narrowly campanulate, 7.5–8 mm; phyllaries 4-seriate, all erect, apex obtuse; outer phyllaries reddish brown, oblanceolate, 4–5 mm; middle ones ca. 7 mm, base brown and red, apex white; innermost ones linear, 5.5–7 mm. Florets in center of capitulum sterile, ca. 3; corolla ca. 4 mm; pappus ca. 3 mm, incrassate at tip of apex. Outer florets ca. 8; corolla ca. 3.5 mm; pappus white, ca. 3.5 mm. Achene oblong, ca. 0.6 mm, glabrous.

• W Sichuan.

No specimens of this species were seen by the present authors. The description is based on the protologue, as well as work by Handel-Mazzetti (Notizbl. Bot. Gart. Berlin-Dahlem 13: 631. 1937).

17. *Anaphalis deserti* J. R. Drummond, Bull. Misc. Inform. Kew 1910: 76. 1910.

江孜香青 *jiang zi xiang qing*

Rhizome slender, woody; stolons slender, with rufous lanceolate scales and terminal rosette leaves. Stems erect from geniculate base, 30–40 cm, slender, usually curved, lower parts glabrous, slightly woody, upper parts arachnoid tomentose or lanate-piliferous, with lanate axillary buds and short branches, sparsely leafy. Lower leaves caducous and lost by anthesis; middle leaves oblong-linear, 4–5 × 0.3–0.5 mm, base equilateral or slightly narrow, decurrent on stems and becoming a narrow wing, margin flat, apex acute or subrounded, with long cusp; upper leaves considerably small, ca. 1.5 × 0.3 cm; all leaves dark green, abaxially pallid thinly arachnoid tomentose and with capitate cauliferous tentacles, adaxially arachnoid tomentose, later glabrous, upper leaves pubescent on both surfaces, midvein not conspicuous. Capitula small, 5 or 15–20, congested to globose-corymbiform synflorescences not exceeding upper leaves. Involucre broadly campanulate, ca. 7 mm; phyllaries 4- or 5-seriate; outer phyllaries purple-brownish, ovate; middle ones oval-lanceolate, upper parts white or slightly yellow, apex obtuse. Predominantly male capitula with male florets only. Ovary considerably small, glandular at apex; pappus longer than achene. Fl. Jul. $2n = 56^*$.

• Forests; ca. 3900 m. E and S Xizang (Baxoi, Gyangzê, Shaquantang).

No specimens of this species were seen by the second author.

18. *Anaphalis virens* C. C. Chang, Sinensia 6: 546. 1935.

黄绿香青 *huang lu xiang qing*

Rhizome thickish, woody, ascending, upper parts densely withered leaves, with rosette leaves and densely caespitose flowering stems and sterile stems. Stems erect or ascending, 20–50 cm, lower parts woody, persistent, simple or branching at base or broken stems, with yellow capitate-stalked glandular hairs, arachnoid tomentose at lower parts, densely leafy. Rosette leaves obovate or oblong, ca. 1.5 × 0.5 cm, both surfaces ash-gray cottony tomentose. Lower cauline leaves caducous and lost by anthesis; middle leaves somewhat expanding, oblong or linear-lanceolate, 3–7 × 0.3–1 cm, base equilateral, decurrent on stems and becoming a narrow or cuneate wing, margin flat, apex acute, with conspicuous cusp; leaves becoming smaller upward, erect or somewhat expanding, lanceolate-linear, acuminate, with withered scarious long cusp; all leaves yellow-

green, thin, with stalked glandular hairs on both surfaces, 3-veined, hairs around veins considerably long. Capitula numerous, dense, compound corymbiform, terminal on stems and branches; peduncle slender. Involucre broadly campanulate, ca. $7 \times 5-8$ mm; phyllaries 4- or 5-seriate; outer phyllaries broadly ovate, ca. 3.5 mm, cottony tomentose; middle ones yellow-white, oblong, ca. 6×2.5 mm, base fulvous, apex obtuse or rounded; innermost ones oblong, ca. 5.5 mm, with a claw ca. 1/3 of full length. Receptacle with fimbriate short hairs. Center of predominantly female capitula with female florets and 1-3 male florets; predominantly male capitula with male florets only. Corolla 4-4.5 mm. Pappus almost as long as corolla, male florets pappus incrassate at tip of apex, dentate. Achene oblong, ca. 1 mm, sparsely papillate. Fl. Jul-Sep.

• Subalpine or low hill grasslands, between rocks; 1800-3600 m. SW Sichuan (Chawalong, Jiulong, Muli), NW Yunnan.

19. *Anaphalis elegans* Y. Ling, Acta Phytotax. Sin. 11: 101. 1966.

雅致香青 ya zhi xiang qing

Rhizome thickish, woody, ascending, upper parts densely with withered leaves, with rosette leaves and caespitose flowering stems and sterile stems. Stems erect or ascending, 20-50 cm, lower parts woody, persistent, slightly slender, usually simple, with capitate-stalked glandular hairs and sparsely arachnoid hairy, densely hairy in upper parts, whole stems or lower parts densely leafy. Rosette leaves obovate or spatulate-elliptic, $0.7-1.5 \times 0.3-0.5$ cm, apex obtuse. Lower leaves caducous and lost by anthesis, oblong-spatulate, base attenuate and forming long-winged stalk, or base sheathlike; middle leaves elliptic or oblong-lanceolate, $3-5 \times$ ca. 1 cm, base somewhat narrow or sub-rounded, decurrent on stems and becoming a narrow wing, margin flat, apex acute or obtuse, with small cusp; upper leaves slightly erect, linear-lanceolate, with withered long cusp; all leaves with capitate-stalked glandular hairs on both surfaces, white arachnoid tomentose at margin and abaxially, 3-veined, midvein thickish. Capitula numerous, dense, compound corymbiform, terminal on branches; peduncle 0.3-1 cm. Involucre broadly campanulate, 6-7 mm; phyllaries 4- or 5-seriate; outer phyllaries light brownish, ovate, ca. 3 mm, lanate; middle ones ivory white or somewhat reddish, obovate-oblong, $5-6 \times 2-3$ mm, apex rounded; innermost ones spatulate-oblong, ca. 5 mm, with a claw ca. 1/2 of full length. Receptacle with fimbriate short hairs. Center of predominantly female capitula with female florets and 4-6 male florets. Corolla 4-4.2 mm. Pappus almost equal to corolla; upper parts of male florets pappus considerably incrassate at tip of apex, serrulate. Achene oblong, ca. 1.2 mm, papillate. Fl. Jul-Aug.

• Sunny hillside gravel slopes; 3100-3200 m. W Sichuan (Dêgê), NW Yunnan (Zhongdian).

No specimens of this species were seen by the second author.

20. *Anaphalis chungtienensis* F. H. Chen, Acta Phytotax. Sin. 11: 102. 1966.

中甸香青 zhong dian xiang qing

Rhizome thickish or somewhat slender, woody, surrounded by withered leaves. Flowering stems and sterile stems laxly

caespitose. Stems erect or ascending, 15-30 cm, unbranched, somewhat slender, light fulvous arachnoid lanate or white arachnoid lanate, laxly leafy. Rosette leaves spatulate-oblong, ca. 9×1 cm, base attenuate and forming winged stalk. Basal leaves caducous and lost by anthesis; lower and middle leaves lingulate or linear-oblong, rarely oblong-lanceolate, $3.5-7 \times 0.2-1$ cm, base usually equilateral, semiamplexicaul, decurrent on stems and becoming a broadly or narrowly cuneate wing, margin flat, apex rounded or obtuse; upper leaves linear, gradually acute, with withered long cusp; all leaves light fulvous arachnoid lanate on both surfaces and mixed with capitate cauliferous tentacles, inconspicuously 3-veined. Capitula numerous, dense, compound corymbiform or paniculate-corymbiform; peduncle densely lanate. Involucre broadly campanulate, $7-8 \times$ ca. 7 mm; phyllaries 5- or 6-seriate; outer phyllaries light brownish, elliptic, lanate; middle ones white, oblong or elliptic, ca. 7×2 mm, apex acute in female florets and rounded or obtuse in male florets; innermost ones linear-oblong, ca. 4.5 mm, with a claw ca. 2/3 of full length. Receptacle with fimbriate appendage. Center of predominantly female capitula with female florets and 1-3 male florets; predominantly male capitula with male florets only. Corolla 3.2-3.5 mm. Pappus longer than corolla, incrassate at tip of apex in male florets, dentate. Achene terete, ca. 0.7 mm, almost glabrous. Fl. and fr. Jul-Aug.

• Hillside grasslands; 3100-3800 m. NW Yunnan (Dêqên, Zhongdian).

No specimens of this species were seen by the second author.

21. *Anaphalis sinica* Hance, J. Bot. 12: 261. 1874.

香青 xiang qing

Rhizome slender or thickish, woody, runners ca. 8 cm. Stems laxly or densely caespitose, erect, 20-50 cm, slender or thickish, usually simple or branching after efflorescence or on broken branches, white or ash-gray cottony tomentose, densely leafy. Rosette leaves densely lanate, apex obtuse or rounded. Lower leaves caducous and lost by anthesis; middle leaves oblong, oblanceolate-oblong, or linear, $2.5-9 \times 0.2-1.5$ cm, base attenuate, decurrent on stem and becoming a narrow or slightly broad wing, margin flat, apex acute, with short and small cusp; upper leaves smaller, lanceolate-linear or linear; all leaves arachnoid lanate, or densely white or yellow-white lanate abaxially or on both surfaces, mixed with glandular hairs, 1- or 3-veined with lateral veins vanishing. Capitula numerous, dense compound corymbiform or polycyclic corymbiform; peduncle slender. Involucre campanulate or almost obconical, $4-5(-6) \times 4-6$ mm; phyllaries 6- or 7-seriate; outer phyllaries light brownish, oval, ca. 2 mm, arachnoid tomentose; middle ones milky white or dirty white, lingulate-oblong, ca. $3.5 \times 1-1.2$ mm, apex obtuse or rounded; innermost ones narrower, narrowly elliptic, with a claw ca. 2/3 of full length; phyllaries in male florets usually obtuse. Center of predominantly female capitula with female florets and 1-4 male florets. Corolla 2.8-3 mm. Pappus slightly longer than corolla, incrassate at tip of apex in male florets, serrate. Achene 0.7-1 mm, with small gland. Fl. Jul-Sep, fr. Aug-Oct.

Low hill or subalpine shrub forests, grasslands, hillsides, slopes, banks, riversides; 400-2100 m. S Anhui, Fujian, Gansu, Guangxi, Gui-

zhou, Hebei, W Henan, W Hubei, E and S Hunan, S Jiangsu, W Jiangxi, Shaanxi, Shandong, Shanxi, NE Sichuan, Yunnan, Zhejiang [Japan, Korea, ?Nepal].

This is a widespread, extremely variable species. It is similar to *Anaphalis aureopunctata* but differs in being usually taller and more robust and having leaves denser, involucre smaller, and phyllaries more layered with base beige or gray-brown.

- 1a. Stems laxly caespitose, 20–50 cm, internodes 5–20 mm; synflorescence dense or expanding; phyllaries white, rarely red.
 2a. Leaves oblong or oblanceolate-oblong; internodes 5–10 mm 21a. var. *sinica*
 2b. Leaves lanceolate, linear-oblong, or linear; internodes 10–20 mm, longer on upper stems 21b. var. *alata*
 1b. Stems densely caespitose, branched from rhizome, ca. 20 cm, internodes 2–10 mm; synflorescence dense; phyllaries white or weakly red.
 3a. Leaves green and sparsely lanate adaxially, densely lanate abaxially 21c. var. *densata*
 3b. Leaves and stems densely white thickish lanate 21d. var. *lanata*

21a. *Anaphalis sinica* var. *sinica*

香青(原变种) xiang qing (yuan bian zhong)

Anaphalis possietica Komarov; *A. pterocaulon* (Franchet & Savatier) Maximowicz; *A. pterocaulon* var. *sinica* (Hance) Handel-Mazzetti; *A. todaiensis* Honda; *Gnaphalium pterocaulon* Franchet & Savatier.

Stems laxly caespitose; internodes short, 5–10 mm. Leaves oblong or oblanceolate-oblong, 3–9 × 1–1.5 cm, abaxially densely lanate, adaxially arachnoid lanate. Synflorescence dense or expanding. Phyllaries white, rarely red.

Hill or mountain woods, grasslands, slopes, banks; 400–2000 m. S Anhui, Guangxi, W Hubei (Fangxian, Lichuan), E and S Hunan, S Jiangsu, W Jiangxi, NE Sichuan (Wanyuan), Zhejiang [Japan, Korea].

This taxon is widespread in Asia and is extremely variable.

21b. *Anaphalis sinica* var. *alata* (Maximowicz) S. X. Zhu & R. J. Bayer, comb. et stat. nov.

疏生香青 shu sheng xiang qing

Basionym: *Anaphalis alata* Maximowicz, Bull. Acad. Imp. Sci. Saint-Petersbourg 27: 478. 1882; *A. chanetii* (H. Léveillé) H. Léveillé; *A. sinica* var. *remota* Y. Ling, nom. illeg. superfl.; *Gnaphalium chanetii* H. Léveillé.

Stems laxly caespitose; internodes 10–20 mm. Leaves lanceolate, linear-oblong, or linear, 4–9 × 0.5–1.5 cm, abaxially densely white or whitish yellow lanate, adaxially sparsely lanate, base attenuate, decurrent on stems and becoming narrow wing. Phyllaries white.

• Hill or mountain woods, grasslands, slopes, banks; 800–2100 m. Gansu (Zhangxian), Hebei (Jingxing, Neiqiu, Xingtai), Shaanxi (Ningqiang, Taibai Shan, Yangxian), Shanxi [?Nepal].

Anaphalis alata was recorded from C and W Nepal in Annot. Checkl. Fl. Pl. Nepal (49. 2000). This occurrence is disjunct from the

distribution in N China (see http://www.efloras.org/florataxon.aspx?flora_id=110&taxon_id=242302857; accessed 15 Apr 2011).

The valid publication of *Anaphalis alata* Maximowicz var. *viridis* Handel-Mazzetti (Acta Horti Gothob. 12: 245. 1938) simultaneously created the autonym *A. alata* var. *alata*, which has priority at varietal rank over *A. sinica* var. *remota* Y. Ling (Acta Phytotax. Sin. 11: 103. 1966), hence the need for this new combination.

21c. *Anaphalis sinica* var. *densata* Y. Ling, Acta Phytotax. Sin. 11: 103. 1966.

密生香青 mi sheng xiang qing

Stems densely caespitose, ca. 20 cm; internodes 2–10 mm. Leaves lanceolate, linear-oblong, or linear, 2.5–4 × 0.2–0.5 cm, abaxially densely white or whitish yellow lanate, adaxially green and sparsely lanate. Phyllaries white or whitish red.

• Shandong (Laoshan, Taishan).

21d. *Anaphalis sinica* var. *lanata* Y. Ling, Acta Phytotax. Sin. 11: 103. 1966.

棉毛香青 mian mao xiang qing

Stems densely caespitose, ca. 20 cm; internodes 2–10 mm. Leaves and stems densely white thickish lanate. Phyllaries white or weakly red.

• Mountaintop grasslands; 1000–1100 m. W Henan (Song Shan).

This variety is similar to *Anaphalis sinica* var. *densata*.

22. *Anaphalis spodiophylla* Y. Ling & Y. L. Chen, Acta Phytotax. Sin. 11: 103, 112. 1966.

灰叶香青 hui ye xiang qing

Rhizome long. Stems erect, 20–45 cm, lower parts thickish and woody, branching at base or having slender branches at lower axils, with long flowering branches at upper parts, densely hairy, lower leaves dense and upper leaves sparse. Rosette leaves obovate, ca. 1.5 × 1 cm, base cuneate and becoming short stalk; lower leaves caducous and lost by anthesis; middle leaves obovate, oblanceolate-spatulate, or oblong, 3–7 × 0.8–2 cm, base attenuate and forming a petiole, or almost equal width and base cuneate, semiamplexicaul, decurrent on stem and becoming a short wing, margin smooth, apex obtuse or rounded, rarely acute; upper leaves bractlike, lanceolate-linear or linear, apiculate; all leaves slightly thickish, ash-gray arachnoid lanate, mixed with capitate shortly stalked glandular hairs, midvein raised on both surfaces, conspicuously 3-veined or with another pair of veinlets near margin. Capitula considerably numerous and dense, compound corymbiform, terminal on stems and branches; peduncle ca. 3 mm. Involucre narrowly campanulate, 4–5 × ca. 4 mm; phyllaries 5-seriate; outer phyllaries light brownish, ovate, ca. 2.5 mm, arachnoid tomentose; middle ones white or dirty white, oblong-lingulate, ca. 4 × 1–1.3 mm, apex rounded-obtuse; innermost ones narrowly oblong, ca. 3.5 mm, with a claw ca. 2/3 of full length. Receptacle with fimbriate appendage. Center of predominantly female capitula with female florets and 1 or 2 male florets. Corolla 2.5–3 mm. Pappus slightly longer than corolla. Achene oblong, ca. 0.8 mm, papillate. Fl. and fr. Aug.

• Sunny roadsides; 3000–3100 m. E and S Xizang (Luliang, Nyingchi).

No specimens of this species were seen by the second author.

23. *Anaphalis yangii* Y. L. Chen & Y. L. Lin, *Acta Phytotax. Sin.* 41: 387. 2003.

竟生香青 *jing sheng xiang qing*

Herbs, perennial. Rhizome unknown. Stems erect or arcuate, ca. 25 cm or more, lower stems 4–5 mm in diam., densely gray lanuginous, simple or upper part 1- or 2-branched, 4–9 cm, with sparse leaves; internode 1.5–2 cm. Lower leaves usually withered in anthesis; middle leaves broadly elliptic or suborbicular, 5–6.5 × 3–4 cm, base sharply narrowed to winged petiole, dilated and amplexicaul, margin flat, apex acute or subrounded, rarely acuminate; upper leaves gradually diminutive, oblanceolate-spatulate or oblanceolate-oblong, 5–6 × 1.3–2 cm, base attenuate to broadly winged petiole, amplexicaul, apex acuminate with tip; all leaves thick, both surfaces densely yellowish gray lanate, intermixed with villiform glandular hairs, 3- or 5-veined, lateral veins 1 or 2 pairs, midvein prominent abaxially. Capitula few, compound corymbiform, 1.5–3 cm in diam.; peduncle 2–3 mm, densely tomentose. Involucre narrowly campanulate, 4–5 × 3–4 mm; phyllaries ca. 5-seriate; outer phyllaries beige, ovate, 1.5–2 mm, arachnoid; middle ones sordid white, elliptic-oblong, 2.5–3 × 1–1.2 mm, apex rounded, or rarely 3-denticulate; innermost ones narrowly oblong or linear, ca. 3.5 mm, with green vittate claw. Capitula with heteromorphic florets, outer with many female florets, center with 1 or 2 male florets; male floret corolla tubular, female floret corolla filiform; pappus white, slightly exerted to corolla, in male slightly thick, in female setaceous. Achene brown, oblong, 0.7–0.8 mm, mammillate. Fl. Sep.

- Canal sides, roadsides; ca. 3700 m. Xizang (Gongbo'gyamda).

No specimens of this species were seen by the second author.

24. *Anaphalis transnokoensis* Sasaki, *Trans. Nat. Hist. Soc. Formosa* 20: 166. 1930.

能高香青 *neng gao xiang qing*

Rhizome ascending. Stems solitary, not caespitose, erect, 10–18 cm, unbranched, densely lanate, with leaves at apex. Rosette leaves at base, caducous and lost by anthesis, smaller than middle leaves; leaves erect, light green abaxially, green adaxially, narrowly oblong, 3–4 cm × 9–12 mm, thin, both surfaces lanate and scabrid, base decurrent on stem and becoming a broad short wing, margin flat, apex acute; upper leaves smaller. Synflorescence dense, corymbiform. Involucre hemispheric when dry, ca. 5 × 9 mm; phyllaries 5-seriate, middle ones longest, longer than floret, apex obtuse, middle to apex white, somewhat brownish abaxially. Capitula with heteromorphic florets; female florets numerous and present in margin, corolla ca. 2.5 mm, pappus thinly scabrid hairy; male florets fewer, tubular, apex glandular, pappus dirty white, apex slightly thickish. Receptacle glabrous. Achene unknown. Fl. Aug–Oct.

- Taiwan.

No specimens of this species were seen by the present authors.

25. *Anaphalis aureopunctata* Lingelsheim & Borza, *Repert. Spec. Nov. Regni Veg.* 13: 392. 1914 [*"aureo-punctata"*].

黄腺香青 *huang xian xiang qing*

Rhizome slender or somewhat thickish; runner ca. 12 cm, or rarely to 20 cm. Stems erect or ascending, 20–50 cm, slender or thickish, simple, rarely with erect flowering branches after efflorescence, herbaceous or woody at base, white or pallid arachnoid tomentose, or lower parts somewhat glabrous. Lower leaves dense or upper leaves lax; rosette leaves broadly spatulate-elliptic, lower part attenuate and becoming a long stalk, usually densely lanate. Lower leaves caducous and lost by anthesis, spatulate or lanceolate-elliptic, with winged stalk, 5–16 × 1–6 cm; middle leaves slightly smaller, somewhat spreading, base attenuate, decurrent on stem and becoming a wide or narrow wing, margin flat, apex acute or rarely acuminate, with mucro or long cusp; upper leaves small, lanceolate-linear; all leaves white or pallid arachnoid hairy with tentacles, lanate, or glabrous abaxially, cauliferous lanate and easily deciduous arachnoid adaxially, 3- or 5-veined, lateral veins conspicuous and reaching margin or disappearing at margin, or 1-veined. Capitula numerous, dense, compound corymbiform; peduncle slender. Involucre campanulate or narrowly campanulate, 5–6 × ca. 5 mm; phyllaries ca. 5-seriate; outer phyllaries light or dark brownish, ovate, ca. 2 mm, lanate; middle ones white or yellow-white, ca. 5 mm, apex broadly rounded in male florets, ca. 2.5 mm wide, apex obtuse or acute in female florets, ca. 1.5 mm wide; innermost ones slightly narrow and short, spatulate or oblong, with a claw ca. 2/3 of full length. Receptacle with fimbriate appendage. Center of predominantly female capitula with female florets and 3 or 4 male florets; predominantly male capitula with male florets only or 3 or 4 female florets present in outer layer. Corolla 3–3.5 mm. Pappus slightly longer than corolla, incrassate at tip of apex in male florets, serrulate. Achene ca. 1 mm, villosulous. Fl. Jul–Sep, fr. Sep–Oct.

- Forests, forest margins, hills, grasslands, bamboo or grassy slopes, rocky places, valleys, wetlands; 1000–4200 m. S Gansu, N Guangdong, N Guangxi, Guizhou, W Henan, W Hubei, SW and W Hunan, NW Jiangxi, E Qinghai, S Shaanxi, S Shanxi, Sichuan, Yunnan.

No specimens of this species were seen by the second author.

This species is similar to *Anaphalis sinica* but differs in having stems herbaceous, only sometimes slightly woody at base, leaves dense on lower stems, internode longer on upper stems; involucre large, especially in male plants, phyllaries large and broadly rounded; and leaves with long lateral veins.

- 1a. Phyllaries yellowish white, base black-brown or purple-brown 25d. var. *atrata*
- 1b. Phyllaries white or yellowish white, base beige after desiccation.
 - 2a. Leaves abaxially densely lanate, 3-veined to apex 25c. var. *tomentosa*
 - 2b. Leaves abaxially arachnoid hairy or glabrous, 1-, 3-, or 5-veined.
 - 3a. Leaves narrow, 3-veined or sometimes 1-veined 25a. var. *aureopunctata*
 - 3b. Leaves broad, 5-veined to apex, upper leaves 3-veined 25b. var. *plantaginifolia*

25a. *Anaphalis aureopunctata* var. *aureopunctata*

黄腺香青(原变种) huang xian xiang qing (yuan bian zhong)

Anaphalis aureopunctata f. *calvescens* (Pampanini) Y. L. Chen; *A. pterocaulon* (Franchet & Savatier) Maximowicz var. *calvescens* Pampanini; *A. pterocaulon* var. *intermedia* Pampanini; *A. sinica* Hance var. *calvescens* (Pampanini) S. Y. Hu; *A. sinica* subsp. *intermedia* (Pampanini) Kitamura.

Stems slender or thickish, arachnoid lanate or somewhat glabrous on lower parts. Leaf shape variable, or lower leaves elliptic-spatulate or broadly elliptic, with winged petiole; middle leaves oblong-lanceolate or oblanceolate, 5–12 × 1–2.5 cm; all leaves 3-veined, lateral veins not reaching apex, or sometimes linear and 1-veined, abaxially arachnoid or thinly lanate or glabrous.

• Forests, forest margins, grasslands, valleys, rocky places; 1200–3600 m. S Gansu (Chengxian, Yuzhong), N Guangdong (Lechang, Renhua), N Guangxi (Rongshui), Guizhou (Panxian), W Henan (Lushi), W Hubei, S Hunan (Yizhang), E Qinghai (Datong, Menyuan), S Shaanxi (Huxian, Lüeyang), S Shanxi (Yuanqu), Sichuan, E to W Yunnan.

25b. *Anaphalis aureopunctata* var. *plantaginifolia* F. H. Chen, Acta Phytotax. Sin. 11: 105. 1966.

车前叶黄腺香青 che qian ye huang xian xiang qing

Stems thickish, with arachnoid adnate hairs. Lower or middle leaves broadly elliptic, base attenuate to long petiole, 6–16 cm × 2–6 mm, both surfaces at first with arachnoid or stalked glandular hairs, later glabrous except along veins abaxially, 5-veined, and lateral veins reaching apex; upper leaves small, elliptic to linear-lanceolate, (1 or)3-veined.

• Hills, wetlands; 1000–2700 m. W Hubei (Sangzhi), W Hunan (Baojing), NW Jiangxi (Huanglong Shan), S Sichuan (Emei).

25c. *Anaphalis aureopunctata* var. *tomentosa* Handel-Mazzetti, Acta Horti Gothob. 12: 242. 1938.

绒毛黄腺香青 rong mao huang xian xiang qing

Anaphalis sinica var. *tomentosa* (Handel-Mazzetti) Kitamura.

Stems thickish, arachnoid hairy. Lower and middle leaves broadly elliptic, spatulate to lanceolate-elliptic, 5–9 × 2–4 cm, abaxially densely white or gray lanate and with rust-colored hairs along veins, adaxially with arachnoid and capitate-stalked glandular hairs, 3-veined up to apex, base sharply narrowed to broad wing. Phyllaries base beige.

• Forests, bamboo slopes; 2100–3800 m. Guizhou (Fanjing Shan), W Henan (Lushi), W Hubei, S Shaanxi (Taibai Shan), Sichuan, Yunnan.

25d. *Anaphalis aureopunctata* var. *atrata* (Handel-Mazzetti) Handel-Mazzetti, Acta Horti Gothob. 12: 242. 1938.

黑鳞黄腺香青 hei lin huang xian xiang qing

Anaphalis pterocaulon var. *atrata* Handel-Mazzetti, Symb. Sin. 7: 1103. 1936; *A. conferta* C. C. Chang; *A. sinica* var. *atrata* (Handel-Mazzetti) Kitamura.

Stems thickish or slender. Leaves stenophyllous, spatulate or oblanceolate-elliptic, abaxially densely white or gray lanate, adaxially with arachnoid and glandular hairs, 3-veined, base gradually narrow, apex acute. Phyllaries yellowish white, dried base puce or purple-brown.

• Alpine forests, grassy and rocky slopes; 3000–4200 m. SW and W Sichuan (Kangding, Muli), NW Yunnan.

This taxon is an alpine type, easily distinguishable from the above varieties.

26. *Anaphalis flaccida* Y. Ling, Acta Phytotax. Sin. 11: 105. 1966.

萎软香青 wei ruan xiang qing

Rhizome slender, slightly woody; stolons slender, with smaller leaves or terminal rosette leaves. Stems caespitose, erect from geniculate base, 20–30 cm, slender, usually curved, simple or with few synflorescence branches, herbaceous, pallid arachnoid villous, lower leaves dense and upper leaves lax. Lower leaves caducous and lost by anthesis, narrowly spatulate, base acuminate and becoming a long stalk, ca. 5 × 0.8 cm; middle and upper leaves erect or spreading, linear-spatulate or linear, 2.5–5 × 0.2–0.5 cm, base attenuate or equilateral, decurrent on stem and becoming a narrow wing, margin flat, apex obtuse or rounded, with small cusp; all leaves pallid arachnoid lanate on both surfaces, inconspicuously 3-veined. Capitula numerous, compound corymbiform, terminal on stems and branches; peduncle 1–3 mm. Involucre campanulate, 4–5 × 4–5 mm; phyllaries 4- or 5-seriate; outer phyllaries light fulvous, elliptic, ca. 2 mm, lanate, apex obtuse; middle ones oblong or elliptic, 4–5 × 1–1.5 mm, upper parts white, apex obtuse or acute, sometimes lacerate, lower parts membranous, subhyaline; innermost ones narrowly oblong, ca. 4 mm, with a claw ca. 2/3 of full length. Receptacle with fimbriate short hairs. Center of predominantly female capitula with female florets and 1–6 male florets. Corolla 2.5–3 mm. Pappus slightly longer than corolla. Achene subterete, ca. 0.7 mm, villosulous and with small glandular spot. Fl. and fr. Jun–Aug.

• Peaks, hillside grasslands, shrub forests; 1800–2400 m. W Guizhou (Weining), Sichuan, NE Yunnan.

No specimens of this species were seen by the second author.

27. *Anaphalis corymbifera* C. C. Chang, Sinensia 6: 545. 1935.

伞房香青 san fang xiang qing

Rhizome slender, repent, stolons slender, with lanceolate membranous scales and terminal rosette leaves. Stems erect or ascending, 7–16 cm, considerably slender, simple or with synflorescence branches, white arachnoid piliferous, with slender sulcus, lower leaves dense and upper leaves lax. Basal leaves caducous and lost by anthesis, almost homomorphic with rosette leaves, obovate or spatulate, 0.5–1(–2) × 0.4(–0.8) cm, base cuneate, apex rounded and obtuse; middle leaves oblanceolate-oblong or elliptic, 2–4 × 0.3–0.8 cm, base attenuate and decurrent along stem and becoming a short wing, margin smooth, apex acute or obtuse, mucronulate; upper leaves stenophyllous, linear-lanceolate, with long cusp; all leaves densely

pallid arachnoid lanate abaxially, green and arachnoid piliferous adaxially, usually later glabrous, midvein exerted abaxially, conspicuously 3-veined. Capitula numerous, 2–5 congested and terminal on branches, compound corymbiform; peduncle 1–4 mm. Involucre campanulate, 4–5 × 4–5 mm; phyllaries 5- or 6-seriate; outer phyllaries deep brownish, broadly ovate, 1.5–2 mm, base arachnoid piliferous, apex obtuse; middle ones oblong-lanceolate, 4.5–5 × 1.5–2.2 mm, base light brownish, upper parts white, apex obtuse; innermost ones linear, 3.5–4 mm, with a claw ca. 2/3 of full length. Receptacle with fimbriate appendage. Center of predominantly female capitula with female florets and 1 or 2 male florets; predominantly male capitula with 12 or 13 male florets. Corolla 3–3.5 mm, rarely ca. 2 mm. Pappus slightly longer than corolla, incrassate at tip of apex in male florets. Ovary somewhat ovoid, ca. 0.5 mm, almost glabrous. Fl. Jun–Jul.

Alpine grasslands and deserts; 3000–3200 m. NW Yunnan (Nujiang) [N Myanmar].

No specimens of this species were seen by the second author.

28. *Anaphalis pachylaena* F. H. Chen & Y. Ling, Acta Phytotax. Sin. 11: 106. 1966.

厚衣香青 hou yi xiang qing

Herbs, perennial, throughout densely silvery gray tangled to cottony lanate. Rhizome thickish, woody; branches short, with dense withered leaves, rosette leaves terminal. Stems erect from curved base, 20–50 cm, somewhat thickish, herbaceous, piliferous, lower leaves dense and upper leaves lax. Rosette leaves spatulate or obovate-oblong, 3–7 × 0.6–1.4 cm, at first yellowish white or gray lanate, later gradually tangled to cottony-papery hairy, base attenuate and becoming a long stalk, apex obtuse or rounded. Lower leaves almost homomorphic with rosette leaves, caducous and lost by anthesis; middle leaves somewhat erect, spatulate or linear-oblong, 3–7 × 0.3–0.8 cm, base somewhat narrow, decurrent on stem and becoming a narrow wing, margin flat, apex acute; upper leaves linear, with long cusp; all leaves 1- or 3-veined, midvein exerted abaxially. Capitula considerably numerous, terminal on stems and branches, compound corymbiform; peduncle ca. 4 mm. Involucre campanulate, 4–5 × 3–4 mm; phyllaries 5-seriate; outer phyllaries oval, ca. 3 mm, base fulvous or deep brownish, lanate; middle ones white (lutescent when dry), oblong, ca. 4.5 × 1.5 mm, apex rounded; innermost ones linear-oblong, ca. 3 mm, with a claw ca. 2/3 of full length. Receptacle alveolate, with cusp. Center of predominantly female capitula with female florets and 1 or few male florets; predominantly male capitula with male florets only. Corolla 2–3 mm. Pappus ca. 3 mm, somewhat incrassate at tip of apex in male florets, serrulate. Achene ca. 0.9 mm, papillate. Fl. Jul–Sep, fr. Sep–Oct.

• Alpine or subalpine grassy slopes; 3200–3800 m. SW Sichuan (Muli).

No specimens of this species were seen by the second author.

29. *Anaphalis tibetica* Kitamura, Acta Phytotax. Geobot. 15: 38. 1953.

西藏香青 xi zang xiang qing

Rhizome thickish, shrublike, branching; sobols numerous, with withered leaves at upper parts, rosette leaves terminal, with densely caespitose flowering stems. Stems erect, 15–35 cm, slender, simple, woody at base, usually persistent, arachnoid laxly lanate and with capitate cauliferous tentacles, somewhat glabrous at lower parts, densely leafy. Lower leaves shorter and caducous and lost by anthesis; middle leaves somewhat spreading, linear, 2–3.5 × 0.3–0.5 cm, base decurrent and becoming a narrow and long wing, margin sinuous and recurved, apex slightly obtuse; upper leaves small, acuminate; all leaves densely white lanate abaxially, green adaxially, with capitate cauliferous tentacles, 1-veined, somewhat raised abaxially. Capitula 10 or numerous, terminal on stems and branches, compound corymbiform; peduncle absent; common peduncle of synflorescence white lanate. Involucre narrowly campanulate, 4–6 × 3–4 mm; phyllaries 4- or 5-seriate; outer phyllaries light or deep brownish, broadly ovate, ca. 2.5 mm, irregularly toothed-scissile, lanate; middle ones light lutescent, elliptic, 4.2–5 × ca. 2 mm, apex rounded and obtuse; innermost ones spatulate-linear, somewhat short, with a claw ca. 2/3 of full length. Involucre of female florets usually small. Receptacle with fimbriate short hairs. Center of predominantly female capitula with female florets and 1–4 male florets; predominantly male capitula with male florets only. Corolla 3.5–4 mm. Pappus slightly equal to corolla, incrassate at tip of apex in male florets, dentate. Achene oblong, ca. 0.8 mm, villosulous. Fl. Jul–Aug, fr. Aug–Sep.

• Sunny alpine and subalpine conifer forests, shrub forests or hillsides. S Xizang.

No specimens of this species were seen by the second author.

30. *Anaphalis surculosa* (Handel-Mazzetti) Handel-Mazzetti, Acta Horti Gothob. 12: 243. 1938.

萌条香青 meng tiao xiang qing

Anaphalis pterocaulon (Franchet & Savatier) Maximowicz var. *surculosa* Handel-Mazzetti, Symb. Sin. 7: 1103. 1936.

Rhizome thickish, woody. Stems 50–100 cm, lower parts repent or ascending, woody, persistent, stems with ascending branches, thickish, channeled and angulate, herbaceous, arachnoid hairy, and with capitate-stalked glandular hairs, lower parts usually glabrous, usually with tomentose axillary or short branches, densely leafy. Lower leaves caducous and lost by anthesis; middle leaves spreading, linear, linear-lanceolate, or oblong, 3–8 × 0.5–1(–1.5) cm, base attenuate, decurrent on stem and becoming a 1.5–3 mm wide or cuneate wing, margin flat or undulate, apex acute, with long cusp; upper leaves small; uppermost leaves linear or subulate, acuminate, bractlike; all leaves thin, with capitate-stalked glandular hairs or arachnoid hairy on both surfaces, or only abaxially or glandular abaxially, 3-veined. Capitula considerably numerous, dense, compound corymbiform; peduncle short or ca. 3 mm. Involucre subcampanulate, 4–5 × 3–4 mm; phyllaries 6-seriate; outer phyllaries light brownish, ovate, ca. 2 mm; middle ones white, elliptic or spatulate-elliptic, ca. 4 mm, less than 1.5 mm in female florets, apex rounded; innermost ones white, subs spatulate, ca. 4 mm, with a claw ca. 2/3 of full length. Receptacle chaffy hairy. Center of predominantly female capitula with female florets

and 1 or 2 male florets; predominantly male capitula with male florets only. Pappus slightly longer than corolla, incrassate at tip of apex in male florets, dentate. Achene oblong, ca. 1 mm, hairy and glandular. Fl. Jul–Oct, fr. Sep–Oct.

• Low hill or subalpine grasslands and shrub forests; 100–2700 m. NW and W Sichuan, NW Yunnan (Dêqên).

31. *Anaphalis larium* Handel-Mazzetti, Symb. Sin. 7: 1104. 1936.

德钦香青 de qin xiang qing

Rhizome slender, woody; sobols short, with membranous oval squamiform leaves, rosette leaves terminal. Stems caespitose, erect, 1–30 cm, slender, channeled, herbaceous, white arachnoid lanate, lower parts glabrous, simple, densely leafy. Lower leaves caducous and lost by anthesis; middle and upper leaves broad and large, spreading, oblanceolate-elliptic to oblanceolate, 2.5–4 × 0.7–1.2 cm, base attenuate or cuneate, decurrent on stem and becoming a short cuneate wing, margin flat, apex acute, with small cusp; apical leaves smaller; all leaves thickish, densely light yellow lanate, 3-veined and veins gradually disappearing toward apex, midvein slender, slightly exerted abaxially. Capitula 10 or numerous, dense, compound corymbiform; peduncle ca. 2 mm, light lutescent lanate. Involucre broadly campanulate, 5–8 × 5–6 mm; phyllaries 3- or 4-seriate, erect; outer phyllaries dark brownish, obovate, ca. 2.5 mm, lanate; middle ones spatulate-oblong, ca. 4 × 2 mm, apex obtuse, slightly yellowish white; innermost ones spatulate-linear, ca. 3.5 mm, with a claw ca. 2/3 of full length. Predominantly male capitula with male florets only. Corolla ca. 3 mm. Pappus dirty white, incrassate at tip of apex, serrulate. Fl. Aug–Sep.

• Alpine or subalpine dry slopes; 3000–4300 m. NW Yunnan (Dêqên).

No specimens of this species were seen by the second author.

32. *Anaphalis oxyphylla* Y. Ling & C. Shih, Acta Phytotax. Sin. 11: 107. 1966.

锐叶香青 rui ye xiang qing

Rhizome arranged horizontally; runners short, with brownish lanceolate squamiform leaves and dense slender roots. Stems caespitose, erect, 16–30 cm, slender, usually slightly twisted, simple or with short sterile branches, arachnoid lanate or usually glabrate on lower parts; upper parts densely leafy. Lower leaves caducous and lost by anthesis, oblong-lanceolate, 1–1.5 cm, abaxially sparsely lanate; middle and upper leaves becoming large, spreading, elliptic or oblong-lanceolate, 2.5–5 × 0.5–1 cm, base attenuate, almost not decurrent, margin flat, apex acuminate, with brownish long cusp 1–1.5 mm, apical and middle leaves somewhat equal in length; all leaves gray-brownish and fulvous lanate abaxially, brownish lanate and usually glabrescent adaxially, 3-veined, midvein slender, usually glabrous abaxially. Capitula 3–9, terminal or axillary, dense, corymbiform, 1.5–2 cm in diam., or laxly compound corymbiform with long peduncle. Involucre broadly campanulate, ca. 5 × 5–6 mm; phyllaries 5- or 6-seriate; outer phyllaries light brownish, oval, thick, scarious, apex obtuse, white; middle ones

white in upper parts, ovate-lanceolate, ca. 4 × 2.5 mm, apex obtuse, with longitudinal corrugation; innermost ones narrowly lanceolate, with a claw ca. 1/2 of full length. Receptacle with fimbriate short hairs. Predominantly male capitula with male florets only or 1–3 female florets present in outer layer. Corolla ca. 3.5 mm in male florets and ca. 3.8 mm in female florets. Pappus almost as long as corolla, slightly incrassate at tip of apex in male florets, dentate. Ovary 0.8–1.2 mm, with small glandular spots. Fl. Sep–Oct.

• Rocky hillsides. NW Yunnan (Gongshan).

No specimens of this species were seen by the second author.

33. *Anaphalis porphyrolepis* Y. Ling & Y. L. Chen, Acta Phytotax. Sin. 11: 107. 1966.

紫苞香青 zi bao xiang qing

Rhizome repent or ascending, brown squamate; withered leaves growing in upper part, with slender root. Stems few (3 or 4), caespitose, erect, 23–30 cm, slightly slender, simple, white pallid tomentose, densely leafy in upper parts. Lower leaves squamate, oblong, withered in efflorescence; leaves gradually larger from middle part to apex of stem, slightly expanding, oblong-lanceolate, 2.5–5 cm × 3–6 mm, base attenuate, almost not decurrent, margin flat, apex acute with short cusp; uppermost leaves as large as or smaller than middle leaves, densely arranged in synflorescence, radiate; all leaves yellowish white, both surfaces tomentose, 3-veined; midvein slightly convex on both surfaces. Capitula 3–5, densely arranged at top of stems, compound corymbiform, without peduncle. Involucre campanulate, 5–6 × ca. 5 mm; phyllaries 4- or 5-seriate, mauve or margin white; outer phyllaries ovate-elliptic, ca. 5 × 2 mm, apex obtuse or lacerate; middle ones oblong, ca. 5.5 mm, keeled, clawed; innermost ones linear-oblong, ca. 4 mm, with a ca. 3/4 of full length claw, apex lacerate. Receptacle with fimbriate short hairs. Capitula with numerous marginal female florets, center of predominantly female capitula with 3–6 male florets. Corolla tube ca. 3.2 mm, upper parts mauve. Pappus slightly exceeding corolla. Ovary ca. 0.5 mm, glabrous. Achenes not seen. Fl. Aug.

• Alpine meadows; ca. 4000 m. E Xizang.

No specimens of this species were seen by the second author.

34. *Anaphalis yunnanensis* (Franchet) Diels, Notes Roy. Bot. Gard. Edinburgh 7: 337. 1912.

云南香青 yun nan xiang qing

Gnaphalium yunnanense Franchet, J. Bot. (Morot) 10: 410. 1896.

Subshrubs, multibranched. Rhizome thickish, contorted; sobol or sterile branches erect or ascending, with withered marcescent leaves and axillary or acrogenous floriferous stems. Floriferous stems erect, 10–20 cm, white pallid arachnoid tomentose, rather densely leafy. Basal leaves or sobol acrogenous leaves rather short, spatulate or spatulate-oblong, 0.5–1.5 cm × 3–5 mm, rounded at apex; middle and upper leaves oblong-spatulate, 2–4 cm × 2–5 mm, base attenuate, decurrent on stem to a narrow wing, margin flat, apex obtuse or acute, with indis-

tinct short cusp; uppermost leaves somewhat erect, acuminate, with short cusp; all leaves pallid yellowish white tomentose on both surfaces, 1-veined or distinctly 3-veined. Capitula numerous, densely compound corymbiform; peduncle rather short. Involucre broadly campanulate, 6–7 × 4–6 mm; phyllaries ca. 5-seriate; outer phyllaries brown or dark brown, oval-lanceolate, ca. 3 mm, arachnoid; middle ones elliptic-lanceolate, ca. 5 × 1.5 mm, apex obtuse or slightly rounded, white or yellowish white; innermost ones linear-oblong, ca. 4 mm, with a ca. 2/3 of full length claw. Receptacle with fimbriate short hairs. Capitula with numerous marginal female florets, center of predominantly female capitula with 1 or 2 male florets. Corolla tube 2.5–3 mm. Pappus slightly exceeding corolla, incrassate at tip of apex in male florets. Achenes oblong, ca. 1.5 mm, densely papillose. Fl. Jun–Sep, fr. Aug–Sep.

SW Sichuan, NW Yunnan [Nepal].

35. *Anaphalis muliensis* (Handel-Mazzetti) Handel-Mazzetti, Notizbl. Bot. Gart. Berlin-Dahlem 13: 631. 1937.

木里香青 mu li xiang qing

Anaphalis yunnanensis (Franchet) Diels var. *muliensis* Handel-Mazzetti, Anz. Akad. Wiss. Wien, Math.-Naturwiss. Kl. 61: 203. 1924.

Subshrubs, multibranched, 10–20 cm tall. Rhizome thickish; sobol or sterile branches erect or ascending, white arachnoid tomentose, later glabrous, with dense leaves, and with tomentose acrogenous buds; cauline leaves oblong or linear-lanceolate, 1–2 cm × 1–3 mm, slightly decurrent, somewhat revolute on margin, withered, marcescent. Floriferous branches growing at tip of sterile branch, 4–10 cm, slender, white tomentose, densely leafy in lower parts. Basal leaves obovate-oblong, rosulate; middle leaves obovate or linear-oblong, 1.5–3.5 cm × 2–4 mm, base attenuate, decurrent on stem into a narrow wing, margin flat or slightly revolute, apex obtuse or rounded, with indistinct cusp; upper leaves erect or expanding, with withered long cusp; all leaves white tomentose abaxially, arachnoid adaxially or sometimes glabrous, midvein slightly convex abaxially. Capitula 5–25, densely compound corymbiform; peduncle rather short. Involucre broadly campanulate, 6–7 × 5–7 mm; phyllaries 4- or 5-seriate; outer phyllaries rufous, ovate, 3–4 mm, apex rounded; middle ones spatulate or elliptic, ca. 7 × 2.5 mm, apex obtuse or slightly rounded; innermost ones spatulate, slightly short, with a ca. 2/3 of full length claw. Receptacle with membranous appendages. Capitula with numerous marginal female florets, center of predominantly female capitula with 1 or 2 male florets. Corolla tube 3–3.5 mm. Pappus slightly exceeding corolla, incrassate at tip of apex in male florets. Achenes oblong, ca. 1.5 mm, glabrous. Fl. Jun–Sep, fr. Sep–Oct.

Alpine taiga, rocky places, grasslands; 3400–4000 m. SW Sichuan (Jiulong, Muli), NW Yunnan (Zhongdian) [Nepal].

36. *Anaphalis suffruticosa* Handel-Mazzetti, Notizbl. Bot. Gart. Berlin-Dahlem 13: 631. 1937.

亚灌木香青 ya guan mu xiang qing

Subshrubs, small, multibranched, 40–60 cm tall. Rhizome

thickish; sobol or sterile stem erect or ascending, cinereous arachnoid tomentose, often denuded, with fertile axillary buds or short branches and sparse leaves. Leaves expanding or adherent to stem, spatulate-obovate or spatulate, 1–2(–3) cm × 5–10 mm, thick, both surfaces pallid or white tomentose, or adaxially pallid arachnoid tomentose, distinctly 3-veined, lateral veins slender, midvein slightly convex abaxially, base decurrent on stem into a narrow long wing, margin flat or slightly revolute, apex obtuse or rounded, with brown cusp; leaves on sterile stems long hairy. Capitula numerous, densely compound corymbiform; peduncle short. Involucre narrowly campanulate, 4–5 × 2–3 mm; phyllaries ca. 6-seriate, imbricate; outer phyllaries white or light red, narrowly ovate, ca. 2 mm; middle ones spatulate-elliptic, 3–3.5 mm, apex rounded; innermost ones linear-lanceolate, with a ca. 2/3 of full length claw. Receptacle with fimbriate short hairs. Capitula with numerous marginal female florets, center of predominantly female capitula with 1 or 2 male florets. Corolla tube ca. 3 mm. Pappus slightly shorter than corolla, incrassate at tip of apex in male florets. Achenes glabrous. Fl. Aug.

• Low mountain or subalpine valleys, slope grasslands; 1800–3100 m. NW Yunnan (Lijiang, Zhongdian).

No specimens of this species were seen by the second author.

Male plants were not seen by the present authors. According to the protologue, this species has 1-veined leaves.

37. *Anaphalis stenocephala* Y. Ling & C. Shih, Acta Phytotax. Sin. 11: 108. 1966.

狭苞香青 xia bao xiang qing

Subshrubs, multibranched, ca. 60 cm tall. Rhizome thickish, with numerous sterile branches or floriferous branches, erect or ascending; sterile branches short, whitish cinereous tomentose, herbaceous. Floriferous branches or annual branches somewhat woody, often glabrous, with sulcus; internode 0.5–1 cm, rarely up to 1.5 cm; axillary buds growing into short densely foliate branches after efflorescence. Leaves expanding, elliptic or oblong-linear, 1.5–3 × 0.3–0.5 cm, abaxially thickly white or ochroleucous tomentose, adaxially arachnoid tomentose, indistinctly 1- or 3-veined, midvein slightly convex abaxially, base attenuate, decurrent on stem into a long and narrow wing, margin flat or slightly revolute, apex obtuse or slightly acute; upper leaves gradually smaller, apex obtuse or with brown cusp. Capitula without peduncle or with a short peduncle, 9 to numerous capitula densely forming corymbiform synflorescence, 1.5–4 cm in diam. Involucre cylindrical, 4–5 × 2–3 mm; phyllaries ca. 5-seriate, imbricate; outer phyllaries usually brown, broadly ovate, ca. 2.5 mm, arachnoid tomentose; middle ones white, oblong-spatulate, 3.5–4 mm; innermost ones spatulate-linear, with a 2/3 or 3/4 of full length claw. Receptacle with fimbriate appendage. Predominantly female capitula with numerous marginal female florets, center with 1–3 male florets; predominantly male capitula with male florets only. Corolla tube ca. 3 mm. Pappus white, slightly exceeding corolla, incrassate at tip of apex in male florets, serrulate. Achenes oblong, ca. 1 mm, papillose. Fl. and fr. Jul–Aug.

• Subalpine regions, *Pinus* forests. SE Xizang (Cawarong), NW Yunnan (Dêqên).

No specimens of this species were seen by the second author.

38. *Anaphalis gracilis* Handel-Mazzetti, Symb. Sin. 7: 1103. 1936.

纤枝香青 xian zhi xiang qing

Subshrubs. Rhizome thickish; sobols or sterile stems erect or ascending, densely withered, marcescent leafy and with distinct axillary buds and terminal buds. Flowering stems arising from axillary buds, 5–40 cm or more, often slender, upper parts herbaceous, simple, tomentose or cauliferous glandular pilose, sparsely leafy. Leaves expanding or somewhat erect, linear, linear-lanceolate, or oblanceolate, 1–3.5 × 0.1–0.7 cm, uniformly wide or base attenuate, decurrent on stem into a narrow or broad green wing, apex acute or acuminate, with short cusp; upper leaves acuminate, with long cusp, margin revolute; all leaves thickly arachnoid tomentose or cauliferous glandular pilose. Capitula 5–50, densely corymbiform or compound corymbiform; peduncle 1–2 mm. Involucre narrowly campanulate, 4–5 mm, rarely to 6 mm; phyllaries ca. 6-seriate, expanding; outer phyllaries brown, broadly ovate, ca. 1.5 mm, tomentose, slightly acute; middle ones lingulate-elliptic, 3–3.5 × ca. 1 mm, ca. 1.5 mm wide in male capitula, apex white, obtuse or rounded; innermost ones ca. 4 mm, with a ca. 3/4 of full length claw. Receptacle with fimbriate appendage. Predominantly female capitula with numerous marginal female florets, center with 1–4 male florets; predominantly male capitula with male florets only. Corolla tube ca. 3 mm. Pappus slightly exceeding corolla, incrassate at tip of apex in male florets, serrulate. Achenes oblong, ca. 1 mm, densely papillose. Fl. Jul–Aug, fr. Aug–Sep.

• Alpine or subalpine shrublands, slopes, rocky places, valleys, and banks; 2000–4000 m. NW and W Sichuan, NW Yunnan.

This species is extremely variable.

- 1a. Leaves linear, linear-oblong, or lanceolate, 3–7 mm wide, base decurrent along stems to broad wing, margin undulate-recurved, adaxially with arachnoid and capitate glandular hairs 38c. var. *ulophylla*
- 1b. Leaves linear or linear-lanceolate, 1–3.5 mm wide, base decurrent along stems to narrow wing, margin recurved, adaxially arachnoid or lanate or with capitate-stalked glandular hairs.
- 2a. Leaves adaxially arachnoid or sparsely lanate 38a. var. *gracilis*
- 2b. Leaves adaxially with capitate-stalked glandular hairs 38b. var. *aspera*

38a. *Anaphalis gracilis* var. *gracilis*

纤枝香青(原变种) xian zhi xiang qing (yuan bian zhong)

Stems 5–30 cm, white arachnoid lanate, upper parts white lanate. Leaves linear or linear-lanceolate, 1–2.5 cm × 1–3 mm, abaxially densely gray arachnoid lanate, adaxially arachnoid or sparsely lanate, margin recurved.

• Alpine dry slopes and rocky places; 3200–4000 m. NW and W Sichuan.

38b. *Anaphalis gracilis* var. *aspera* Handel-Mazzetti, Acta Horti Gothob. 12: 244. 1938.

糙叶纤枝香青 cao ye xian zhi xiang qing

Stems ca. 40 cm, with capitate glandular hairs, upper parts also arachnoid hairy. Leaves usually linear or linear-lanceolate, 1.5–2.5(–4) cm × 1.5–3.5 mm, abaxially white arachnoid hairy, adaxially green with capitate-stalked glandular hairs.

• Alpine or subalpine shrublands and slopes; 2600–3500 m. NW and W Sichuan (Barkam, Ganzi, Lixian).

38c. *Anaphalis gracilis* var. *ulophylla* Handel-Mazzetti, Acta Horti Gothob. 12: 244. 1938.

皱缘纤枝香青 zhou yuan xian zhi xiang qing

Sobol long, runnerlike. Stems tall, with thickish branches, arachnoid and capitate glandular hairy. Leaves linear, linear-oblong, or lanceolate, 1.5–2.5 cm × 3–7 mm, abaxially white lanate, adaxially arachnoid and capitate glandular hairy, base attenuate and decurrent on stems to broad wing, margin undulate-recurved, apex acute or acuminate.

• Subalpine grassy slopes, valleys, and banks; 2000–3000 m. W Sichuan, NW Yunnan (Dêqên).

39. *Anaphalis lactea* Maximowicz, Bull. Acad. Imp. Sci. Saint-Petersbourg 27: 479. 1882.

乳白香青 ru bai xiang qing

Shrubs, much branched, erect or ascending, upper part with dense withered leaves, with terminal rosette of leaves and stems. Rhizome thickish. Stems erect, 10–40 cm, slightly thickish, simple, herbaceous, white or pallid tomentose, upper parts densely leafy. Rosette leaves lanceolate or spatulate-oblong, 6–13 × 0.5–2 cm, base attenuate into a winged, sheathlike petiole; lower leaves smaller than rosette leaves, margin flat, apex acute or acuminate, with or without short cusp; middle and upper leaves somewhat erect and adherent to stem, oblong, linear-lanceolate, or linear, 2–10 × 0.8–1.3 mm, base slightly narrow, decurrent on stem into a narrow wing, apex acuminate, with withered long cusp; all leaves white or pallid tomentose on both surfaces, 1- or 3-veined. Capitula numerous, densely compound corymbiform, at apex of stems or branches; peduncle 2–4 mm. Involucre campanulate, (5–)6(–7) × 5–7 mm; phyllaries 4- or 5-seriate; outer phyllaries light or dark brown, ovate, ca. 3 mm, tomentose; middle ones milky white, ovate-oblong, ca. 6 × 2–2.5 mm, apex rounded; innermost ones narrowly oblong, ca. 5 mm, with a ca. 2/3 of full length claw. Receptacle with fimbriate short hairs. Predominantly female capitula with numerous marginal female florets, center with 2 or 3 male florets; predominantly male capitula with male florets only. Corolla tube 3–4 mm. Pappus slightly exceeding corolla, incrassate at tip of apex in male florets, serrulate. Achenes terete, ca. 1 mm, almost glabrous. Fl. and fr. Jun–Sep.

• Subalpine or low mountain grasslands or taiga; 2000–3400 m. S Gansu, E Qinghai (Datong, Menyuan, Qilian), NW Sichuan (Songpan).

40. *Anaphalis batangensis* Y. L. Chen, Acta Phytotax. Sin. 28: 488. 1990.

巴塘香青 ba tang xiang qing

Rhizome repent, thickish, with slender sobols. Stems erect or ascending, 10–40 cm, densely gray or grayish white tomentose, upper parts densely leafy. Lower and middle leaves small, 4–4.5 × 0.3–0.5 cm, base attenuate, decurrent on stem into a narrow wing, margin flat, apex acute or acuminate; upper leaves somewhat erect or adnate to stem, acuminate at apex, with withered long cusp; all leaves white or ash-gray tomentose on both surfaces, 1- or 3-veined. Capitula 4–8, densely corymbiform or capitate, at apex of stems or branches; peduncle 2–4 mm. Involucre broadly campanulate, ca. 7 × 8 mm; phyllaries 4- or 5-seriate; outer phyllaries light or dark brown, ovate, ca. 3 mm, tomentose; middle ones milky white, ovate-oblong, ca. 6 × 2–2.5 mm, rounded at apex; innermost ones narrowly oblong, ca. 5 mm, with a ca. 2/3 of full length claw. Receptacle with fimbriate short hairs. Predominantly female capitula with numerous marginal female florets, center with 2 or 3 male florets; predominantly male capitula with male florets only. Corolla tube 3–4 mm. Pappus slightly exceeding corolla, incrassate at tip of apex in male florets, serrulate. Fl. and fr. Jul–Aug.

- *Picea* forest margins; 4000–4200 m. Sichuan (Batang).

No specimens of this species were seen by the second author.

41. *Anaphalis souliei* Diels, Repert. Spec. Nov. Regni Veg. Beih. 12: 505. 1922.

蜀西香青 shu xi xiang qing

Rhizome thickish, erect or ascending, upper leaves dense, withered, with terminal rosette leaves and stems. Stems erect, 5–30 cm, slender, herbaceous, simple, arachnoid tomentose. Rosette leaves lanceolate or obovate-elliptic, 2–9 × 0.3–1.3 cm, sometimes up to 20 cm, base attenuate to a long or short, winged, sheathlike petiole, margin flat, apex rounded or acute, with short cusp; lower leaves homomorphic with rosette leaves, smaller, withered or persistent in efflorescence; middle and upper leaves somewhat expanding, or erect and adherent to stem, oblanceolate-oblong or linear, 20–40 × 3–5 mm, abruptly narrow at base, apex acuminate, with withered long cusp; all leaves tomentose on both surfaces, sometimes with capitate glandular hairs, lower parts convexly 3-veined. Capitula numerous, densely compound corymbiform. Involucre broadly campanulate, 5–7 × 5–6 mm; phyllaries 5- or 6-seriate; outer phyllaries light brown, ovate, ca. 3 mm, tomentose; middle ones white in upper parts, oblong or obovate-oblong, 4.5–5 × 1.5–2 mm, apex acute or rounded; innermost ones linear, ca. 3 mm, with a ca. 2/3 of full length claw; phyllaries of male capitula often long and narrow. Receptacle with fimbriate appendage. Predominantly female capitula with numerous marginal female florets, center with 2–4 male florets; predominantly male capitula with male florets only. Corolla tube 2.3–3 mm. Pappus exceeding corolla, incrassate at tip of apex in male florets, serrulate. Achenes oblong, ca. 1 mm, papillose. Fl. Jun–Aug, fr. Jul–Sep.

- Alpine or subalpine ridges, grasslands, and forests; 3000–4200 m. W Sichuan.

42. *Anaphalis rhododactyla* W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 10: 169. 1918.

红指香青 hong zhi xiang qing

Rhizome thickish, with dense withered leaves, numerous erect branches or sterile stems congested to pulvinate. Sterile stems with dense squamate leaves and fertile axillary buds; cauline leaves obovate, 0.5–1.5 × 0.2–0.4 mm, cinereous tomentose, rounded at apex, sometimes with gland-dotted short cusp. Flowering stems on sterile stems, 5–30 cm, slender, cinereous to yellowish white tomentose, densely leafy; basal leaves obovate or spatulate-oblong, 1.5–4 × 0.3–0.5 mm, base attenuate to a long petiole; middle leaves erect or slightly expanding, spatulate or lanceolate-oblong, uniformly wide or slightly narrow at base, decurrent on stem into a short wing; upper leaves lanceolate or linear, apex acute, with long chaffy cusp; all leaves pallid arachnoid tomentose, 3-veined, midvein convex abaxially, tomentose. Capitula 5–10, densely corymbiform; peduncle 1–2 mm. Involucre broadly campanulate, 7–8 × 5–6 mm; phyllaries ca. 5-seriate, expanding; outer phyllaries upper parts mauve, lower parts brown, ovate or elliptic, 3–5 mm, tomentose; middle ones mauve or white, yellowish white when dry, oblong-lanceolate, ca. 7 × 1.5–2 mm, acute at apex; innermost ones linear-oblong-lanceolate, ca. 5 mm, with a ca. 3/5 of full length claw. Receptacle with fimbriate appendage. Predominantly female capitula with numerous marginal female florets, center of 1 or 2 male florets; predominantly male capitula with male florets only. Corolla tube ca. 4 mm. Pappus slightly exceeding corolla, incrassate at tip of apex in male florets, serrulate. Achenes oblong, ca. 1 mm, densely glandular. Fl. Jul–Aug, fr. Sep. 2n = 56*.

- Alpine grasslands, open slopes, rock fissures; 3800–4200 m. SW Sichuan (Chawalong, Muli), E Xizang (Zayü, Zogang), N Yunnan (Gongshan, Weixi, Zhongdian).

43. *Anaphalis szechuanensis* Y. Ling & Y. L. Chen, Acta Phytotax. Sin. 11: 109. 1966.

四川香青 si chuan xiang qing

Rhizome thickish, contorted, with upper leaves dense, withered terminal rosette leaves, and flowering stems. Stems erect or ascending, ca. 20 cm, herbaceous, slender, white-canescenscent arachnoid tomentose, densely leafy. Lower leaves homomorphic with rosette leaves, spatulate, 0.5–3.5 × 0.3–0.7 cm, base abruptly narrowed into a purple, slender, short or rather long petiole, margin flat, apex rounded or obtuse; middle leaves erect or somewhat expanding, spatulate or spatulate-oblong-lanceolate, 1–1.5 × 0.3–0.6 cm, base decurrent on stem into an indistinct short wing, apex obtuse or slightly acute; upper leaves gradually smaller, linear-lanceolate, with short cusp or withered long cusp; all leaves white-canescenscent tomentose on both surfaces, sometimes lower leaves glabrous to reveal capitate glandular hairs, indistinctly 1- or 3-veined. Capitula 8–15, densely corymbiform or compound corymbiform. Involucre narrowly campanulate, ca. 5 × 4–5 mm; phyllaries 5- or 6-seriate; outer phyllaries light brown, ovate, ca. 2.5 mm, abaxially tomentose; middle ones white, oblong-elliptic, ca. 4 × 1.5 mm, apex obtuse, but subrounded in male florets; innermost ones spatulate-oblong, ca. 3.5 mm, with a ca. 2/3 of full length claw. Receptacle with fimbriate appendage. Predominantly female capitula with numerous marginal female florets, center with 5 male florets; predominantly male capitula with male florets only. Corolla tube 2.5–3.5 mm. Pappus exceeding corolla, incrassate at tip

of apex in male florets, serrulate. Achenes oblong, ca. 1 mm, densely papillose. Fl. Jul–Aug, fr. Sep.

• Alpine rocky grassy slopes and calcareous ground; 3500–4500 m. W Sichuan (Kangding, Lixian, Taining).

No specimens of this species were seen by the second author.

44. *Anaphalis xylophiza* Schultz Bipontinus ex J. D. Hooker, Fl. Brit. India 3: 281. 1881.

木根香青 mu gen xiang qing

Rhizome thickish, with numerous branches; upper leaves squamate, withered terminal rosette leaves and flowering stems congested to pulvinate. Stems erect or ascending, 3–7(–17) cm, slender, herbaceous, simple, white-canescens arachnoid tomentose, densely leafy. Rosette leaves and lower leaves spatulate, oblong, or linear-spatulate, 0.5–3 × 0.3–0.7 cm, base attenuate to a broadly winged long petiole, margin flat, apex rounded; upper leaves gradually smaller, erect or adherent to stem, oblanceolate or linear-oblong, base decurrent on stem into a short narrow wing, apex obtuse with short cusp or acuminate with withered long cusp; all leaves sparsely canescens taupe tomentose on both surfaces, basal and upper parts except margin usually denuded or with capitate glandular hairs, distinctly 3-veined, midvein raised on both surfaces, lateral veins raised abaxially, or upper leaves 1-veined. Capitula 5–10, densely compound corymbiform; peduncle short. Involucre broadly campanulate or obconical, 5–6 × ca. 6 mm; phyllaries 5-seriate, expanding; outer phyllaries ovate, ca. 3 mm, tomentose; middle ones oblong-lanceolate, ca. 6 × 2 mm, lower parts puce or purple-brown, acute at apex, in female florets slightly obtuse; innermost ones linear-oblong, ca. 4 mm, with a claw ca. 3/4 of full length. Receptacle with chaffy hairs. Predominantly female capitula with numerous marginal female florets, center with 3 or 4 male florets; predominantly male capitula with male florets only. Corolla tube ca. 3.5 mm. Pappus exceeding corolla, incrassate at tip of apex in male florets, serrulate. Achenes obovoid-oblong, ca. 1.5 mm, tomentose. Fl. Jun–Sep, fr. Aug–Oct. $2n = 28^*$.

Alpine grasslands and lichen-covered areas; 3800–4000 m. S Xizang [Bhutan, N India, Nepal].

45. *Anaphalis chlamydophylla* Diels, Notes Roy. Bot. Gard. Edinburgh 5: 188. 1912.

茧衣香青 jian yi xiang qing

Shrubs, multibranched; rhizome thickish; upper leaves dense, withered, rosette leaves and flowering stems congested to pulvinate. Stems erect or ascending, 3–25 cm (from protologue up to 40 cm), white-canescens glutinous cottony papery tomentose, all stems densely leafy. Basal leaves persistent in efflorescence, homomorphic with rosette leaves, obovate, oblong, or oblong-spatulate, 0.5–2.5 × 0.3–0.5 cm, canescens tomentose; middle leaves erect or adherent to stem, linear-lanceolate, 1.5–2.5 × 0.3–0.5 cm, base attenuate on stem into a narrow wing, margin flat, apex acute, often with membranous long cusp; upper leaves small, linear, same as middle leaves with grayish twined papery tomentose hairs. Capitula 7–20, densely compound corymbiform; peduncle ca. 2 mm. Involucre broadly campanulate, ca. 10 × 8–10 mm; phyllaries 4- or 5-seri-

ate, somewhat expanding; outer phyllaries fulvous except apex, ovate, tomentose; middle ones ochroleucous, oblanceolate, ca. 9 × 2 mm, acute at apex; innermost ones short, narrow, ca. 5 mm, with a claw ca. 2/3 of full length. Receptacle with fimbriate hairs. Predominantly female capitula with numerous marginal female florets, center with 2–4 male florets; predominantly male capitula with male florets only. Corolla tube ca. 3.5 mm. Pappus white, ca. 4 mm, incrassate at tip of apex in male florets, serrulate. Achenes oblong, ca. 1.2 mm, densely papillose. Fl. Jul–Aug, fr. Sep.

• Subalpine meadows, taiga, copses or calcareous ground; 2700–3700 m. NW Yunnan (Lijiang).

46. *Anaphalis pannosa* Handel-Mazzetti, Symb. Sin. 7: 1100. 1936.

污毛香青 wu mao xiang qing

Rhizome slightly thickish, much branched; upper leaves dense, withered, with terminal rosette leaves and flowering stems. Stems erect or ascending, up to 20 cm, slightly thickish, herbaceous, fulvous tomentose, with slightly dense or sparse leaves. Lower leaves persistent in efflorescence, homomorphic with rosette leaves, obovate or oblong-spatulate, 1.5–4 × 0.5–1 cm, base attenuate to a brown, glabrous, broad sheath, apex rounded or obtuse; middle and upper leaves erect, adherent to stems, spatulate-oblong or narrowly oblong, 2–4 × 0.3–0.7(–1) cm, base decurrent on stem into an indistinct short wing, margin flat, apex obtuse or rounded, with short black cusp; upper leaves acuminate, with withered long cusp; all leaves fulvous brown tomentose on both surfaces, indistinctly 3-veined. Capitula 7–10, densely glomerulate. Involucre broadly campanulate, ca. 10 × 10 mm; phyllaries ca. 5-seriate, expanding; outer phyllaries brown, oval-lanceolate, ca. 4 mm, brown tomentose; middle ones obovate or oblong-lanceolate, 9–10 × 2.5–3.5 mm, acute at apex, but obtuse in male capitula, upper parts yellowish white; innermost ones linear-lanceolate, ca. 5 mm, with a claw ca. 3/5 of full length. Receptacle with chaffy process. Predominantly female capitula with numerous marginal female florets, center with 3–6 male florets; predominantly male capitula with numerous male florets. Corolla tube ca. 5 mm. Pappus 6–7 mm, incrassate at tip of apex in male florets, serrulate. Achenes oblong, ca. 2 mm, densely papillose. Fl. Jul–Aug, fr. Sep.

• Alpine dry rocky slopes; 3800–4300 m. NE, NW, and W Yunnan.

47. *Anaphalis cinerascens* Y. Ling & W. Wang, Acta Phytotax. Sin. 11: 110. 1966.

灰毛香青 hui mao xiang qing

Rhizome usually thickish, woody, much branched, upper part with dense squamate withered leaves, rosulate and flowering stems congested to pulvinate. Stems erect or ascending, (2–)3–8 cm (or plants acaulescent), herbaceous, slender. Basal leaves homomorphic with rosette leaves, obovate or spatulate, obtuse, rounded, or acute at apex, usually with gland-dotted short cusp; lower leaves oblanceolate-oblong, base attenuate, decurrent on stem into short wing, margin smooth, apex acute or obtuse; upper leaves rather narrow, erect or adherent to stem,

or foliate on stem; all leaves thin, both surfaces argenteous tomentose, denuded at base, indistinctly 3-veined. Capitula 5–10, densely corymbiform, or solitary. Involucre broadly campanulate, 9–10 × 10(–15) mm; phyllaries ca. 5-seriate, expanding, white, rarely yellowish white, puce at base; outer phyllaries elliptic-lanceolate, ca. 5 mm, sparsely tomentose at base; middle ones oblong-lanceolate, ca. 9 × 2.5 mm, acute at apex; innermost ones broadly oblong or spatulate-linear, ca. 5 mm, with a claw ca. 1/2 of full length; phyllaries of male capitula slightly obtuse. Receptacle with fimbriate hairs. Predominantly female capitula with numerous marginal female florets, center with 2–5 male florets; predominantly male capitula with male florets only. Corolla tube 3.5–4 mm. Pappus slightly exceeding corolla, incrassate at tip of apex in male florets, serrulate. Achenes oblong, ca. 1 mm, glabrous. Fl. Jul–Sep.

- Alpine slopes and rocks; 4300–4400 m. S Sichuan, NW Yunnan.

No specimens of this species were seen by the second author.

- 1a. Plants caulescent; capitula 5–10, densely corymbiform, with short peduncle 47a. var. *cinerascens*
- 1b. Plants acaulescent; capitulum single, without peduncle 47b. var. *congesta*

47a. *Anaphalis cinerascens* var. *cinerascens*

灰毛香青(原变种) hui mao xiang qing (yuan bian zhong)

Stems erect or ascending, 3–6 cm, with dense leaf rosettes 1.5–3 cm in diam.; internodes 0.5–1 cm. Rosette leaves obovate-oblong or spatulate, 5–15 × 3–5 mm; lower leaves oblanceolate-oblong, 1–1.5 cm × 2–3 mm, base sometimes glabrous, attenuate, decurrent into short wing along stems, margin flat, apex obtuse or acute; upper leaves narrow, erect or adnate to stems, acuminate. Capitula 5–10, congested to corymb; peduncle short, lanate. Involucre ca. 10 mm in diam.

- Alpine slopes and rocks; ca. 4000 m. SW Sichuan (Mianning), NW Yunnan (Zhongdian).

47b. *Anaphalis cinerascens* var. *congesta* Y. Ling & W. Wang, Acta Phytotax. Sin. 11: 111. 1966.

密聚灰毛香青 mi ju hui mao xiang qing

Plants acaulescent or stems only ca. 2 mm; rosette and basal leaves congested to globose, 8–12 mm in diam. Leaves more layered, densely imbricate, lower layers (subterranean leaves) flat, rounded, gradually withered, upper layers (rosette and basal leaves) obovate or broadly spatulate, ca. 5 mm, rarely ca. 7 mm, membranous, brown, upper parts gray lanate, base glabrous, apex obtuse or rounded. Capitulum usually solitary, without peduncle. Involucre 12–15 mm in diam. Achene obovoid-oblong, ca. 1 mm.

- Alpine sunny slopes, rocky peaks; 4300–4400 m. S Sichuan (Mianning).

48. *Anaphalis viridis* Cummins, Bull. Misc. Inform. Kew 1908: 19. 1908.

绿香青 lü xiang qing

Stems and leaves densely caespitose, pulvinate. Stems erect or ascending, 4–8 cm (or plants acaulescent), herbaceous, slender, canescent tomentose, densely leafy, or upper part sparse. Basal leaves persistent during efflorescence, homomorphic with rosette leaves, obovate, oblanceolate, or spatulate-elliptic, 0.3–2 × 0.3–0.7 cm, apex acute; middle and upper leaves (if present) erect or adherent to stem, lanceolate or oblanceolate-oblong, rather acerose, base decurrent on stem into a short cuneate wing, margin smooth, apex acute or acuminate, often with withered cusp; all leaves keeled on both surfaces, canescent yellow tomentose, base sometimes glabrous, 1-veined or indistinctly 3-veined. Capitula 2–15, glomerulate or simple, without distinct peduncle. Involucre broadly campanulate, 9–11 × 10–12 mm, slightly exceeding disk; phyllaries 4- or 5-seriate, somewhat expanding; outer phyllaries brown, elliptic, ca. 4 mm, tomentose; middle ones white, upper parts white or ochroleucous, oblong-lanceolate, 9–10 × 2–3 mm, acute at apex; innermost ones linear-oblanceolate, ca. 8 mm, with a claw ca. 2/3 of full length. Receptacle with chaffy process. Capitula with numerous marginal female florets, center of predominantly female capitula with 1–5 male florets. Corolla tube 4–5 mm. Pappus equaling corolla. Achenes obovoid-oblong, ca. 2 mm, densely papillose. Fl. Jul–Aug, fr. Aug–Sep.

- Mountaintops, on granite of alpine glacial valleys, rocky or grassy slopes; 3000–4800 m. W Sichuan, E Xizang, NW Yunnan.

No specimens of this species were seen by the second author.

- 1a. Stems 4–8 cm; capitula 5–15, congested into globose corymb at stem apex, 2–3 cm in diam. 48a. var. *viridis*
- 1b. Plants acaulescent or stems up to 4 mm; capitula solitary or 2- or 3-fasciate on rosette leaves 48b. var. *acaulis*

48a. *Anaphalis viridis* var. *viridis*

绿香青(原变种) lü xiang qing (yuan bian zhong)

Stems 4–8 cm tall; lower leaves dense; internodes 0.2–0.5 cm, while upper internodes to 1 cm. Leaves lanceolate or oblanceolate-oblong, 1.5–3.5 × 1.5–3.5 cm. Capitula 5–15, densely congested into globose corymb at stem apex, 2–3 cm in diam.

- Mountaintops, rocky or grassy slopes; 3000–4800 m. E Xizang (Cawarong, Qamdo), NW Yunnan (Lijiang).

48b. *Anaphalis viridis* var. *acaulis* Handel-Mazzetti, Acta Horti Gothob. 12: 240. 1938.

无茎绿香青 wu jing lü xiang qing

Plants acaulescent or stems up to 4 mm. Leaves spatulate-elliptic, 0.7–1.5 × 0.3–0.5 cm. Capitula solitary or 2- or 3-fasciate on rosette leaves.

- On granite of alpine glacial valleys; 3600–4800 m. W Sichuan (Dawu, Kangding, Muli).

49. *Anaphalis flavescens* Handel-Mazzetti, Symb. Sin. 7: 1100. 1936.

淡黄香青 dan huang xiang qing

Rhizome slightly slender; runners acerose, membranous squamate leafy, with terminal rosette leaves. Stems erect or ascending from geniculate base, 10–22 cm, slender, canescent arachnoid tomentose, rarely thickly white tomentose, lower leaves dense. Rosette leaves oblanceolate, 1.5–5 × 0.5–1 cm, lower part attenuate to a long petiole, apex acute or obtuse; basal leaves withered in efflorescence; lower and middle leaves oblong-lanceolate or lanceolate, 2.5–5 × 0.5–0.8 cm, erect or adherent to stem, base decurrent on stem into narrow wing, margin flat, apex acute, with withered long brown cusp; upper leaves small, narrowly lanceolate, 1–1.5 cm; all leaves canescent or yellowish white arachnoid tomentose or white tomentose, somewhat distinctly 3-veined. Capitula 6–16, densely corymbiform or compoundly so; peduncle 3–5 mm. Involucre broadly campanulate, 8–10 × ca. 10 mm; phyllaries 4- or 5-seriate, somewhat expanding; outer phyllaries fulvous, elliptic, ca. 6 mm, tomentose at base; middle ones white, lanceolate, ca. 10 × 3–4 mm, acute at apex; innermost ones linear, 6–8 mm, with a claw 1/3–1/2 of full length. Receptacle with fimbriate hairs. Predominantly female capitula with numerous marginal female florets, center with 3–12 male florets; predominantly male capitula with 10–25 male florets. Corolla exceeding pappus; corolla tube 4.5–5.5 mm. Pappus incrassate at tip of apex in male florets, serrulate. Achenes oblong, 1.5–1.8 mm, densely papillose. Fl. Aug–Sep, fr. Sep–Oct.

- Gansu, Qinghai, Shaanxi, W Sichuan, E and S Xizang.

- 1a. Stems and leaves gray or yellowish white arachnoid tomentose; rosette and lower leaves oblanceolate-oblong or oblong, 2–5 × 0.5–1 cm 49a. var. *flavescens*
- 1b. Stems and leaves densely white or gray lanate; rosette and lower leaves spatulate-oblong, 1.5–2.5 × 0.5–0.7 cm 49b. var. *lanata*

49a. *Anaphalis flavescens* var. *flavescens*

淡黄香青(原变种) dan huang xiang qing (yuan bian zhong)

Anaphalis flavescens f. *rosea* Y. Ling; *A. flavescens* f. *sulphurea* Y. Ling.

Stems and leaves gray or yellowish white arachnoid tomentose. Rosette and lower leaves oblanceolate-oblong or oblong, 2–5 × 0.5–1 cm.

- Alpine or subalpine slopes, grasslands, forests; 2800–4700 m. S and W Gansu, E Qinghai, S Shaanxi, W Sichuan, E Xizang.

This taxon is extremely variable. The phyllaries can be buff with a fulvous base, yellow with a black-brown base, or pale red with a puce base.

49b. *Anaphalis flavescens* var. *lanata* Y. Ling, Acta Phytotax. Sin. 11: 111. 1966.

棉毛淡黄香青 mian mao dan huang xiang qing

Stems and leaves densely white or gray lanate. Rosette and lower leaves spatulate-oblong, 1.5–2.5 × 0.5–0.7 cm. Involucre 8–10 mm; phyllaries buff.

- W Sichuan.

50. *Anaphalis hancockii* Maximowicz, Bull. Acad. Imp. Sci. Saint-Petersbourg 27: 479. 1882.

铃铃香青 ling ling xiang qing

Anaphalis bodinieri Franchet; *Gnaphalium bodinieri* (Franchet) Franchet.

Rhizome slender, somewhat woody, runners membranous squamate leafy, with terminal rosette leaves. Stems erect from geniculate base, 5–35 cm, slender, arachnoid tomentose and capitate cauliferous glandular pilose, upper part arachnoid tomentose, often sparsely leafy. Rosette and lower leaves spatulate or linear-oblong, 2–10 × 0.5–1.5 cm, base attenuate into a petiole, or sessile, apex rounded or acute; middle and upper leaves erect or adherent to stem, linear or linear-lanceolate, rarely linear-oblong, somewhat expanding, margin flat, membranous, apex with withered long cusp; all leaves thin, both surfaces with capitate glandular hairs, canescent arachnoid tomentose on margin, distinctly 3-veined or additionally with 2 indistinct lateral veins. Capitula 9–15, densely compound corymbiform; peduncle 1–3 mm. Involucre broadly campanulate, 8–9(–11) × 8–10 mm; phyllaries 4- or 5-seriate, somewhat expanding; outer phyllaries rufous or puce, oval, 5–6 mm; middle ones white, oblong-lanceolate, 8–10 × 3–4 mm, acute at apex; innermost ones linear, with a claw ca. 1/3 of full length. Receptacle with fimbriate short hairs. Capitula with numerous female florets, center of predominantly female capitula with 1–6 male florets; predominantly male capitula with male florets only. Corolla tube 4–4.5 mm. Pappus exceeding corolla, incrassate at tip of apex in male florets, serrulate. Achenes oblong, ca. 1.5 mm, densely papillose. Fl. Jun–Aug, fr. Aug–Sep.

- Subalpine peaks and grassy slopes; 2000–3700 m. SW and W Gansu, N and W Hebei, E Qinghai (Datong, Haiyuan), S Shaanxi (Tai-bai Shan), N and W Shanxi, NW and W Sichuan (Gede, Xiaojin), E Xizang (Lulang).

This taxon is extremely variable.

51. *Anaphalis nepalensis* (Sprengel) Handel-Mazzetti, Symb. Sin. 7: 1099. 1936.

尼泊尔香青 ni bo er xiang qing

Herbs, perennial. Rhizome slender or slightly robust, runners ca. 20 cm, rarely ca. 40 cm; leaves of runner obovate or spatulate, 1–2 cm, with terminal rosette leaves. Stems erect or ascending, 4–45 cm (or plants acaulescent), white tomentose, densely or sparsely leafy. Lower leaves persistent during efflorescence, rarely withered, homomorphic with rosette leaves, spatulate, oblanceolate, or oblong-oblanceolate, 1–7 × 0.5–2 cm or larger, base attenuate, margin flat, apex rounded or acute; middle leaves oblong or oblanceolate, often rather narrow, base amplexicaul, sessile, apex obtuse or acute, with acerose cusp; upper leaves attenuate; or short stems without middle and upper leaves; all leaves white tomentose or cauliferous glandular pilose on both surfaces or abaxially, (1 or)3-veined. Capitula solitary or few, rarely numerous, sparsely corymbiform; peduncle 0.5–2.5 cm. Involucre somewhat spherical, 8–12 × 15–20 mm, exceeding disk; phyllaries 8- or 9-seriate, radiate in efflorescence; outer phyllaries puce except at apex, oval or lanceolate, 3–3.5 mm; middle ones white, lanceolate, 7–10 × 2.5–3 mm, acute at apex; innermost ones linear-lanceolate, 5–8 mm, with a claw ca. 1/3 of full length. Receptacle lacunose. Predominantly female capitula with numerous marginal female florets, center

with 3–6 male florets; predominantly male capitula with male florets only, or 1–3 female florets outside. Corolla of male florets ca. 3 mm, ca. 4 mm in female florets. Pappus ca. 4 mm, incrassate at tip of apex in male florets, serrulate. Achenes terete, ca. 1 mm, hirsutulous. Fl. Jun–Sep, fr. Aug–Oct.

Alpine or subalpine grasslands, conifer forests, forest margins, scrub, valleys, riverbanks, river sands, rocks, rock crevices, among lichens on slopes; 2400–4500 m. Gansu, Shaanxi, Sichuan, Xizang, Yunnan [Bhutan, India, ?Myanmar, Nepal].

- 1a. Plants acaulescent, or stems low, up to 6 cm tall, rarely taller, with leaves densely clustered; capitulum solitary, among rosette leaves or at stem apex 51c. var. *monocephala*
- 1b. Stems 5–45 cm tall; capitula few or numerous, arranged in sparse corymb, rarely solitary.
- 2a. Stem thickish, 30–45 cm tall; capitula usually 8–15; lower leaves usually withered by anthesis 51b. var. *corymbosa*
- 2b. Stem slender, 5–30 cm tall; capitula 1–6; lower leaves usually surviving during anthesis 51a. var. *nepalensis*

51a. *Anaphalis nepalensis* var. *nepalensis*

尼泊尔香青(原变种) ni bo er xiang qing (yuan bian zhong)

Helichrysum nepalense Sprengel, Syst. Veg. 3: 485. 1826, based on *H. stoloniferum* D. Don, Prodr. Fl. Nepal. 176. 1825, not (Linnaeus f.) Willdenow (1803); *Anaphalis cuneifolia* (Candolle) J. D. Hooker; *A. intermedia* (Candolle) Duthie; *A. mairei* H. Léveillé; *A. mucronata* Candolle var. *polycephala* Candolle; *A. nubigena* Candolle var. *intermedia* (Candolle) J. D. Hooker; *A. nubigena* var. *polycephala* (Candolle) C. B. Clarke; *A. triplinervis* (Sims) C. B. Clarke var. *intermedia* Airy Shaw; *Antennaria triplinervis* Sims var. *cuneifolia* Candolle; *A. triplinervis* var. *intermedia* Candolle.

Stems erect or ascending, slender, 5–30 cm tall, sparsely caespitose. Lower leaves usually surviving during anthesis, spatulate or oblanceolate, 2–7 × 0.8–2.5 cm, gradually attenuate at base into long petiole. Capitula 1–6 or more; peduncle 0.5–1.5 cm.

Alpine or subalpine grasslands, forest margins, valleys, rocks; 2400–4500 m. S and SW Gansu, S Shaanxi, W Sichuan, S Xizang, Yunnan [Bhutan, India, Nepal].

This taxon is extremely variable.

51b. *Anaphalis nepalensis* var. *corymbosa* (Bureau & Franchet) Handel-Mazzetti, Acta Horti Gothob. 12: 239. 1938.

伞房尼泊尔香青 san fang ni bo er xiang qing

Gnaphalium corymbosum Bureau & Franchet, J. Bot. (Morot) 5: 71. 1891; *Anaphalis corymbosa* (Bureau & Franchet) Diels.

Stems thickish, 30–45 cm tall. Lower leaves usually withered by anthesis, oblong-lanceolate, ca. 10 cm, gradually attenuate at base into long petiole. Capitula 8–15, forming a spreading corymb; peduncle 1–3 cm or more.

• Alpine or subalpine grasslands, scrub, conifer forests, river sands; 2500–4100 m. W Sichuan, NW and W Yunnan [?Bhutan, ?Myanmar, ?Nepal].

This taxon is recorded in Annot. Checkl. Fl. Pl. Nepal (50. 2000, as *A. corymbosa*) from Bhutan, Myanmar, and Nepal. However, it is not mentioned in Fl. Bhutan (2(3): 1515–1522. 2001).

51c. *Anaphalis nepalensis* var. *monocephala* (Candolle) Handel-Mazzetti, Acta Horti Gothob. 12: 239. 1938.

单头尼泊尔香青 dan tou ni bo er xiang qing

Anaphalis monocephala Candolle, Prodr. 6: 272. 1838; *A. mucronata* Candolle; *A. mucronata* var. *monocephala* Candolle; *A. nubigena* Candolle; *A. triplinervis* var. *monocephala* (Candolle) Airy Shaw.

Plants acaulescent, or stems low, up to 6 cm tall, rarely taller, congested with rosette leaves. Leaves densely clustered, spatulate to oblanceolate-oblong, 0.8–2(–3) × 0.2–2 cm, abaxially densely white lanate, adaxially arachnoid tomentose, 1-veined or inconspicuously 3-veined. Capitulum solitary, terminal, rarely 2 or 3 capitula among rosette leaves.

Among lichens on alpine dank slopes, rock crevices, riverbanks; 4100–4500 m. W Sichuan (Kangding), S Xizang, NW Yunnan [Bhutan, India, Nepal].

52. *Anaphalis triplinervis* (Sims) C. B. Clarke, Compos. Ind. 105. 1876.

三脉香青 san mai xiang qing

Antennaria triplinervis Sims, Bot. Mag. 51: t. 2468. 1824; *Gnaphalium cynoglossoides* Trevisan.

Herbs perennial, caespitose; rhizome woody; stolons repent, with slender roots. Stems annual, erect, corymbiform branches on upper parts, 40–60 cm, white tomentose. Lower leaves small, rarely cauliferous, elliptic, 3-veined. Cauline leaves oblong or elliptic, 3-veined or more, abaxially white tomentose, adaxially arachnoid tomentose, base sessile, sometimes amplexicaul, apex acute; lower leaves oblong-lanceolate, cauliferous (sometimes long) or attenuate into a petiole; middle leaves broadly lanceolate, 7–10 × 1.5–2.5 cm. Capitula large. Involucre 5–7 × 7–10 mm; phyllaries white, apex acute; inner elliptic or oblong-lanceolate. Fl. Aug–Oct, fr. Oct–Nov. 2n = 28.

Grassy slopes; ca. 2300 m. S Xizang (Nyalam) [Afghanistan, Bhutan, N India, Kashmir, Nepal, Pakistan].

53. *Anaphalis nagasawae* Hayata, Bot. Mag. (Tokyo) 20: 15. 1906 [“*nagasawai*”].

永健香青 yong jian xiang qing

Gnaphalium niitakayamense Hayata.

Rhizome slender, slightly woody; stolons densely leafy, with terminal rosette leaves. Stems and sterile branches or stolons densely caespitose; stem 8–12 cm, slender, mainly ascending, simple, white tomentose, densely leafy. Lower leaves persistent during efflorescence, spatulate or obovate, 0.5–1 × 0.3–0.5 mm, apex rounded or obtuse; middle leaves oblong or lanceolate, 1–2 × 0.4–0.6 cm, base slightly attenuate, decurrent

on stem into a narrow wing, margin flat, apex obtuse, without distinct short cusp; upper leaves slightly short; all leaves pallid tomentose on both surfaces. Involucre subspherical, ca. 1 × 1–1.5 cm, red-brown, thinly tomentose at base; middle phyllaries white or ochroleucous, elliptic-lanceolate, 7–8 × ca. 3 mm, apex acute; innermost linear-lanceolate, ca. 7 mm, with a claw ca. 1/2 of full length. Receptacle lacunose, glabrous. Capitula with numerous marginal female florets, center of predominantly female capitula with few to 15 female florets present. Corolla of female florets ca. 4 mm, rather short; male florets unknown. Achenes terete, ca. 1 mm. Fl. Jul–Aug.

- Alpine dry grasslands. Taiwan.

54. *Anaphalis acutifolia* Handel-Mazzetti, J. Bot. 76: 286. 1938.

尖叶香青 *jian ye xiang qing*

Rhizome thickish, creeping, caespitose, usually with marcescent leaves. Stems erect, 12–23 mm, slender, 1–1.5 mm in diam., becoming slightly woody at base, white arachnoid tomentose, sometimes glabrate in lower parts; leaves at base persistent, short, membranous, broadly ovate or orbicular, brown squamiform leaves arising from base, internode 3–10 mm.

Lower leaves persistent and withered; middle leaves somewhat spreading, linear or linear-lanceolate, 2.5–3.5 × ca. 0.6 cm, herbaceous, pallid or ochroleucous (when young), both surfaces tomentose or glandular pilose, 1-veined, base attenuate, not decurrent, margin flat, apex acute, with very short cusp; upper leaves small, equaling or exceeding synflorescence, somewhat erect or clinging to synflorescence, apex acute, with short or withered long cusp. Capitula 5–10, densely glomerulate, 5–10 mm in diam.; peduncle short to 3 mm, white tomentose. Involucre globose, ca. 10 × 15 mm, slightly exceeding disk; phyllaries 7- or 8-seriate, radiate, equal in length; outer phyllaries ovate-lanceolate, ca. 3.5 mm, base brownish, apex acute; middle ones white, elliptic-lanceolate, 5–7 × ca. 2 mm, claw deep brown, apex acute or acuminate; innermost ones linear-lanceolate, with a claw ca. 1/2 of full length. Receptacle without fimbriate appendage. Capitula with numerous marginal female florets, center of predominantly female capitula with 5–14 male florets. Corolla 3–3.5 mm. Pappus white, filiform-dentate. Ovary ca. 0.5 mm, pubescent. Fl. Jul–Sep.

- Gravel slopes, gritty regions; ca. 3900 m. S Xizang (Yadong).

No specimens of this species were seen by the second author.

Species incertae sedis

Anaphalis horaimontana Masamune, Trans. Nat. Hist. Soc. Formosa 26: 57. 1936.

大山香青 *da shan xiang qing*

Stems unbranched, erect, ca. 10 cm, densely tomentose, base ca. 1 mm in diam., foliose, apex ascending corymbiform branched. Basal leaves rosulate, small, obovate, withered by anthesis, both surfaces gray tomentose; middle leaves spatulate, 12–14 × 3–3.5 mm, both surfaces densely tomentose, base attenuate, almost sheathlike, apex obtuse; upper leaves linear, 5–6 mm. Capitula 6, corymbiform, pedunculate. Involucre cam-

panulate-globose, ca. 6 × 6 mm, base rounded, densely lanate; phyllaries imbricate, 6-seriate; outer phyllaries red-brown, ovate-lanceolate, apex acuminate or obtuse; inner ones white, apex obtuse. Capitula with many marginal female florets, corolla filiform, ca. 3.5 mm; bisexual florets few, corolla tubular, ca. 3.5 mm, apex 5-denticulate. Pappus in female florets ca. 3.5 mm, in male florets ca. 3.7 mm, apex scabrid, not clavate. Ovary small, puberulent.

- Alpine grasslands. Taiwan.

Specimens of this species were not seen by the present authors. The above description is based on the original literature.

183. *PSEUDOGNAPHALIUM* Kirpicznikov, Trudy Bot. Inst. Akad. Nauk S.S.S.R., Ser. 1, Fl. Sist. Vyssh. Rast. 9: 33. 1950.

拟鼠麴草属 *ni shu qu cao shu*

Chen Yousheng (陈又生); Randall J. Bayer

Gnaphalium subg. *Laphangium* Hilliard & B. L. Burtt; *Laphangium* (Hilliard & B. L. Burtt) Tzvelev.

Herbs, perennial, biennial, or annual. Leaves alternate, flat with entire margins, tomentose on both surfaces. Capitula many in corymbs. Phyllaries papery, whitish, rosy, tawny, or brownish, opaque or hyaline, dull or shiny; stereome divided. Receptacle flat, epaleate. Outer florets yellow, filiform. Central florets bisexual, yellow. Anthers with flat appendages. Style branches truncate, with hairs apically. Achenes oblong, with short clavate twin hairs. Pappus bristles capillary, barbellate, and free.

About 90 species: worldwide, mostly South America to North America, mostly in temperate regions; six species (two endemic) in China.

1a. Phyllaries light white or bright brown.

2a. Robust herbs, up to 1 m tall; leaves distinctly 3-veined 1. *P. adnatum*

2b. Dwarf herbs, 10–40 cm tall; leaves 1-veined.

3a. Annual herbs; leaves spatulate or spatulate-oblong, apex obtusely rounded, base narrower 2. *P. luteoalbum*

3b. Perennial herbs; leaves lanceolate or ovate-lanceolate, rarely linear, apex shortly acute, base broader 3. *P. flavescens*

1b. Phyllaries golden yellow or citrine yellow.

4a. Stems shortly glandular; leaf base decurrent to form wings; capitula ca. 5 mm in diam. or larger 4. *P. chrysocephalum*

4b. Stems white lanate; leaf base decurrent, sometimes slightly amplexicaul; capitula 2–4 mm in diam.

5a. Dwarf herbs, 10–40 cm tall, usually branched from base; leaves spatulate or spatulate-oblancoolate, not amplexicaul or auriculate, whitish tomentose on both surfaces; pappus connate at base 5. *P. affine*

5b. Robust herbs, up to 80 cm tall, only branched in upper part; leaves linear, subamplexicaul-auriculate, green glandular adaxially, white tomentose abaxially; pappus distinct 6. *P. hypoleucum*

1. *Pseudognaphalium adnatum* (Candolle) Y. S. Chen, **comb. nov.**

宽叶拟鼠麴草 kuan ye ni shu qu cao

Basionym: *Anaphalis adnata* Candolle, Prodr. 6: 274. 1838; *A. esquirolii* (H. Léveillé) H. Léveillé; *A. sericeoalbida* (Vaniot) H. Léveillé; *Gnaphalium adnatum* (Candolle) Wallich ex Thwaites; *G. esquirolii* H. Léveillé; *G. formosanum* Hayata; *G. sericeoalbidum* Vaniot.

Herbs, robust. Stems erect, 4–8 mm in diam., 50–100 cm tall, unbranched or rarely branched below, corymbosely branched above, densely lanate. Basal leaves withering at anthesis; middle and lower leaves oblanceolate or subelliptic, 4–9 × 1–2 cm, leathery, both surfaces densely tomentose, midrib elevated, base decurrent, apex obtuse. Capitula 5–7 mm in diam., in corymbs on upper stem. Involucre yellow or whitish, 3- or 4-seriate, globose, 5–6 mm wide, scarious; outer phyllaries obovate or oblanceolate, ca. 4 mm, rounded; inner ones elliptic or oblong, ca. 4 mm. Outer florets many; corolla ca. 3 mm. Central florets 5–7, ca. 3 mm. Achenes oblong, ca. 0.5 mm. Pappus white, ca. 3 mm. Fl. Aug–Oct.

Mountain slopes, roadsides, exposed rocky environments; 500–3000 m. Fujian, Gansu, Guangdong, Guangxi, Guizhou, Henan, Hunan, Jiangsu, Jiangxi, Sichuan, Taiwan, SE Xizang, Yunnan, Zhejiang [Bhutan, India, Myanmar, Nepal, Philippines, Thailand, Vietnam].

2. *Pseudognaphalium luteoalbum* (Linnaeus) Hilliard & B. L. Burt, Bot. J. Linn. Soc. 82: 206. 1981 [*“luteo-album”*].

丝棉草 si mian cao

Gnaphalium luteoalbum Linnaeus, Sp. Pl. 2: 851. 1753 [*“luteo-album”*]; *Laphangium luteoalbum* (Linnaeus) Tzvelev.

Herbs, annual, 15–40 cm, taprooted or fibrous-rooted. Stems loosely white tomentose, not glandular. Leaves crowded; internodes 1–5, sometimes to 10 mm; blade narrowly obovate to subspatulate, 1–3(–6) cm × 2–8 mm (distal smaller, oblanceolate to narrowly oblong or linear), both surfaces mostly concolorous to weakly bicolored, abaxially gray tomentose, adaxially usually gray tomentose, sometimes glabrescent, neither surface glandular, bases subclasping, usually decurrent 1–2 mm, margin weakly revolute. Capitula in terminal glomerules 1–2 cm in diam. Involucre broadly campanulate, 3–4 mm; phyllaries 3- or 4-seriate, silvery gray to yellowish, hyaline, ovate to ovate-oblong, glabrous. Female florets 135–160. Bisexual florets 5–10; corollas red tipped. Achenes not evidently ridged, conspicuously dotted with whitish, papilliform hairs. Pappus bristles loosely coherent basally, released in clusters or easily fragmented rings. $2n = 14, 28$.

Exposed fields, roadsides; below 3200 m. Gansu, Hainan, Henan, Hubei, Jiangsu, Shaanxi, Shandong, Sichuan, Taiwan [Afghanistan, India, Laos, Pakistan, N Thailand, Vietnam; Africa, SW Asia (Iran), Australia, Europe, North America].

3. *Pseudognaphalium flavescens* (Kitamura) Anderberg, Opera Bot. 104: 147. 1991.

拉萨拟鼠麴草 la sa ni shu qu cao

Gnaphalium flavescens Kitamura, Acta Phytotax. Geobot. 15: 71. 1953.

Herbs, perennial, somewhat woody at base. Stems in tufts, 1–1.2 mm thick, branched from middle and in upper part, 14–16 cm tall, arachnoid tomentose. Basal leaves withering at anthesis, linear, 10–12 × ca. 1.5 mm; middle leaves lanceolate or ovate-lanceolate, 15–18 × 2–3 mm, abaxially white lanate, adaxially green and arachnoid pubescent, base amplexicaul, apex mucronate; upper leaves ovate or ovate-oblong, 10–15 × 3–5 mm, base broader, apex mucronate. Capitula numerous, 4–5 mm in diam., pedunculate, in terminal compound corymbs. Involucre campanulate, 4–5 mm in diam.; phyllaries 4- or 5-seriate, nitid, grayish white or light yellow; outer ones ovate, 2–2.5 mm, abaxially densely lanate, apex obtuse; middle ones oblong or obovate-oblong, 3–4 mm, apex rounded or toothed; innermost ones obovate-oblong, 4.5–5 mm, abaxially glabrous. Receptacle slightly convex, glabrous. Outer florets female; corolla filiform, 2.5–3 mm, limbs usually 4-toothed, rarely 3- or 5-toothed. Disk corolla 5-toothed. Achenes oblong or elliptic, ca. 1 mm, papillose. Pappus white, ca. 3.5 mm, scabrid. Fl. Aug–Nov.

• Alpine grasslands, thickets; 3000–3800 m. Xizang.

4. *Pseudognaphalium chrysocephalum* Hilliard & B. L. Burt, Bot. J. Linn. Soc. 82: 205. 1981.

金头拟鼠麴草 jin tou ni shu qu cao

Gnaphalium chrysocephalum Franchet, J. Bot. (Morot) 10: 412. 1896, not Schultz Bipontinus (1845).

Herbs, perennial, erect. Stem usually simple, 60–80 cm tall, shortly pubescent, upper part lanate. Leaves narrowly lanceolate or linear-lanceolate, 5–8 × 5–8 cm, abaxially scabrid, adaxially gray lanate, base half decurrent and narrowly cuneate, apex acute. Capitula densely corymbose, campanulate, ca. 6 mm in diam. Outer phyllaries lanate; middle ones golden yellow and polished, obovate-oblong, apex rounded; innermost ones pale, spatulate, base leathery, apex membranous. Florets bisexual. Achenes columnar to subellipsoid, glabrous. Pappus white, ca. 4 mm, deciduous. Fl. Jun–Oct.

• Grassy slopes; 2600–2800 m. W Sichuan, Yunnan.

5. *Pseudognaphalium affine* (D. Don) Anderberg, Opera Bot. 104: 146. 1991.

拟鼠麴草 ni shu qu cao

Gnaphalium affine D. Don, Prodr. Fl. Nepal. 173. 1825; *G. confusum* Candolle; *G. javanum* Candolle; *G. luteoalbum* Linnaeus subsp. *affine* (D. Don) J. Koster; *G. luteoalbum* var. *multiceps* (Wallich ex Candolle) J. D. Hooker; *G. multiceps* Wallich

ex Candolle; *G. ramigerum* Candolle; *Laphangium affine* (D. Don) Tzvelev; *Pseudognaphalium luteoalbum* (Linnaeus) Hilliard & B. L. Burtt subsp. *affine* (D. Don) Hilliard & B. L. Burtt.

Herbs, biennial. Stems 15–40 cm tall, densely white lanate tomentose. Leaves thin; lower leaves smaller than median cauline leaves; cauline leaves spatulate, 2–6 × 4–12 cm, white lanate on both surfaces, base angular, narrowed, sessile, decurrent, margin entire, apex rounded, mucronulate. Capitula numerous, densely aggregated in terminal corymbs. Involucre globose-campanulate, ca. 3 × 3.5 mm; phyllaries 3-seriate, pale yellow, outer ones shorter, broadly ovate, inner ones oblong, apex obtuse. Outer florets many, ca. 1.75 mm. Central florets 5–10; corolla ca. 2 mm. Achenes oblong, compressed, ca. 0.5 mm, papillose. Pappus white, ca. 2 mm, bristles deciduous separately. $2n = 14$.

A weed of wastelands and cultivated fields, common; sea level to 2000 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hainan, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Shaanxi, Shandong, Sichuan, Taiwan, Xizang, Yunnan, Zhejiang [Afghanistan, Bhutan, India, Indonesia, Japan, Korea, Myanmar, Nepal, Pakistan, Philippines, Vietnam; SW Asia (Iran), Australia].

6. *Pseudognaphalium hypoleucum* (Candolle) Hilliard & B. L. Burtt, Bot. J. Linn. Soc. 82: 205. 1981.

秋拟鼠麴草 *qiu ni shu qu cao*

Gnaphalium hypoleucum Candolle in Wight, Contr. Bot. India, 21. 1834; *G. amoyense* Hance; *G. confertum* Benth; *G. hololeucum* Hayata; *G. hypoleucum* var. *amoyense* (Hance) Handel-Mazzetti; *G. hypoleucum* var. *brunneonitens* Handel-Mazzetti; *G. hypoleucum* var. *hololeucum* (Hayata) Yamamoto.

Herbs, erect, 30–60(–80) cm tall, usually simple, branched above, grayish pubescent to lanate or brownish glandular. Leaves linear, 1.5–7.5 × 0.1–0.7 cm, bicolored, white tomentose abaxially, dull green glandular pubescent adaxially, margin entire to crispate or revolute, subamplexicaul, usually undulate. Capitula in dense corymbose clusters, densely lanate, 3–3.5 mm in diam. Phyllaries 4- or 5-seriate, yellow to snow white, oblong, ca. 4 mm, apex acute rarely subacute. Outer florets filiform; corolla yellow, ca. 2 mm, 3- or 4-toothed. Disk florets ca. 2 mm; corolla 5-lobed. Achenes papillose, ca. 0.5 mm. Pappus setae white, free, minutely bristly, equaling corolla. Fl. Apr–Oct. $2n = 14$.

Waste fields, grasslands, roadsides; below 2700 m. Anhui, Fujian, Guangdong, Hunan, Jiangxi, Sichuan, Taiwan, Yunnan, Zhejiang [Bhutan, India, Indonesia, Japan, Korea, Myanmar, Nepal, Pakistan, Philippines, Thailand, Vietnam; SW Asia (Iran)].

This species is easily distinguished by its robust habit and subamplexicaul leaves, which are dull green adaxially and white tomentose abaxially.

184. XEROCHRYSUM Tzvelev, Novosti Sist. Vyssh. Rast. 27: 151. 1990.

蜡菊属 *la ju shu*

Chen Yousheng (陈又生); Randall J. Bayer

Herbs, perennial, sometimes biennial or annual. Stems with fibers in phloem, without resin canals, without pericyclic cambium. Leaves alternate, sessile, glandular hairy, margin generally flat, entire. Capitula heterogamous, disciform, few to solitary. Phyllaries few to many seriate, entire, papery, monomorphic, monochromous; lamina yellow, pink, orange, red, or white, opaque; stereome undivided. Receptacle flat, epaleate. Female florets yellow, filiform, fewer than disk florets. Achenes and pappus as in disk florets. Disk florets bisexual; corolla yellow; corolla lobes erect, veins ending before apex of lobes. Anthers ecalcarate, shortly tailed; endothelial tissue polarized; apical appendages concave, as wide as thecae. Pollen gnaphalioid. Style bifid; style branches acute with obtuse sweeping hairs dorsally; stigmatic surface separated. Achenes large, terete to quadrangular with 3 vascular bundles, glabrous, epidermis smooth. Pappus of free, barbellate, capillary bristles without patent cilia; apical cells acute.

Six species: Australia; one species (introduced) in China.

1. *Xerochrysum bracteatum* (Ventenat) Tzvelev, Novosti Sist. Vyssh. Rast. 27: 151. 1990.

蜡菊 *la ju*

Xeranthemum bracteatum Ventenat, Jard. Malmaison, t. 2. 1803; *Bracteantha bracteata* (Ventenat) Anderberg & Haegi; *Helichrysum bracteatum* (Ventenat) Haworth.

Herbs, annual or biennial. Stems 20–120 cm tall. Leaves

lanceolate to linear, up to 12 cm, costa prominent, base gradually narrower, margin entire, apex acute. Capitula 2–5 cm in diam., solitary on strong, branching stems. Phyllaries imbricate, outer ones shorter, inner ones broadly lanceolate, apex acuminate, nitid, white, red, yellow, pink, or purple. Florets numerous, yellow. Achenes glabrous. Pappus of scabrid bristles. Fl. Jul–Sep. $2n = 28$.

Widely cultivated in China as an ornamental plant [native to Australia].

185. HELICHRYSUM Miller, Gard. Dict. Abr., ed. 4, [462]. 1754 [*“Elichrysum”*], nom. cons.

拟蜡菊属 *ni la ju shu*

Chen Yousheng (陈又生); Randall J. Bayer

Herbs, perennial or annual, sometimes shrublets. Leaves alternate, generally flat with entire margins, often tomentose. Capitula solitary or many in corymbs. Phyllaries papery, brown, yellow, pink, or white; stereome divided or undivided. Receptacle flat,

epaleate or rarely paleaceous. Outer filiform florets yellow, or absent. Central florets bisexual, yellow. Anthers with flat appendages. Style branches truncate, with hairs apically. Achenes oblong, glabrous or with elongated or short clavate twin hairs. Pappus bristles capillary, barbellate or subplumose, connate or free.

About 600 species: Africa, Asia, Europe, Madagascar; three species (one endemic) in China.

- 1a. Phyllaries white 1. *H. kashgaricum*
 1b. Phyllaries yellow.
 2a. Stems usually not branched; outer phyllaries apex rounded 2. *H. arenarium*
 2b. Stems branched; outer phyllaries apex acute 3. *H. thianschanicum*

1. *Helichrysum kashgaricum* C. H. An, Fl. Xinjiang. 5: 476. 1999.

喀什蜡菊 ka shi la ju

Herbs, perennial. Rhizome with flowering stems and sterile stems. Stems 10–15 cm tall; entire plant white lanate, denser on peduncles. Leaves oblong-ob lanceolate, 1–3 cm × 2–5 mm, base gradually narrowed, semiamplexicaul, apex acuminate. Capitula in terminal corymbs. Involucre 1.5–1.8 cm in diam.; phyllaries 4- or 5-seriate, ovate-lanceolate or lanceolate, 5–8 × ca. 2 mm; outer ones white, dry membranous, base dark brown, apex acuminate; inner ones lanceolate, subleathery, nearly black outside, margin white, membranous. Female florets few, narrowly funnelform, ca. 1.5 mm, limbs 5-lobed. Bisexual florets light brown, funnelform above, columnar below, ca. 4 mm, limbs 5-lobed. Pappus ca. 4 mm. Fl. Aug.

- Valleys; ca. 2000 m. Xinjiang.

2. *Helichrysum arenarium* (Linnaeus) Moench, Methodus, 575. 1794.

沙生蜡菊 sha sheng la ju

Gnaphalium arenarium Linnaeus, Sp. Pl. 2: 854. 1753.

Herbs, perennial. Rhizome woody, more often thick, 5–7(–15) mm in diam., or much thinner, only 1–4 mm in diam. Flowering stems few or many, erect or ascending, unbranched, 10–60 cm tall, at very base sometimes with decayed leaves; entire plant tomentose-lanate, usually forming ± dense clusters. Leaves at apex with a small brownish cusp, gradually diminishing upward; upper and middle ones sessile, lanceolate-linear, oblong-obovate, or oblong-elliptic, gradually narrowed toward base. Capitula (5–)10–30(–100) arranged in compact or slightly branching loose corymb, subspherical or widely obovate, (3–)4–6(–9) mm in diam., on peduncles of indefinite length; in young state corymbs capitate, usually surrounded

by a few terminal leaves. Phyllaries ca. 50, slightly loosely arranged in (3 or)4–6(or 7) rows, often with declined tip at end of anthesis, bright lemon-yellow, more pallid yellow, pinkish, or orange; outer ones obovate or elliptic, abaxially densely villous, apex rounded; inner ones widely oblong-spatulate to sublinear. Florets (25–)35–45(–50), almost always bisexual, sometimes marginal florets female. Achenes papillate. Pappus of ca. 30 very thin soft scabrid yellowish or almost white hairs, approximately as long as corolla. Fl. Jul–Sep. $2n = 56$.

Grassy slopes; 400–2400 m. N Xinjiang [Mongolia, Russia; Europe].

3. *Helichrysum thianschanicum* Regel, Trudy Imp. S.-Peterburgsk. Bot. Sada 6: 307. 1879.

天山蜡菊 tian shan la ju

Herbs, perennial. Rhizome up to 1 cm in diam., woody, fibrous-splintery, multicapital. Flowering stems few to numerous, 30–60 cm tall, branching approximately from middle (rarely simple), with slender ramuscles 5–12 cm; entire plant covered, with thin dense whitish-grayish tomentose pubescence. Leaves of sterile offshoots linear-spatulate, wider and longer than linear-lanceolate acuminate leaves of flowering stems. Capitula 3–6 or more arranged at ends of shoots and branches, narrowly campanulate or obconical, 5–7 × 4–6 mm, almost as long as peduncles, or subsessile. Phyllaries ca. 30, yellow, rather loosely imbricate, arranged in 6 or 7 rows, ± squarrose in upper part, abaxially tomentose pubescent in lower part, outermost ones lanceolate and 1/3–1/2 as long as inner ones, linear-lanceolate or spatulate, acuminate or truncate at apex. Florets in a capitulum ca. 25. Pappus of ca. 40 very thin hairs. Fl. Jul–Sep. $2n = 28$.

Gravelly places, dry slopes, dunes; below 3000 m. W Xinjiang [Kazakhstan].