

## 14. Tribe HELIANTHEAE

向日葵族 xiang ri kui zu

Chen Yousheng (陈又生); D. J. Nicholas Hind

Annual or perennial herbs, subshrubs, or shrubs. Rootstock fibrous, tuberous, or woody in form of a xylopodium. Leaves mostly opposite or mostly alternate, rarely whorled, petiolate or sessile, entire, lobed or rarely pinnatisect. Synflorescences of scapose capitula, or capitula arranged in axillary or terminal cymes, corymbs, or panicles, rarely with synflorescences with secondary or tertiary aggregation of capitula. Capitula either heterogamous radiate, heterochromous or homochromous, rarely disciform, or homogamous, discoid, homochromous, florets usually bisexual, rarely unisexual; involucre cylindrical to hemispheric or rotate; phyllaries persistent, herbaceous, rarely membranous, 1–6-seriate, when 1-seriate sometimes with oil glands; receptacles usually flat or convex, sometimes hemispheric or conical, usually paleate; paleae usually deciduous, sometimes persistent, distinct or rarely connate, herbaceous to scarious, apices sometimes 3-lobed or -toothed. Ray florets neuter, or female and fertile; lamina entire or 2- or 3-toothed. Disk florets bisexual, fertile or sterile, 4- or 5-lobed; style branches truncate or appendiculate; anther thecae dark or pale, anther tails obtuse and entire, or sagittate, auriculate. Achenes often compressed or angled, usually black or blackish; pappus absent, or usually of (1 or)2(–8) scales and/or awns, sometimes coroniform.

About 210 genera and ca. 3,330 species: mostly in America; 34 genera (25 introduced) and 64 species (one endemic, 43 introduced) in China.

Many species of this tribe are widely cultivated in China. They include *Dahlia pinnata* Cavanilles, *Dyssodia tenuiloba* (Candolle) B. L. Robinson, *Helenium autumnale* Linnaeus, *Heliopsis helianthoides* (Linnaeus) Sweet, *Melampodium divaricatum* (Richard) Candolle, *Ratibida columnifera* (Nuttall) Wootton & Standley, *Sanvitalia procumbens* Lamarck, and *Silphium perfoliatum* Linnaeus.

- 1a. Plant generally wind-pollinated or self-pollinated, capitula small and not showy; all florets unisexual, or if bisexual then capitula aggregated into glomerules; ray florets absent.
- 2a. Florets all bisexual; capitula aggregated into glomerules surrounded by leaflike bracts; achenes free and not surrounded by modified phyllaries into a bur or into spiny, tuberculate, or winged coat ..... 228. *LAGASCEA*
- 2b. Florets unisexual; capitula not aggregated into glomerules and lacking any outer leaflike bracts; achenes surrounded by modified phyllaries into a prickly bur or spines, tubercles, or wings.
- 3a. Phyllaries in male capitula 1- or 2-seriate, free to base; phyllaries in female capitula 6–12-seriate, their distinct tips mostly  $\pm$  hooked (distal 1–3 usually longer, stouter, and not hooked), whole becoming a hard, prickly perigynium or bur; florets 2 ..... 232. *Xanthium*
- 3b. Phyllaries in male capitula 1-seriate, connate; phyllaries in female capitula 1–8-seriate, usually with free tips forming tubercles, spines, or wings; florets 1(–5) ..... 233. *Ambrosia*
- 1b. Plant generally adapted for attracting pollinating insects, capitula colorful and attractive; some or all florets bisexual; ray florets present, sometimes inconspicuous, rarely absent.
- 4a. Leaves and phyllaries with obvious oil glands.
- 5a. Phyllaries connate into a tube, sometimes splitting with age; style arms relatively long, spreading or arcuate; leaves lacking basal cilia ..... 202. *Tagetes*
- 5b. Phyllaries free; style arms minute, scarcely bifurcated; leaf bases distinctly ciliate ..... 203. *Pectis*
- 4b. Leaves and phyllaries lacking oil glands.
- 6a. Only ray florets fertile, ray achenes much longer than those of sterile disk florets.
- 7a. Leaves alternate; ray achenes strongly flattened, each achene  $\pm$  enclosed by and often attached to subtending phyllary and 2 adjacent paleae, all falling as a unit ..... 234. *Parthenium*
- 7b. Leaves opposite; ray achenes thick, rounded or weakly compressed, without wings; achenes thick, not obviously flattened, not falling as unit with adjacent paleae.
- 8a. Achenes enveloped and enclosed by prickly inner phyllaries ..... 214. *Acanthospermum*
- 8b. Achenes merely subtended by unarmed phyllaries ..... 217. *Smallanthus*
- 6b. Disk florets fertile; ray florets present and fertile or sterile or absent.
- 9a. Ray florets with or without short tubes, persistent with corollas fused to apex of achene ..... 211. *Zinnia*
- 9b. Ray florets deciduous, or if ray florets absent (i.e., capitula disciform or discoid) then corollas not fused to apex of achene.
- 10a. Pappus of subulate to acrose scales, or spatulate, entire to erose, fimbriate, or lacinate, sometimes aristate, scales 1-seriate, or plumose, setiform scales (or flattened bristles) 1-seriate, or an apical peg.
- 11a. Pappus of plumose setae ..... 212. *Tridax*
- 11b. Pappus of aristate or linear scales with erose or fimbriate margins, or absent.
- 12a. Pappus of 6–12 aristate, rarely linear scales with erose margins; capitula > 10 mm in diam. .... 235. *Gaillardia*
- 12b. Pappus absent or of fimbriate, sometimes aristate scales; capitula 3–5 mm in diam. .... 213. *Galinsoga*

- 10b. Pappus absent, or awned.
  - 13a. Achenes compressed.
    - 14a. Pappus of retrorsely barbed awns; leaves opposite or upper alternate.
      - 15a. Style branches with long hairs; pappus of 2 scabrid awns ..... 205. *Glossocardia*
      - 15b. Style branches with short minute papillae; pappus of 2–4 scabrid awns.
        - 16a. Anther filaments pubescent; achene apex beaked ..... 206. *Cosmos*
        - 16b. Anther filaments glabrous; achene apex narrow, not beaked ..... 207. *Bidens*
    - 14b. Pappus absent, or persistent, of 2 bristly cusps or scales; leaves opposite.
      - 17a. Phyllaries 2-seriate, outer few and smaller, inner membranous, connate at base; pappus of 2–4 awns or scales or absent ..... 208. *Coreopsis*
      - 17b. Phyllaries free, outer leathery, subequal, inner shorter, similar with paleae; ray achenes narrowly oval and winged, with 2 triangular scales.
        - 18a. Achenes markedly dimorphic, those of ray florets with conspicuous, lacerate winged margin, others wingless ..... 219. *Synedrella*
        - 18b. Achenes all ± alike, wingless or somewhat thickly winged distally, not lacerate.
          - 19a. Shrubs or small trees; synflorescence of numerous capitula in congested panicles or corymbs; achenes wingless ..... 223. *Clibadium*
          - 19b. Annual or perennial herbs; synflorescence of solitary capitula or capitula several in dense clusters; achenes winged or angled.
            - 20a. Capitula radiate; pappus of 2 stout awns ..... 220. *Calyptocarpus*
            - 20b. Capitula discoid; pappus peglike ..... 221. *Eleutheranthera*
    - 13b. Achenes all relatively plump, or 3–5-angled in ray florets and compressed in disk florets.
      - 21a. Achenes enclosed by inner phyllaries or outer paleae.
        - 22a. Capitula tightly or loosely aggregated on short peduncles in corymbose panicles ..... 204. *Flaveria*
        - 22b. Capitula axillary or in sparse cymes or panicles.
          - 23a. Female florets 1-seriate; phyllaries 5, spreading; capitula in sparse panicles, peduncles long ..... 216. *Sigesbeckia*
          - 23b. Female florets multiseriate; phyllaries 4, broad, in 2 pairs; capitula axillary, peduncles very short ..... 209. *Enydra*
      - 21b. Achenes not enclosed by inner phyllaries.
        - 24a. Paleae narrow, long, flat; ray florets 2-seriate, lamina small; pappus absent or of 2 short awns.
          - 25a. Ray floret lamina white; achene body tuberculate ..... 222. *Eclipta*
          - 25b. Ray floret lamina yellow; achene body striate ..... 215. *Guizotia*
        - 24b. Paleae concave or folded, ± enclosing florets.
          - 26a. Achenes in ray florets broadly ovate or elliptic, 3-angled; disk achenes ellipsoid, strongly compressed; pappus absent or of up to 10 awnlike bristles ..... 210. *Acmella*
          - 26b. Achenes in bisexual florets 4- or 5-angled, or compressed.
            - 27a. Ray florets sterile.
              - 28a. Paleae completely investing and falling with accompanying achene, each forming a hardened perigynium ..... 227. *Sclerocarpus*
              - 28b. Paleae sometimes conduplicate, ± enfolding achenes, not forming perigynium.
                - 29a. Pappus absent, a small crown of minute scales, or of 2–4 small scales; receptacles conical to columnar ... 229. *Rudbeckia*
                - 29b. Pappus of 2 awns sometimes with a few scales, or a crown of fused scales, or of 2 awns with fused scales, or absent; receptacles flat to shallowly convex.
                  - 30a. Peduncles usually distally dilated, always fistulose; pappus absent or coroniform, of connate scales, 1 or 2 scales sometimes subulate to aristate ..... 230. *Tithonia*
                  - 30b. Peduncles never fistulose; pappus absent or readily deciduous, of 2(or 3) usually lanceolate, aristate, or erose scales, plus 0–8 usually shorter scales ..... 231. *Helianthus*

- 27b. Ray florets fertile.
- 31a. Pappus elements 2–5, unequal, spinelike or squamalike, persistent, base connate; ray florets female, ray floret lamina short or very short, apex 2–4-dentate; capitula small ..... 218. *Blainvillea*
- 31b. Pappus absent, or scalelike, cyathiform, coroniform, or of 1 or 2 setae; capitula relatively large.
- 32a. Corollas orange to yellow; outer phyllaries herbaceous and larger than inner; leaves sessile or very shortly petiolate; plants mainly prostrate; achenes triangular (ray) or compressed (disk); capitula always solitary, terminal (but appearing axillary) on erect peduncles; achene beak and pappus obscured at maturity by corky collar ..... 224. *Sphagneticola*
- 32b. Corollas white or yellow; outer phyllaries ± equal in size to inner; leaves usually conspicuously petiolate; plants mostly erect or ascending [sometimes vines or subshrubs outside of our area]; synflorescence of 1–3(–6) capitula, terminal or axillary; pappus of obvious setae (rarely absent).
- 33a. Ray florets female and sterile or neuter; pappus awns caducous ..... 225. *Melanthera*
- 33b. Ray florets female and fertile; pappus absent or single awn persistent ..... 226. *Wollastonia*

## 202. TAGETES Linnaeus, Sp. Pl. 2: 887. 1753.

万寿菊属 wan shou ju shu

Annual or perennial herbs, subshrubs, or shrubs. Stems erect, branched distally or throughout. Leaves cauline, mostly opposite (distal sometimes alternate), petiolate or sessile; blades mostly lanceolate to oblanceolate overall, usually pinnately 1–3-lobed or -pinnatisect, ultimate margin toothed or entire, both surfaces glabrous or hairy. Synflorescence of solitary capitula or of sometimes dense, many-headed corymbs. Capitula radiate or discoid; calyculus absent; involucre narrowly cylindrical or fusiform to turbinate or broadly campanulate, 1–12+ mm in diam.; phyllaries persistent, 1- or 2-seriate (connate to 7/8+ their lengths, usually streaked and/or dotted with oil glands); receptacle convex to conical, smooth or finely pitted, epaleate. Ray florets female, fertile (except “double” cultivars); lamina yellow or orange, red-brown, or white. Disk florets bisexual, fertile; corollas greenish yellow to orange, sometimes tipped with red or red-brown, tubes much longer than or ± equaling funnellike throats, lobes 5, deltate to linear-lanceolate. Achenes narrowly obpyramidal or fusiform-terete, sometimes weakly flattened, glabrous or hairy; pappus persistent, of 2–5(–10) dissimilar, distinct or connate, 1-seriate scales: 0–5+ oblong to lanceolate, erose-truncate or lacinate, 0–2(–5) longer, subulate to aristate.  $x = 12$ .

About 40 species: tropical and warm-temperate America, especially Mexico; two species (both introduced) in China.

- 1a. Synflorescence of solitary terminal capitula; ray limb yellow to orange or reddish brown, rarely white (in cultivars); disk florets (10–)50–120 ..... 1. *T. erecta*
- 1b. Synflorescence of dense terminal corymbs of numerous capitula; ray limb pale yellow to cream; disk florets 4–7 ..... 2. *T. minuta*

### 1. *Tagetes erecta* Linnaeus, Sp. Pl. 2: 887. 1753.

万寿菊 wan shou ju

*Tagetes patula* Linnaeus; *T. tenuifolia* Cavanilles.

Annuals, 10–120 cm. Leaf blades 30–120(–250) mm overall, principal lobes/leaflets 9–25, lanceolate to linear-lanceolate, 15–25(–45) × 3–8(–12) mm. Capitula solitary; peduncles 30–100(–150) mm; involucre 10–22+ × (3–)5–12 mm; phyllaries 5–8. Ray florets (3–)5–8(–100) in “double” cultivars; lamina yellow to orange, red-brown (sometimes bi-colored: yellow/red-brown), or white (some cultivars), flabellate to ovate-quadrate, (2–)12–18(–25) mm. Disk florets (10–)50–120; corollas 7–12 mm. Achenes 6–11 mm; pappus of 0–2 subulate-aristate

scales 6–12 mm and 2–4 distinct or connate, linear-oblong, erose scales 2–6+ mm. Fl. Jun–Oct.  $2n = 24, 48$ .

Widely cultivated in China [native to North America].

Cultivars of *Tagetes erecta* are widely grown in gardens and, commercially, for cut flowers. They often persist after plantings are abandoned. Tetraploid plants ( $2n = 48$ ) with smaller involucre and wholly or partially red-brown corollas included here in *T. erecta* have been called *T. patula* by some botanists.

### 2. *Tagetes minuta* Linnaeus, Sp. Pl. 2: 887. 1753.

印加孔雀草 yin jia kong que cao

*Tagetes bonariensis* Persoon; *T. glandulifera* Schrank; *T. porophyllum* Vellozo; *T. riojana* M. Ferraro.

Annual herbs, 10–250 cm, plant aromatic. Stems much branched in larger plants and almost woody, ribbed, glabrous, glandular. Leaves mostly opposite, often alternate in upper part, dark green, pinnatisect, elliptic in outline, 3–30 × 0.7–8 cm, rachis narrowly winged, lobes up to 17, linear-oblong, to 11 × 1 cm, with orange glands. Synflorescence a dense terminal corymb. Capitula narrowly cylindrical; involucre 8–12 mm; phyllaries 3 or 4, yellow-green, fused, glabrous, with brown or orange linear glands. Ray florets 2 or 3, pale yellow to cream,

lamina 2–3.5 mm. Disk florets 4–7, yellow to dark yellow, 4–5 mm. Achenes black, narrowly ellipsoid, 6–7 mm, pilose; pappus of 1 or 2 setae to 3 mm and 3 or 4 scales to 1 mm, apices ciliate.

Recently naturalized in Taiwan [widespread in Central and South America; naturalized in Africa (Kenya, South Africa) and Australia].

The occurrence of this species in Taiwan was first reported by C. M. Wang and Chih H. Chen (Taiwania 51: 32–35. 2006).

### 203. PECTIS Linnaeus, Syst. Nat., ed. 10, 2: 1189, 1221, 1376. 1759.

香橐菊属 *xiang meng ju shu*

*Lorentea* Lagasca (1816), not Ortega (1797).

Annual or perennial herbs, often strongly scented, sparsely to densely branched. Stems slender, terete to slightly angled, glabrous or hirtellous, or puberulent with retrorsely curved hairs. Leaves opposite, sessile, simple, glandular punctate with glandular oil pits, margin entire or rarely toothed or lobed, ciliate with slender bristles mostly toward base; midvein strong, without prominent secondary veins. Inflorescences terminal on stems or branches, in loose to dense cymose clusters or with solitary capitula; peduncles with or without bracteoles. Capitula heterogamous, radiate; involucre cylindrical to campanulate; phyllaries uniseriate, subequal, abaxially variously glandular punctate with glandular pits, margins thin, narrowly to broadly overlapping, median keel narrow to strong, bases projecting outward, apex slightly to strongly apiculate; receptacle slightly convex, naked, epaleate. Ray florets inserted in basal pockets of phyllaries, equal in number to phyllaries, uniseriate, fertile; corolla yellow to reddish, with distinct limb, apex minutely 3-lobed. Disk florets 3 to ca. 40, fertile, bisexual; corolla yellow, sometimes drying purplish, glabrous or puberulent with blunt hairs, throat funnellform, lobes 5, equal or unequal, sometimes weakly bilabiate, lanceolate to broadly linear, with or without oil gland in tip; anther thecae pale, shortly pointed at base, apical anther appendages ovate to truncate; style shaft with brush of short hairs; style arms narrow or short and broad. Achenes black, narrowly cylindrical or fusiform, weakly ribbed, glabrous or setuliferous; carpopodium a short cap; pappus of scabrid bristles, of a few stout awns, bristles, or scales, or only of scales.  $x = 12$ .

About 85 species: tropical and subtropical America, especially Mexico; one species (introduced) in China.

#### 1. *Pectis prostrata* Cavanilles, Icon. 4: 12. 1797.

伏生香橐菊 *fu sheng xiang meng ju*

*Lorentea prostrata* (Cavanilles) Lagasca; *Pectis costata* Seringe & P. Mercier ex Candolle, nom. illeg. superfl.; *P. multi-setosa* Rydberg; *P. prostrata* var. *urceolata* Fernald; *P. urceolata* (Fernald) Rydberg.

Annual herbs. Stems prostrate or ascending, 1–30 cm, puberulent, hairs in 2 rows. Leaves linear to narrowly oblanceolate, 10–30 × 1.5–7 mm, abaxially densely pubescent and dotted with conspicuous orbicular oil glands, adaxially glabrous, margin with conspicuous, spreading basal cilia or bristles ca. 1–3 mm. Inflorescences of solitary terminal capitula or capi-

tula in groups of 2 or 3; peduncles 1–2 mm, bracteolate. Capitula radiate, heterogamous; involucre campanulate to cylindrical, appearing almost urceolate; phyllaries 5 or 6, uniseriate, oblong to obovate, 5–7 × 1–3 mm, glabrous, apex truncate. Ray florets 5, female; ray limb bright yellow, 3.5–4 mm, scarcely exceeding involucre, apex scarcely shortly lobed. Disk florets 6–15 (but reported as 10–18 in Taiwan), bisexual; corolla yellow, ca. 2.5 mm. Achenes fusiform, 3–3.7 mm; body weakly many ribbed, sparsely to densely setuliferous; pappus of 3–5 stout, whitish, lanceolate scales 1.5–2.5 mm with margin lacinate. Fl. probably year-round.  $2n = 24$  (from Mexican material).

Newly introduced weed cultivated and now naturalized in grassland and along some riverbanks. Taiwan [native to Caribbean region, Central America, Mexico, and S United States].

### 204. FLAVERIA Jussieu, Gen. Pl. 186. 1789.

黄顶菊属 *huang ding ju shu*

Annuals, perennials, or subshrubs. Stems erect or decumbent, branched. Leaves cauline, opposite, petiolate or sessile; blade oblong-ovate to lanceolate or linear, both surfaces glabrous or shortly pubescent, margin entire or serrate, or spinulose-serrate. Synflorescences of lax or dense aggregations of capitula in corymbose panicles or glomerules. Capitula radiate or discoid; involucre oblong, urceolate, cylindrical, or turbinate, 0.5–2 mm in diam.; phyllaries persistent, 2–6(–9), 1-seriate; receptacle small, convex, epaleate. Ray florets 0 or 1(or 2), female, fertile, when present external to clusters of capitula; corollas yellow or whitish. Disk florets 1–15, bisexual, fertile; corollas yellow, tubes shorter than to ± equaling funnellform to campanulate throats, lobes 5, ± deltate. Achenes black, weakly compressed, narrowly oblanceolate or linear-oblong, ribbed, glabrous; pappus usually absent, or sometimes persistent, of 2–4 hyaline scales, or coroniform, or of connate scales.  $x = 18$ .

About 21 species: India, Mexico, United States; Africa, Australia, Caribbean, Central and South America; one species (introduced) in China.

See the revision of *Flaveria* by Powell (Ann. Missouri Bot. Gard. 65: 590–636. 1978).

**1. Flaveria bidentis** (Linnaeus) Kuntze, Revis. Gen. Pl. 3(3): 148. 1898.

黄顶菊 huang ding ju

*Ethulia bidentis* Linnaeus, Syst. Nat., ed. 12, 2: 536; Mant. Pl. 1: 110. 1767.

Annuals. Stems erect, to 100 cm tall, sparsely villous. Leaves petiolate (proximal, petioles 3–15 mm) or sessile (distal); blades lanceolate-elliptic, 50–120(–180) × 10–25(–70) mm, bases (distal) connate, margins serrate or spinulose serrate.

Capitula 20–100+ in tight subglomerules in scorpioid cymes; calycular bracts 1 or 2, 1–2 mm; involucre oblong-angular, ca. 5 mm; phyllaries 3(or 4), oblong. Ray florets 0 or 1; lamina pale yellow, obliquely ovate, to 1 mm (not or barely surpassing phyllaries). Disk florets (2 or)3–8; corolla tubes ca. 0.8 mm, throats funnelform, ca. 0.8 mm. Achenes oblanceolate or subclavate, 2–2.5 mm (those of ray florets longer); pappus absent. Fl. Jul–Nov.  $2n = 36$ .

A newly introduced weed of moist places, wastelands or disturbed sites, clay, gravel, or sands. Hebei [native to South America].

## 205. GLOSSOCARDIA Cassini, Bull. Sci. Soc. Philom. Paris 1817: 138. 1817.

鹿角草属 lu jiao cao shu

Herbs, perennial, glabrous, with a thick caudex. Stems erect, branched; leaves few. Radical leaves crowded, long petiolate, pinnately parted; cauline leaves alternate. Capitula small, solitary or few in corymbs, heterogamous; phyllaries 1–4-seriate, outer phyllaries and paleae oblong, slightly connate, somewhat inflated at base, inner palea narrowed, flat. Ray florets 1-seriate, female, fertile; corollas spreading, 3-lobed. Disk florets tubular, bisexual; corollas 4-lobed; anthers obtuse at base. Achenes glabrous, flattened dorsally, linear, truncate; pappus of 2 retrorsely scabrid awns.

Eleven species: N Africa, tropical Asia to S Australia and the Pacific islands; one species in China.

**1. Glossocardia bidens** (Retzius) Veldkamp, Blumea 35: 468. 1991.

鹿角草 lu jiao cao

*Zinnia bidens* Retzius, Observ. Bot. 5: 28. 1788; *Bidens meyeniana* Walpers; *B. tenuifolia* Labillardière; *Glossogyne bidens* (Retzius) Alston; *G. oluanpiensis* S. S. Ying; *G. tenuifolia* (Labillardière) Cassini.

Herbs, perennial. Stems woody at base, 20–30 cm, somewhat tufted. Radical leaves persistent, 4.5–9 cm, glabrous, sometimes undivided and linear, usually pinnately parted, seg-

ments 2 or 3 pairs, remote, spreading, linear, 1.8–2 mm wide, obtuse, lower segments 8–20 mm, petiole 2.7–6 cm; median leaves few, remote, petiolate, 3–4 cm, pinnately parted or linear; upper leaves smaller, linear. Capitula ca. 7 mm in diam., solitary, basal bracteoles ca. 1.5 mm; phyllaries and paleae ca. 7, oblong, ca. 3 mm. Ray florets few, 1-seriate, fertile; corolla ca. 3.5 mm, lip 3-lobed. Disk florets: corolla ca. 2.5 mm, apex 4-lobed. Pappus awns erect, 1.5–2 cm.  $2n = 24$ .

Exposed coastal areas, sometimes on raised coral reefs; low elevations. Fujian, Guangdong, Guangxi, Hainan, Taiwan, Xizang [Bangladesh, India, Indonesia, Malaysia, Papua New Guinea, Philippines, Thailand, Vietnam; Australia, Pacific islands (New Caledonia)].

## 206. COSMOS Cavanilles, Icon. 1: 9. 1791.

秋英属 qiu ying shu

Annuals, perennials, or shrubs. Stems usually 1, erect or ascending, branched distally or ± throughout. Leaves mostly cauline, opposite, petiolate or sessile; blades usually pinnately 1–3-lobed or undivided, ultimate margin usually entire, both surfaces usually glabrous, sometimes glabrate, hispid, puberulent, or scabridulous. Synflorescence of solitary capitula or corymbose. Capitula radiate, borne singly or in corymbiform arrays; calycular bracts (5–)8, basally connate, ± linear to subulate, herbaceous; involucre hemispheric or subhemispheric, 3–15 mm in diam.; phyllaries persistent, (5–)8, ± 2-seriate, distinct, lanceolate, oblong-lanceolate, ovate-lanceolate, or oblong, ± equal, membranous or herbaceous, margin ± scarious; receptacles flat, paleate; paleae deciduous, linear, flat or slightly concave-convex, scarious or entire. Ray florets neuter; corollas white to pink or purple, or yellow to red-orange. Disk florets bisexual, fertile; corollas yellow or orange, tubes shorter than funnelform throats, lobes 5, ± deltate. Achenes relatively slender, quadrangular-cylindric or -fusiform, sometimes slightly arcuate, attenuate-beaked, wingless [or winged], faces glabrous or hispid to scabridulous or ± setose, sometimes papillate, usually with 1 groove; pappus of 2–4(–8) retrorsely barbed awns, sometimes absent.  $x = 12$ .

About 26 species: tropical and subtropical America, especially Mexico, widely introduced elsewhere; two species (both introduced) in China.

See Sherff, Publ. Field Mus. Nat. Hist., Bot. Ser. 8(6): 401–447. 1932.

- 1a. Ray floret lamina pink, purple, purplish, rose-pink, violet, or white ..... 1. *C. bipinnatus*  
1b. Ray floret lamina yellow to red-orange ..... 2. *C. sulphureus*

**1. Cosmos bipinnatus** Cavanilles, Icon. 1: 10. 1791.

秋英 qiu ying

Plants 30–200 cm tall, glabrous or sparsely puberulent,

sometimes scabridulous. Leaves sessile or with petioles up to 1 cm; blade 6–11 cm, ultimate lobes to 1.5 mm wide, margin entire, apex acute. Capitula solitary, 3–6 cm in diam.; peduncles 10–20 cm; calycular bracts spreading, linear to lanceolate, 6–13

mm, apices acuminate; involucre 7–15 mm in diam.; phyllaries erect, lanceolate to ovate-lanceolate, 7–13 mm, apices rounded or obtuse. Ray corollas white, pink, or purplish, lamina obovate to oblanceolate, 15–50 mm, apices ± truncate, dentate. Disk corollas 5–7 mm. Achenes 7–16 mm, glabrous, papillose; pappus absent, or of 2 or 3 ascending to erect awns 1–3 mm. Fl. Jun–Aug.  $2n = 24$ .

Widely introduced in China [native to Mexico and SW United States].

A favorite garden plant, this species has escaped and naturalized widely in warm climates almost worldwide.

**2. *Cosmos sulphureus* Cavanilles, Icon. 1: 56. 1791.**

硫磺菊 liu huang ju

Plants 30–200 cm tall, glabrous or sparsely pilose to hispid. Leaves petiolate; petiole 1–7 cm; blade 5–12(–25) cm, ultimate lobes 2–5 mm wide, margin sparsely spinulose-ciliate, apex apiculate. Peduncles 10–20 cm; calycular bracts spreading-ascending, linear-subulate, 5–7(–10) mm, apices acute; involucre 6–10 mm in diam.; phyllaries erect, oblong-lanceolate, 9–13(–18) mm, apices acute to rounded-obtuse. Ray corollas intensely yellow to red-orange, lamina obovate, 18–30 mm, apices ± truncate, denticulate. Disk corollas 6–7 mm. Achenes 15–30 mm, usually hispidulous, rarely glabrous; pappus absent, or of 2 or 3 widely divergent awns 1–7 mm. Fl. Jun–Sep.  $2n = 24, 48$ .

Introduced in Beijing, Guangdong, and Yunnan [native to Mexico].

**207. *BIDENS* Linnaeus, Sp. Pl. 2: 831. 1753.**

鬼针草属 gui zhen cao shu

*Kerneria* Moench.

Annuals or perennials. Stems usually erect, branched distally or throughout. Leaves usually cauline, usually opposite, rarely whorled, distal sometimes alternate, petiolate or sessile; blades simple, compound (leaflets petiolulate), or 1–3-pinnatisect or -pinnately lobed, ultimate margin entire, dentate, lacinate, serrate, or toothed, both surfaces usually glabrous, sometimes hirtellous, hispidulous, pilosulose, puberulent, scaberulose, or strigillose. Synflorescence of corymbs, sometimes capitula in 2s or 3s or solitary. Capitula usually radiate or discoid, sometimes disciform; calycular bracts erect to spreading or reflexed, herbaceous; involucre mostly hemispheric or campanulate to cylindric; phyllaries persistent, mostly 2-seriate, usually distinct, sometimes partially connate 0.05–0.1 × their lengths, mostly oblong or ovate to oblong-lanceolate, papery to membranous or scarious, usually striate with brownish veins, margin usually hyaline; receptacles flat or slightly convex, paleate; paleae usually deciduous, usually straw-colored, sometimes yellow to orange, with darker striae, flat to slightly navicular. Ray florets usually 1-seriate, usually neuter, sometimes female and sterile; corollas usually yellow, sometimes white or pinkish. Disk florets bisexual, fertile; corollas usually yellow to orange, sometimes whitish or purplish, tubes shorter than throats, lobes (3–)5, deltate; staminal filaments glabrous; style branch tips deltate or lanceolate to subulate. Achenes usually obcompressed to flat, unequally 3- or 4-angled, and cuneate to oblanceolate or obovate, sometimes (all or inner) equally 4-angled and linear-fusiform, rarely subterete, faces smooth, striate, or tuberculate, glabrous or hairy, each sometimes with 2 grooves, margin usually retrorsely, sometimes patently or antrorsely, barbed or ciliate, apices sometimes attenuate, not beaked; pappus absent, or persistent, of (1 or)2–4(–8) usually retrorsely, sometimes antrorsely, barbellate or ciliate, rarely smooth, awns.  $x = 12$ .

About 150–250 species: widespread, especially in subtropical, tropical, and warm-temperate North and South America; ten species (one endemic, one introduced) in China.

See Sherff, Publ. Field Mus. Nat. Hist., Bot. Ser. 16: 1–709. 1937.

- 1a. Achenes linear, apex gradually narrower.
  - 2a. Achenes with 2 barbed awns; disk corollas 4-lobed ..... 7. *B. parviflora*
  - 2b. Achenes with 3 or 4 barbed awns; disk corollas 5-lobed.
    - 3a. Phyllaries spatulate, dilated toward apex; achenes numerous, 50–70 ..... 8. *B. pilosa*
    - 3b. Phyllaries linear, not dilated toward apex; achenes fewer than 50.
      - 4a. Leaflet margin entire, sometimes ciliolate; leaves 2- or 3-pinnatisect, terminal leaflet narrow ..... 9. *B. bipinnata*
      - 4b. Leaflet margin prominently serrate; leaves subpinnately divided, terminal leaflet broad, ovate ..... 10. *B. biternata*
- 1b. Achenes broad, cuneate or obovate-cuneate, apex truncate.
  - 5a. Achenes 4-angled, barbed awns usually 4; disk floret corolla 5-dentate; ray florets present ..... 1. *B. cernua*
  - 5b. Achenes compressed, barbed awns usually 2; disk floret corolla 4- or 5-dentate; ray florets absent.
    - 6a. Median cauline leaves of pinnate compound leaves ..... 2. *B. frondosa*
    - 6b. Median cauline leaves of dissected simple leaves, rarely entire leaves.
      - 7a. Leaves deeply dissected.
        - 8a. Capitula subequal in length and diam.; outer phyllaries 5–9; achenes 6–11 mm ..... 3. *B. tripartita*
        - 8b. Capitula unequal in length and diam.; outer phyllaries 9–14; achenes 3–4.5 mm ..... 4. *B. maximowicziana*
      - 7b. Leaves not dissected or 3-lobed.
        - 9a. Outer phyllaries 9–12(–14), oblong-linear or lanceolate-linear, 8–20 mm; corolla 4-toothed ..... 5. *B. radiata*
        - 9b. Outer phyllaries usually 4, elliptic, oblong, or linear, 1.5–3.8 cm; corolla 5-toothed ..... 6. *B. leptophylla*

**1. *Bidens cernua*** Linnaeus, Sp. Pl. 2: 832. 1753.

柳叶鬼针草 liu ye gui zhen cao

*Bidens cernua* var. *elliptica* Wiegand; *B. cernua* var. *integra* Wiegand; *B. cernua* var. *minima* (Hudson) Pursh; *B. cernua* var. *oligodonta* Fernald & H. St. John; *B. cernua* var. *radiata* Candolle; *B. filamentosa* Rydberg; *B. glaucescens* Greene; *B. gracilentata* Greene; *B. minima* Hudson; *B. prionophylla* Greene.

Annuals, 10–100 cm tall. Leaves sessile; blade ovate-lanceolate or oblanceolate to lanceolate or linear, 40–100(–200) × (2–)5–25(–45) mm, both surfaces glabrous, base cuneate to rounded, margin usually coarsely dentate to serrate, sometimes entire, sometimes ciliate, apex acute to acuminate. Capitula radiate, rarely discoid, solitary or in lax corymbs; peduncles 10–40(–100+) mm; calycular bracts (3–)5–8(–10), spreading to reflexed, oblong to linear-lanceolate, often ± leaflike, (3–)8–12(–25) mm, abaxially usually glabrous, bases sometimes hispidulous, margin usually ciliate; involucre hemispheric or broader, (3–)6–10 × (8–)12–20+ mm; phyllaries 6–8+, ovate or ovate-lanceolate to lanceolate, 2–10 mm. Ray florets usually 6–8, sometimes absent; lamina orange-yellow, 2–15(–18) mm. Disk florets (10–)40–100(–150+); corollas orange-yellow, 3–4 mm. Achenes blackish or brown, usually flattened, sometimes 4-angled, cuneate, outer (3–)5–6 mm, inner 4–8 mm, faces ± striate, glabrous or tuberculate-strigillose, margin thickened or winged, retrorsely ciliate, apices truncate to convex; pappus of (2–)4 retrorsely barbed awns (1–)2–4 mm. Fl. Aug–Oct.  $2n = 24, 48$ .

Swamps, marshes, peat and sedge bogs, flood plains; sea level to 2300 m. Hebei, Heilongjiang, Jilin, Liaoning, Nei Mongol, Sichuan, Xizang, Yunnan [Mongolia, Russia; Europe, North America].

**2. *Bidens frondosa*** Linnaeus, Sp. Pl. 2: 832. 1753.

大狼把草 da lang pa cao

*Bidens frondosa* var. *anomala* Porter ex Fernald; *B. frondosa* var. *caudata* Sherff; *B. frondosa* var. *pallida* (Wiegand) Wiegand; *B. frondosa* var. *stenodonta* Fernald & H. St. John; *B. melanocarpa* Wiegand; *B. melanocarpa* var. *pallida* Wiegand.

Annuals, 20–120 cm tall. Leaves petiolate; petiole 10–40(–60) mm; blade deltate to ovate-lanceolate overall, 30–80(–150) × 20–60(–100) mm, 3(–5)-foliolate, leaflets petiolulate, lanceolate to ovate-lanceolate, (15–)35–60(–120) × (5–)10–20(–30) mm, both surfaces glabrous or hirtellous, bases cuneate, margins dentate to serrate, sometimes ciliate, apices acuminate to attenuate. Capitula radiate or discoid, usually solitary, sometimes in 2s or 3s or in lax corymbs; peduncles 10–40(–80) mm; calycular bracts (5–)8(–10), ascending to spreading, spatulate or oblanceolate to linear, sometimes ± leaflike, 5–20(–60) mm, abaxially glabrous or hirtellous, margins usually ciliate; involucre campanulate to hemispheric or broader, 6–9 × 7–12 mm; phyllaries 6–12, oblong or ovate to ovate-lanceolate, 5–9 mm. Ray florets 0 or 1–3+; lamina golden yellow, 2–3.5 mm. Disk florets 20–60(–120+); corollas ± orange, 2.5–3+ mm. Achenes blackish to brown or straw-colored, ± obcompressed, obovate to cuneate, outer 5–7 mm, inner 7–10 mm, faces usually 1-veined, sometimes tuberculate,

glabrous or sparsely hirtellous, margin antrorsely or retrorsely barbed, apices ± truncate to concave; pappus of 2 ± erect to spreading, antrorsely or retrorsely barbed awns 2–5 mm. Fl. Aug–Sep.  $2n = 24, 48, 72$ .

A weed in moist woods, meadows, thickets, fields, roadsides, railroads, borders of streams, ponds, sloughs, swamps, ditches. Guangdong, Jiangsu, Jiangxi, Shanghai [native to North America].

**3. *Bidens tripartita*** Linnaeus, Sp. Pl. 2: 831. 1753.

狼把草 lang pa cao

*Bidens repens* D. Don; *B. shimadae* Hayata; *B. tripartita* var. *quinqueloba* C. H. An; *B. tripartita* var. *repens* (D. Don) Sherff; *B. tripartita* var. *shimadae* (Hayata) Yamamoto.

Annuals, 10–150 cm tall. Leaves sessile or petiolate; petiole (0–)5–15(–35) mm (± winged); blade elliptic to ovate or lanceolate, 40–80(–150) × 15–40(–60) mm, sometimes laciniately 1-pinnatisect with 1–4+ lobes near base, both surfaces glabrous or hirtellous, base cuneate, margin entire or dentate to serrate, usually ciliate, apex acute to acuminate. Capitula radiate or discoid, solitary or in 2s or 3s; peduncles 10–40(–80) mm; calycular bracts (2–)6 or 7(–10), spreading, oblanceolate or lanceolate to linear, ± leaflike, 7–35(–60) mm, abaxially hispidulous near bases, distally glabrous, margins entire or serrate, sometimes sparsely ciliate; involucre campanulate to hemispheric or broader, (4–)5–7(–12) × (3–)6–12(–15) mm; phyllaries (6 or)7 or 8(–13), elliptic-ovate to ovate-lanceolate, (4–)6–9(–12) mm. Ray florets usually 0, sometimes 1–5; lamina orange yellowish, 4–8 mm. Disk florets (5–)20–60(–150); corollas pale yellow to orange, (2–)3–4 mm, apex 4- or 5-toothed. Achenes blackish to purplish or brown, ± flattened, sometimes weakly 3(or 4)-angled, usually cuneate to linear, outer (3–)6–7(–10) mm, inner (4–)6–9(–11) mm, faces ± 1-veined, usually smooth, seldom notably tuberculate, glabrous or sparsely strigillose, margin proximally antrorsely to patent, distally retrorsely, barbed, apices ± truncate to concave; pappus 0, or of 1–3(or 4) erect to spreading, retrorsely barbed awns (0.2–)2–3(–6) mm. Fl. Jul–Oct.  $2n = 48$ .

Marshes and other wet sites, waste fields, roadsides. Anhui, Fujian, Gansu, Guizhou, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shandong, Sichuan, Taiwan, Xinjiang, Xizang, Yunnan, Zhejiang [Bhutan, India, Indonesia, Japan, Korea, Malaysia, Mongolia, Nepal, Philippines, Russia; N Africa, Australia, Europe, North America].

This is a worldwide weed.

**4. *Bidens maximowicziana*** Oettingen, Trudy Bot. Sada Imp. Yur'evsk. Univ. 6: 219. 1906.

羽叶鬼针草 yu ye gui zhen cao

Annuals. Stems 30–50(–80) cm tall, erect, simple or branched with obliquely upright branches, glabrous or sparsely and finely hairy mainly in upper part. Leaves petiolate, pinnatisect (rarely ternate); segments narrow and long, oblong to linear, laterals (1 or)2 or 3, 2–3 cm to 7–8 cm, apical segments usually larger than laterals, serrate-toothed, margins fine with appressed prickles. Capitula discoid, solitary or in groups of 2 or 3 at apex of stem and its branches, flat, wider than long and

measuring ca. 15 mm; outer phyllaries green, oblong, distinctly exceeding florets, inner brown-green, shorter, lanceolate, as long as achenes (including awns). Corollas tubular, yellow. Achenes cuneate, ca. 4 mm, laterally compressed, margin tuberculate and slightly hairy with relatively long and abundant retrorse bristly hairs; awns 2. Fl. Jul–Aug.

Riverbanks, wet places in meadows, humus-rich sandy soil. Heilongjiang, Jilin, Liaoning, Nei Mongol [Japan, Korea, Russia].

**5. *Bidens radiata*** Thuillier, Fl. Env. Paris, ed. 2, 432. 1799.

大羽叶鬼针草 da yu ye gui zhen cao

*Bidens radiata* var. *microcephala* C. H. An.

Annuals. Stems (5–)15–60(–80) cm tall, erect, branched, in upper part simple, glabrous or indistinctly hairy. Leaves yellowish green, 3–5-parted or dissected, lateral parts lanceolate or ovate-rhombic, serrate-toothed, apical part much larger than laterals, glabrous or subglabrous, on rather long petiolules, sometimes entire, large toothed to parted (*Bidens radiata* f. *pseudocernua* Ganeschin). Capitula discoid, erect, 12–15(–20) mm wide, wider than long (sometimes almost 2 ×); calycular bracts narrowly linear, exceeding in length or equal to achenes (including awns); outer phyllaries (9 or)10–12(–14), oblong-linear or lanceolate-linear, 8–20 mm, leaflike, margin with fine prickles, considerably exceeding florets (sometimes almost 3 ×), inner shorter, oval. Florets tubular. Achenes cuneate, 3–4 mm, glabrous, compressed, with 2 awns, equal to or almost shorter than achenes, sometimes awns 4, but then 2 longer than other 2. Fl. Jun–Sep.

Riverbanks, lakes, marshes, wet meadows, wet ditches. Heilongjiang, Jilin, Nei Mongol, Xinjiang [Japan, Korea, Mongolia, Russia; Europe].

**6. *Bidens leptophylla*** C. H. An, Fl. Xinjiang. 5: 476. 1999.

薄叶鬼针草 bao ye gui zhen cao

Annuals, up to 25 cm tall. Leaves opposite; blade ovate-elliptic, ovate-rhombic, or oblong, 1.8–5.8 × 0.5–2 cm together with petiole, base decurrent to petiole, margin 1–3-toothed, sometimes with a pair of lobes from base, apex shortly acute; lobes oblong-linear. Capitula discoid, solitary, terminal or axillary; involucre 8–10 × 5–8 mm; outer phyllaries usually 4, leaflike, elliptic, oblong, or linear, 1.5–3.8 cm, margin entire or 1–3-toothed, apex acute, inner brown, leathery. Corollas yellow, 3–3.5 mm, apex 5-lobed. Achenes cuneate, ca. 6 × 2 mm, compressed, 2-ribbed; pappus of 2 barbed awns ca. 2.5 mm.

• Farmland. Xinjiang (Yiwu).

**7. *Bidens parviflora*** Willdenow, Enum. Pl. 2: 840. 1809.

小花鬼针草 xiao hua gui zhen cao

Annuals. Stems (10–)20–50(–80) cm tall, erect, branched, glabrous or bearing rarely indistinct hairs. Leaves bi- or tripinnatisect with narrow lanceolate or linear-lanceolate to linear segments, with small teeth and incisions on petioles, usually sparsely fine hairy to subglabrous. Capitula discoid, solitary (or 2 or 3) at stem and branch apices, on long peduncles, narrow, subcylindric; calycular bracts linear, shorter than achenes; outer phyllaries green, narrowly linear, herbaceous, finely hairy,

shorter than inner ones, inner greenish brown, linear-lanceolate, bearing rarely short bristles only on margin. Florets all tubular, yellow, few. Achenes linear-tetragonal, ± compressed, beset with upright lucid bristles along ribs, otherwise glabrous or finely hairy, unequal in length; inner 15–20(–25) mm, outer shorter, 2 upright awns, 4–5 mm, at top of achenes. Fl. Jul–Sep.

Marshes, fields, streamsides. Anhui, Gansu, Guizhou, Hebei, Heilongjiang, Henan, Jiangsu, Jilin, Liaoning, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi, Sichuan [Japan, Korea, Mongolia, Russia].

**8. *Bidens pilosa*** Linnaeus, Sp. Pl. 2: 832. 1753.

鬼针草 gui zhen cao

*Bidens chilensis* Candolle; *B. pilosa* var. *minor* (Blume) Sherff; *B. pilosa* f. *radiata* Schultz Bipontinus; *B. pilosa* var. *radiata* (Schultz Bipontinus) J. A. Schmidt; *B. pilosa* f. *rubiflora* S. S. Ying; *B. sundaica* Blume var. *minor* Blume; *Kerneria tetragona* Moench, nom. illeg. superfl.

Annuals. Stems 30–180 cm tall, glabrous or very sparsely pubescent in upper part. Petiole 10–30(–70) mm; leaf blade either ovate to lanceolate, 30–70(–120) × 12–18(–45) mm, or pinnately 1-lobed, primary lobes 3–7, ovate to lanceolate, (10–)25–80 × (5–)10–40 mm, both surfaces pilosulose to sparsely hirtellous or glabrate, bases truncate to cuneate, ultimate margin serrate or entire, usually ciliate, apices acute to attenuate. Synflorescence of solitary capitula or capitula in lax corymbs. Capitula radiate or discoid; peduncles 10–20(–90) mm; calycular bracts (6 or)7–9(–13), appressed, spatulate to linear, (3–)4–5 mm, abaxially usually hispidulous to puberulent, margins ciliate; involucre turbinate to campanulate, 5–6 × 6–8 mm; phyllaries (7 or)8 or 9(–13), lanceolate to oblanceolate, 4–6 mm. Ray florets absent or (3–)5–8; lamina whitish to pinkish, 5–15 mm. Disk florets 20–40(–80); corollas yellowish, (2–)3–5 mm. Outer achenes red-brown, ± flat, linear to narrowly cuneate, (3–)4–5 mm, faces obscurely 2-grooved, sometimes tuberculate-hispidulous, margin antrorsely hispidulous, apex truncate or somewhat attenuate; inner achenes blackish, ± equally 4-angled, linear-fusiform, 7–16 mm, faces 2-grooved, tuberculate-hispidulous to sparsely strigillose, margin antrorsely hispidulous, apex attenuate; pappus absent, or of 2 or 3(–5) erect to divergent, retrorsely barbed awns (0.5–)2–4 mm. Fl. year-round.  $2n = 24, 36, 48, 72$ .

Roadsides, fields, villages; below 2500 m. Anhui, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hainan, Hebei, Henan, Hubei, Hunan, Jiangxi, Liaoning, Shaanxi, Shandong, Shanxi, Sichuan, Taiwan, Xizang, Yunnan, Zhejiang [tropical and subtropical regions].

**9. *Bidens bipinnata*** Linnaeus, Sp. Pl. 2: 832. 1753.

婆婆针 po po zhen

*Bidens pilosa* Linnaeus var. *bipinnata* (Linnaeus) J. D. Hooker.

Annual herbs, (15–)30–100(–150+) cm. Petioles 20–50 mm; leaf blade orbicular-deltate to ovate or lanceolate overall, (20–)30–70+ × (20–)30–60+ mm, (1 or)2(or 3)-pinnatisect, ultimate lobes obovate or lanceolate, 15–45+ × 10–25+ mm, both surfaces usually glabrous, sometimes hirtellous, bases truncate to cuneate, ultimate margin entire, sometimes ciliolate, apices

rounded to acute or attenuate. Synflorescences of solitary capitula or  $\pm$  corymbose; peduncles (10–)20–50(–100) mm. Capitula radiate or discoid; calycular bracts (7 or)8(–10), linear, 3–5 mm,  $\pm$  appressed, abaxially usually glabrous, margin ciliate; involucre  $\pm$  campanulate, 5–7  $\times$  3–4(–5) mm; phyllaries 8–12, lanceolate to linear, 4–6 mm. Ray florets absent or 3–5+; lamina yellowish or whitish, 1–2(–3) mm. Disk florets 10–20(–30+); corollas yellowish to whitish, 2–3 mm. Achenes red-brown, outer weakly obcompressed, 7–15 mm, inner  $\pm$  4-angled, linear to linear-fusiform, 12–18 mm, faces 2-grooved, often tuberculate-hispidulous, margin not ciliate, apex  $\pm$  attenuate; pappus of (2 or)3 or 4 erect to divergent, retrorsely barbed awns 2–4 mm. Fl. Aug–Oct.  $2n = 24, 72$ .

Fields, forests, disturbed wet sites; below 1800(–3000) m. Anhui, Fujian, Gansu, Guangdong, Guangxi, Hebei, Jiangsu, Jiangxi, Jilin, Liaoning, Nei Mongol, Shaanxi, Shandong, Shanxi, Sichuan, Taiwan, Yunnan, Zhejiang [Cambodia, Korea, Laos, Nepal, Thailand, Vietnam; Europe, North and South America, Pacific islands].

**10. *Bidens biternata*** (Loureiro) Merrill & Sherff, Bot. Gaz. 88: 293. 1929.

金盞银盞 jin zhan yin pan

*Coreopsis biternata* Loureiro, Fl. Cochinch. 2: 508. 1790; *Bidens chinensis* Willdenow; *B. robertianifolia* H. Léveillé & Vaniot.

Annuals. Stems erect, 30–150 cm tall, subtetragonal, loosely crisp pilose, branched in upper portion. Leaves cauline; median leaves opposite, petiole 3–5 cm, blade 9–15 cm, prominently soft pubescent on both surfaces, once or twice divided into pinnate leaflets, terminal segment ovate, shortly acuminate, rather prominently toothed, lateral segments ovate, sometimes lower one pinnatifid; upper leaves gradually smaller, opposite or alternate, bipinnately parted. Capitula radiate or discoid, 7–10 mm in diam.; peduncle 1.5–5.5 cm; phyllaries 8–10, 1-seriate, herbaceous, linear, 3–6.5 mm, acute; outer chaff calycular bracts 5–6 mm, margin hyaline. Ray florets 0–5, sterile; lamina yellow, ca. 5.5  $\times$  2.5–3 mm, tube 1.2–1.5 mm. Disk florets bisexual, fertile; corolla 4–5.5 mm, tube 1.2–2 mm. Achenes linear, 9–19  $\times$  ca. 1 mm, compressed, 4-angled, shortly strigose; pappus awns 3 or 4, 3–4 mm. Fl. Sep–Nov.

Roadsides, waste fields; below 1300 m. Anhui, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hainan, Hebei, Henan, Hubei, Hunan, Jiangxi, Liaoning, Shaanxi, Shandong, Shanxi, Taiwan, Yunnan, Zhejiang [Africa, Asia, Oceania].

## 208. COREOPSIS Linnaeus, Sp. Pl. 2: 907. 1753.

金鸡菊属 jin ji ju shu

Annuals, perennials, subshrubs, or shrubs, often rhizomatous or with cormiform bases. Stems usually 1, erect, branched distally or  $\pm$  throughout. Leaves basal, basal and cauline, or cauline, opposite or alternate or both, petiolate or sessile; blades simple and usually entire, or pinnately or pedately lobed, both surfaces glabrous or hairy. Synflorescence of solitary capitula or capitula in lax corymbs. Capitula radiate; calycular bracts (3–)8+, distinct,  $\pm$  herbaceous; involucre  $\pm$  globose to cylindrical, 4–25+ mm in diam.; phyllaries usually ca. 8, ca. 2-seriate; receptacle flat to convex; paleae deciduous, ovate to linear or subulate, flat, scarious. Ray florets mostly (5–)8(–12+), neuter, or styliferous and sterile, or female and fertile; corollas usually yellow, sometimes red-brown to purple proximally, sometimes wholly purple or pink to white. Disk florets 8–150+, bisexual, fertile; corollas usually yellow, sometimes red-brown to purple at tips or throughout, tubes equaling or shorter than narrowly funnelform throats, lobes 4 or 5. Achenes obcompressed,  $\pm$  orbicular to ovate, oblong, or linear, usually thin margined or winged, wings membranous to papery or corky, entire or lobed to toothed, sometimes ciliate; faces smooth or  $\pm$  papillate to tuberculate; pappus absent, or persistent, of 2 bristly cusps or scales, sometimes pappus absent and shoulders of achene wings bristly and pappuslike.  $x = 14$ .

About 35 species: mostly temperate North America, also tropical New World and Old World; three species (all introduced) in China.

*Coreopsis verticillata* Linnaeus is cultivated in China.

- 1a. Ray florets yellow above, base reddish brown; disk florets reddish brown; achenes wingless ..... 1. *C. tinctoria*  
 1b. Ray florets and disk florets yellow; achenes winged.  
 2a. Achenes broadly elliptic or subrounded; lower leaves pinnately dissected ..... 2. *C. grandiflora*  
 2b. Achenes rounded; lower leaves entire ..... 3. *C. lanceolata*

**1. *Coreopsis tinctoria*** Nuttall, J. Acad. Nat. Sci. Philadelphia 2: 114. 1821.

两色金鸡菊 liang se jin ji ju

Annuals, (10–)30–70(–150) cm. Leaves: proximal blades usually 1(–3)-pinnate, terminal lobes ovate-lanceolate to oblanceolate, 10–60  $\times$  5–25 mm; cauline blades usually 1–3-pinnate, rarely simple, simple blades or terminal lobes linear-lanceolate to linear or filiform, 10–45  $\times$  0.5–5 mm. Peduncles 1–15 cm; calycular bracts deltate-lanceolate, 1–3+ mm; phyllaries  $\pm$  oblong-lanceolate to ovate-lanceolate, 4–9 mm. Ray limbs usually

yellow with red-brown blotch, sometimes red-brown in proximal 1/3–9/10 and distally yellow, rarely yellow throughout, 12–18+ mm. Disk corollas 2.5–3+ mm. Achenes 1.5–4 mm, wings absent or 0.1–0.7 mm wide; pappus absent, or of 1 or 2 cusps or subulate scales 0.1–1 mm. Fl. Jun–Aug.  $2n = 24$ .

Moist sandy or clay soils, sometimes alkaline flats, prairies, ditches, disturbed sites. Widely cultivated and naturalized in China [native to North America].

*Coreopsis tinctoria* is widely grown in public and residential gardens, is grown commercially (for cut flowers), and has become widely established in the Flora area.

**2. *Coreopsis grandiflora*** Hogg ex Sweet, Brit. Fl. Gard. 2: t. 175. 1826.

大花金鸡菊 da hua jin ji ju

Perennials, 40–60 cm. Aerial nodes proximal to first peduncle usually 6–10+ cm, upper 1–3 internodes 4–7+ cm. Leaves mostly cauline on proximal 2/3–7/8 of plant height; petioles absent or 10–35+ mm; blades usually 1(or 2)-irregularly pinnately or ± pedately lobed with (3–)5–9+ lobes, rarely simple, simple blades or terminal lobes narrowly lanceolate to linear or filiform, 15–45(–90+) × (0.5–)2–8(–12+) mm. Peduncles 8–15(–25+) cm; calycular bracts lanceolate to linear, 3.5–9+ mm; phyllaries lanceolate-ovate, 7–9(–12) mm. Ray limbs yellow, 12–25+ mm. Disk corollas 3.3–4.8 mm, apices yellow. Achenes 2–3+ mm, wings spreading, ± papery, entire or irregularly toothed to pectinate. Fl. May–Aug.  $2n = 26$ .

Sandy soils, ditches and roadsides, other disturbed sites, granite and sandstone outcrops. Widely cultivated and naturalized in China [native to North America].

**3. *Coreopsis lanceolata*** Linnaeus, Sp. Pl. 2: 908. 1753.

剑叶金鸡菊 jian ye jin ji ju

Perennials, 10–30(–60+) cm. Aerial nodes proximal to first peduncle usually 1–3(–5+), distalmost 1–3 internodes 1–2(–8+) cm. Leaves: basal and cauline on proximal 1/4–1/3(–1/2) of plant height; petioles 1–5(–8+) cm; blades simple or with 1 or 2+ lateral lobes, simple blades or terminal lobes ovate-lanceolate or lanceolate to oblanceolate or linear-lanceolate, 5–12 cm × 8–15(–18+) mm. Peduncles (8–)12–20(–35+) cm; calycular bracts ovate-lanceolate to linear-lanceolate or linear, 4–8(–12) mm; phyllaries deltate to dentate-lanceolate, 8–12+ mm. Ray limbs yellow, 15–30+ mm. Disk corollas 6–7.5 mm, apices yellow. Achenes 2.6–4 mm, wings ± spreading, ± papery, entire. Fl. May–Jul.  $2n = 26$ .

Sandy soils, ditches and roadsides, other disturbed sites. Widely cultivated and naturalized in China [native to North America].

**209. ENYDRA** Loureiro, Fl. Cochinch. 2: 510. 1790.

沼菊属 zhao ju shu

Herbs. Leaves opposite, sessile, entire or toothed. Capitula subsessile, solitary, terminal or axillary; phyllaries 4, leaflike; receptacle convex to conical; paleae persistent, apex glandular. Ray florets female, fertile; lamina small, apex 3- or 4-toothed. Disk florets bisexual, tubular; limbs campanulate, 5- or 6-lobed; anther tails obtuse, entire, or inconspicuously auriculate. Achenes oblong, glabrous; pappus absent.

About five species, but usually reported as ten: tropical and subtropical regions; one species in China.

See Lack, Willdenowia 10: 3–12. 1980.

**1. *Enydra fluctuans*** Loureiro, Fl. Cochinch. 2: 511. 1790.

沼菊 zhao ju

Herbs. Stems stout, cylindrical, slightly fleshy, prostrate in lower part, 50–80 cm. Leaves subsessile, oblong or linear-oblong, 2–6 cm × 4–14 mm, both surfaces glabrous, base amplexicaul, margin sparsely serrate, apex obtuse or acute. Capitula 8–10 mm in diam.; involucre of 4 phyllaries, dorsally

glabrous, outer pair larger, ovate-oblong, 10–11 mm, apex rounded; receptacle ca. 3 mm in diam.; paleae rigid, ca. 5 mm, apex toothed and sparsely pubescent. Ray florets ca. 3 mm, lamina 3- or 4-lobed in apex. Disk florets 5-lobed; stamens 5, rarely 6. Achenes obovoid-cylindric, ca. 3.5 mm. Fl. Nov–Apr.

Marshes, streamsides. Hainan, Yunnan [India, Indonesia, Malaysia, Myanmar, Thailand, Vietnam; Australia].

**210. ACMELLA** Persoon, Syn. Pl. 2: 472. 1807.

金钮扣属 jin niu kou shu

*Spilanthes* sect. *Acmella* (Richard) Candolle.

Herbs, annual or perennial. Leaves opposite and/or basally rosulate. Capitula solitary or in few-headed cymes, radiate, disciform, or discoid. Involucres ± hemispheric to ovoid; phyllaries 1–3-seriate, subequal or with outer row spreading and longer, entire or irregularly dentate; receptacles conical; paleae falling with achene, ± navicular, membranous to scarious, each ± equaling subtended floret. Ray florets, when present, 2- or 3-lobed, variously colored. Disk florets: corolla yellow or orange, 4- or 5-lobed. Achene margin ciliate, glabrous, or sometimes corky; ray achenes broadly ovate or elliptic, 3-angled; disk achenes ellipsoid, strongly compressed; pappus absent or of up to 10 awnlike bristles.  $x = 13$ .

About 30 species: pantropical; six species (four introduced) in China.

See the monograph of *Acmella* by Jansen (Syst. Bot. Monogr. 8: 1–115. 1985).

The introduction of this genus in Taiwan was detailed by S. W. Chung et al. (Taiwania 52: 276–279. 2007) and K. F. Chung et al. (Bot. Stud. 49: 73–82. 2008).

1a. Capitula radiate.

2a. Leaf blade ovate to deltate, leaf bases broadly obtuse, truncate to slightly cordate; capitula ovoid; mature achenes with obvious corklike margin ..... 1. *A. ciliata*

- 2b. Leaf blade lanceolate, elliptic to narrowly ovate, leaf bases attenuate or cuneate; capitula cone-shaped; mature achenes without obvious corklike margin.
- 3a. Disk florets 4- or 5-lobed; corollas light yellow or greenish; ray florets relatively inconspicuous; phyllaries 7–11; disk floret achenes 1.5–3 mm ..... 6. *A. brachyglossa*
- 3b. Disk florets 4-lobed; corollas yellow to orange; ray florets conspicuous; phyllaries 5 or 6; disk floret achenes 1.2–1.8 mm ..... 3. *A. uliginosa*
- 1b. Capitula discoid.
- 4a. Pappus absent; achenes glabrous ..... 2. *A. calva*
- 4b. Pappus of 2 or 3 setae; achenes moderately to densely ciliate.
- 5a. Mature achenes with corklike margin ..... 5. *A. paniculata*
- 5b. Mature achenes without obvious corklike margin.
- 6a. Corollas 4-lobed; phyllaries 1-seriate; capitula 4–6 mm in diam. .... 3. *A. uliginosa*
- 6b. Corollas 5-lobed; phyllaries 2- or 3-seriate; capitula > 10 mm in diam. .... 4. *A. oleracea*

**1. *Acmella ciliata*** (Kunth) Cassini in F. Cuvier, Dict. Sci. Nat. 24: 331. 1822.

天文草 tian wen cao

*Spilanthus ciliata* Kunth in Humboldt et al., Nov. Gen. Sp. 4, ed. f°: 163. 1818.

Herbs, perennial, 30–80 cm tall. Stems usually decumbent to ascending, rooting at nodes, green to purple. Leaf blade ovate to broadly ovate, 2.3–7.5 × 1–5.9 cm, glabrous to sparsely pilose on both surfaces, base usually truncate or cordate, margin denticulate to coarsely dentate, apex acute. Capitula radiate, solitary or 2 or 3, terminal or axillary; peduncles 1–7.4 cm, sparsely to moderately pilose; phyllaries 7–10, 2-seriate, outer series 3–5, narrowly to broadly ovate or elliptic, 4–6.9 × 1–2.3 mm, inner series 3–6, lanceolate to ovate or elliptic, 2.8–6.1 × 1–2.9 mm; receptacle 3.8–7.4 × 0.8–1.9 mm; paleae straw-colored, 3–4.5 × 0.4–0.8 mm. Ray florets 5–10; corollas yellow-orange, 2.5–6.5 mm, tube 0.9–2 mm, lamina 1.2–4.7 × 1.1–3 mm. Disk florets 90–177, yellow-orange; corollas 5-lobed, 1.5–2 mm, tube 0.3–0.6 mm, throat 1–1.5 mm, lobes triangular, 0.2–0.4 × 0.2–0.3 mm. Achenes black, 1.4–2.2 × 0.5–1 mm, without shoulders, with obvious corklike margin, margin sparsely to moderately ciliate; pappus usually absent or sometimes of 2 very short subequal bristles, > 1 mm. Fl. year-round.  $2n = 78$ .

Naturalized in Taiwan [native to South America; widely naturalized in S and SE Asia].

**2. *Acmella calva*** (Candolle) R. K. Jansen, Syst. Bot. Monogr. 8: 41. 1985.

美形金纽扣 mei xing jin niu kou

*Spilanthus calva* Candolle in Wight, Contr. Bot. India, 19. 1834; *S. acmella* (Linnaeus) Murray var. *calva* (Candolle) C. B. Clarke ex J. D. Hooker; *S. callimorpha* A. H. Moore.

Herbs, perennial. Stems creeping or prostrate, 20–60 cm, glabrous, rooting at nodes, sparsely pilose. Petiole 5–8(–24) mm, pubescent; leaf blade lanceolate, 3–7 × 1–3 cm, abaxially subglabrous or only pubescent along veins, adaxially pubescent, base cuneate, margin peaked serrate, apex acuminate or caudate. Capitula ovoid-conical, 9–11(–14) × 6–8 mm; peduncles 3–14 cm; phyllaries ca. 8, 2-seriate, subequal, green, ovate-oblong, 3–3.5 mm, margin ciliate, apex acute or obtuse; receptacle columnar-conical, 4–8 mm; paleae oblong, navicular, membranous. Corollas yellow; ray florets female, ca. 4 mm, lamina

short, obovate, apex shallowly 3-lobed; disk florets bisexual, tubular, ca. 2 mm, 4- or 5-toothed. Achenes brown, oblong, 1.5–2 mm, pubescent or glabrous; pappus 2, arista-like. Fl. May–Dec (often flowering year-round).

Streamsides, marshes, moist forest margins, fields; 1000–1900 m. Yunnan [India, Indonesia, Myanmar, Nepal, Philippines, Sri Lanka, Thailand].

**3. *Acmella uliginosa*** (Swartz) Cassini in F. Cuvier, Dict. Sci. Nat. 24: 331. 1822.

沼生金纽扣 zhao sheng jin niu kou

*Spilanthus uliginosa* Swartz, Prodr. 110. 1788; *S. iabadiensis* A. H. Moore.

Herbs, annual, 10–30(–50) cm tall. Stems solitary or several from base, erect to ascending or occasionally decumbent, green to purple, glabrous to moderately pilose. Petiole 0.5–1.5 cm, sparsely to moderately pilose, wingless or narrowly winged; leaf blade lanceolate, narrowly ovate to ovate, 1.3–5 × 0.3–2.5 cm, glabrous to sparsely pilose on both surfaces, base attenuate to cuneate, margin sinuate to dentate, sparsely ciliate, apex acute to acuminate. Capitula radiate, solitary or 2 or 3, terminal, ovoid, 5–8 × 4–6 mm; peduncles 1.2–3 cm, sparsely pilose; receptacle 3–6 × 0.5–1 mm; paleae straw-colored or sometimes with purple tinge early in flowering, 2.5–3.5 × ca. 0.5 mm. Ray florets 4–7; corollas yellow to orange-yellow, 1.5–3.5 mm, tube 0.5–1.5 mm, lamina 3-toothed, 1–2 × 0.5–1.5 mm. Disk florets 68–148, yellow to orange-yellow, 4-merous; corollas 1–1.6 mm, tube 0.2–0.5 mm, throat 0.7–1.2 mm, lobes triangular, 0.2–0.3 × ca. 0.2 mm. Achenes black, 1.2–1.8 mm, moderately to densely ciliate with straight-tipped hairs; pappus of 2 subequal or unequal bristles, longer one 0.2–0.7 mm, shorter one 0.1–0.5 mm. Fl. year-round.  $2n = 52$ .

Naturalized in Hong Kong and Taiwan [native throughout the tropics in Africa, America, and Asia; naturalized in the Pacific islands].

**4. *Acmella oleracea*** (Linnaeus) R. K. Jansen, Syst. Bot. Monogr. 8: 65. 1985.

桂圆菊 gui yuan ju

*Spilanthus oleracea* Linnaeus, Syst. Nat., ed. 12, 2: 534. 1767.

Herbs, annual. Stems decumbent to usually erect, not rooting at nodes, green to red, glabrous. Petiole 2–6.4 cm, glabrous to very sparsely pilose, narrowly winged; leaf blade

broadly ovate to deltate, 5–10 × 4–8 cm, usually glabrous on both surfaces, base truncate to shortly attenuate, margin dentate, apex shortly acuminate to usually acute. Capitula discoid, 10.5–23.5 × 11–17 mm; peduncles 3.5–12.5 cm, glabrous to very sparsely pilose; phyllaries 15–18, 3-seriate, herbaceous, entire to sinuate, sparsely ciliate, those of outer series 5 or 6, 5.8–7.3 × 2.1–2.8 mm, usually narrowly ovate to lanceolate or sometimes ovate, acute; receptacle 8.3–21.5 × 3.5–8.5 mm. Florets 400–600; corollas 2.7–3.3 mm, yellow, 5-lobed; tube 0.5–0.7 × 0.2–0.4 mm; lobes 0.3–0.6 × 0.2–0.4 mm; stamens 1.4–1.7 mm. Achenes 2–2.5 × 0.9–1.1 mm, moderately to densely ciliate with straight-tipped hairs; pappus of 2 subequal bristles, longer one 0.5–1.5 mm, shorter one 0.3–1.3 mm. Fl. Apr–Jul.  $2n = 52, 60, 78$ .

Cultivated in S China, including Taiwan [originating in South America and known only from cultivation, but escaped in weedy habitats in many areas].

*Acmella oleracea* is cultivated for medicinal, insecticidal, and horticultural purposes.

**5. *Acmella paniculata*** (Wallich ex Candolle) R. K. Jansen, *Syst. Bot. Monogr.* 8: 67. 1985.

金钮扣 jin niu kou

*Spilanthes paniculata* Wallich ex Candolle, *Prodr.* 5: 625. 1836; *S. acmella* (Linnaeus) Murray var. *paniculata* (Wallich ex Candolle) C. B. Clarke ex J. D. Hooker.

Herbs, annual. Stems branched, erect or ascending, to 30 cm or more tall, rarely rooting at nodes. Petiole 1–2 cm; leaf blade ovate to ovate-lanceolate, 2–4 × 1–2.5 cm, 3-veined, base cuneate, margin entire or coarsely or crenately serrate, apex acute. Capitula discoid, solitary, terminal or axillary, 8.4–12.5 × 6.9–10 mm; peduncles 2.5–16 cm, sparsely pilose; phyllaries 9–12, 2-seriate, ovate-lanceolate, ca. 6 mm, herbaceous, gla-

brous; receptacle 5–8 × 1.1–3 mm, apex acuminate. Florets 90–200; corollas tubular, minute, 4- or 5-lobed. Achenes obovoid, 3-angled, ca. 3 mm, margin scabrid, apex slightly depressed; pappus of 2 subequal bristles, longer one 0.5–1.1 mm, shorter one 0.4–0.9 mm. Fl. Apr–Nov.  $2n = 26$ .

Fields, wastelands, roadsides, forest margins; 800–1900 m. Guangdong, Guangxi, Taiwan, Yunnan [India, Indonesia, Laos, Malaysia, Myanmar, Nepal, Philippines, Sri Lanka, Thailand, Vietnam].

**6. *Acmella brachyglossa*** Cassini in F. Cuvier, *Dict. Sci. Nat.* 50: 258. 1827.

短舌花金纽扣 duan she hua jin niu kou

Herbs, annual, 10–30 cm tall. Stems usually erect, sometimes decumbent, occasionally rooting at nodes, green or red to dark purple, glabrous to moderately pilose. Petiole 5–37 mm, sparsely to moderately pilose, narrowly winged; leaf blade narrowly ovate to ovate, 1.8–10 × 0.8–6 cm, glabrous to sparsely pilose on both surfaces, base attenuate, margin sinuate to coarsely dentate, apex usually acuminate or acute. Capitula radiate, solitary, ovoid, 6.3–13 × 6.5–9.5 mm; peduncles 4–12.8 cm, sparsely pilose; receptacle 5–11 × 1–2 mm; paleae straw-colored or often with a purple-red tinge in early flowering stage, 3.5–4.6 × 0.5–0.9 mm. Ray florets 5–8; corollas pale yellow, 2–3.1 mm, tube 0.9–1.5 mm, lamina 0.5–1.7 × 0.5–1.5 mm. Disk florets 105–220, pale yellow; corollas 4- or 5-lobed, 1.5–2.1 mm, tube 0.4–0.7 mm, throat 1–1.5 mm, lobes triangular, 0.2–0.4 × 0.2–0.3 mm. Achenes dark brown to black, 1.8–2.3 mm, surface strigose, margin densely ciliate with straight-tipped hairs, without obvious corklike margin; pappus of 2 subequal bristles, longer one 0.5–1.1 mm, shorter one 0.3–1 mm. Fl. Mar–Oct.  $2n = 78$ .

Widely cultivated and naturalized in Taiwan [a weedy species in the Caribbean and Central and South America].

## 211. ZINNIA Linnaeus, *Syst. Nat.*, ed. 10, 2: 1189, 1221, 1377. 1759, nom. cons.

百日菊属 bai ri ju shu

Annual or perennial herbs or subshrubs. Stems prostrate or erect. Leaves cauline, opposite or subopposite, sessile or shortly petiolate; blade acerose, elliptic, linear-lanceolate, lanceolate, linear, oblong, or ovate, both surfaces hairy, usually gland-dotted, base rounded to cuneate, sheathing stem, margin entire. Synflorescence of terminal solitary capitula. Capitula usually radiate; involucre campanulate, cylindric, to hemispheric; phyllaries persistent, 3- or 4-seriate; receptacle conical, paleate. Ray florets female, fertile; corollas yellow, orange, red, maroon, purple, or white. Disk florets bisexual, fertile; corollas usually yellow to reddish, sometimes purple tinged, tubes much shorter than cylindric throats, lobes 5, lanceolate-ovate. Achenes 3-angled or flattened, disk achenes wingless; pappus absent, or persistent, of 1–3 (or 4) awns or toothlike scales.

About 25 species: Mexico, United States; Central and South America; one species (introduced) in China.

*Zinnia angustifolia* Kunth, *Z. elegans* Jacquin, nom. cons. (*Z. violacea* Cavanilles), and *Z. haageana* Regel are cultivated in China.

See Torres, *Brittonia* 15(1): 1–25. 1963.

**1. *Zinnia peruviana*** Linnaeus, *Syst. Nat.*, ed. 10, 2: 1221. 1759.

多花百日菊 duo hua bai ri ju

*Zinnia multiflora* Linnaeus; *Z. pauciflora* Linnaeus.

Annuals, mostly 30–50 (–100) cm. Stems greenish, be-

coming purplish or yellowish, unbranched or sparingly branched distal to bases, strigose. Leaf blade ovate to elliptic or broadly lanceolate, 25–70 × 8–35 mm, 3–5-veined, scaberulose. Peduncles 10–50 (–70) mm; involucre narrowly to broadly campanulate, 9–18 × 10–20 mm; phyllaries obovate to oblong, becoming scarious, glabrous, margin usually entire or erose, sometimes ciliate, apex rounded; paleae red to purple or yellow,

margin erose or subentire, apex obtuse. Ray florets 6–15(–21); corollas usually scarlet red or maroon, sometimes yellow, lamina linear to spatulate, 8–25 mm. Disk florets 12–50; corollas yellow, 5–6 mm, lobes ca. 1 mm. Achenes 7–10 mm, ray achenes 3-angled, disk achenes compressed, ribbed, setulifer-

ous; pappus usually of 1 stout awn 4–6 mm. Fl. Jun–Nov, fr. Jul–Nov.  $2n = 24$ .

Roadsides, grasslands, mountain slopes; below 1300 m. Introduced and naturalized in Gansu, Hebei, Henan, Sichuan, Yunnan [probably native to Mexico, but widespread in South America].

## 212. TRIDAX Linnaeus, Sp. Pl. 2: 900. 1753.

羽芒菊属 yu mang ju shu

Herbs, annual or perennial. Leaves opposite, petiolate or sessile; blade deltate, lanceolate, lanceolate-ovate, or ovate, often pinnately or palmately lobed, both surfaces glabrate, hirsute, scaberulose, or strigillose, ultimate margin coarsely toothed to subentire. Synflorescence of solitary capitula or cymose. Capitula radiate or discoid; involucre cylindrical to hemispheric, 4–8 mm in diam.; phyllaries persistent, in 2 or 3+ series, outer usually shorter, more herbaceous, inner often scarious; receptacle convex to conical; paleae persistent, lanceolate-linear, scarious, weakly conduplicate, often apically toothed. Ray florets female, fertile; lamina pale yellow, white, or purplish. Disk florets bisexual, fertile; corollas yellowish, whitish, or purplish, tubes shorter than cylindrical or funnelform throats, lobes 5, usually deltate, sometimes corollas of marginal florets bilabiate. Achenes obconical to obpyramidal, 3–5-angled, densely pilose-sericeous, glabrous, or villous; pappus persistent, of plumose or ciliate, setiform scales or bristles, rarely absent.  $x = 10$ .

About 26 species: tropical America and Asia; one species (introduced) in China.

See Powell, *Brittonia* 17(1): 47–96. 1965.

### 1. *Tridax procumbens* Linnaeus, Sp. Pl. 2: 900. 1753.

羽芒菊 yu mang ju

Herbs, annual to perennial, caulescent, decumbent. Stems procumbent, branched at base, branches slender, spreading or ascending, 20–50 cm, hirsute. Leaves few, shortly petiolate; blade ovate to ovate-lanceolate, 2.5–5 cm, base cuneate, margin deeply irregularly serrate, pinnatisect, segments few, narrow, apex acute or acuminate. Capitula solitary, 1–1.5 cm in diam.; peduncle 10–30 cm; involucre subcampanulate, 6–7 mm; phyl-

laries few seriate, hispid, outer densely grayish white, elliptic, ca. 5 mm, long hirsute, inner tinged purplish, narrower, ca. 6 mm. Ray florets 4, white. Disk florets yellow, tube ca. 5 mm, limb 5-lobed, lobes reflexed, hairy. Achenes brown, oblong, ca. 2 mm, densely silky pubescent; pappus setae 5–6 mm, shiny, plumose. Fl. Nov–Mar.  $2n = 36$ .

A widespread weed, along exposed dry roadsides, wastelands, lawns. Fujian, Hainan, Taiwan [native to tropical America; now a pantropical weed].

## 213. GALINSOGA Ruiz & Pavon, Fl. Peruv. Prodr. 110. 1794.

牛膝菊属 niu xi ju shu

Annuals, 2–62 cm. Stems erect. Leaves cauline, opposite, petiolate; blade lanceolate to broadly ovate, surfaces glabrate to densely pilose, 3-veined, margin entire or serrulate to serrate. Synflorescence cymose. Capitula radiate or discoid; involucre hemispheric to campanulate, 2.5–6 mm in diam.; phyllaries persistent or deciduous, 6–9[–16], in 2[or 3] series, elliptic, ovate-lanceolate, oblong, or ovate, outer shorter, herbaceous or scarious, margin entire or minutely laciniate; receptacles conical, paleaceous, paleae persistent or deciduous, scarious, proximal broadly elliptic to obovate, often connate at bases or nearly to apices, united in groups of 2 or 3 to adjacent proximal phyllary, each complex often enclosing and shed with a ray achene, distal persistent or deciduous, lanceolate to obovate, entire or 2- or 3-lobed, convex to conduplicate. Ray florets [0–](3–)5(–8)[–15], female, fertile; corollas white or dull white to pinkish [or purplish], tubes pilose, lamina quadrate-obovate to oblong, lobes 0–3. Disk florets 5–50[–150], bisexual, fertile; corollas yellow, tubes shorter than cylindrical throats, pilose, 5-lobed, deltate; anthers yellow; style branch apices acute. Achenes obconical to obpyramidal, glabrous or strigose, ray achenes often shed with subtending phyllary plus 2 or 3 adjacent paleae; pappus absent or of (1–)14–20 white or gray, persistent, fimbriate, sometimes aristate, scales.  $x = 8$ .

About 15–33 species: Caribbean to Bermuda, Central, North, and South America; two species (both introduced) in China.

See Canne, *Rhodora* 79: 319–389. 1977.

- 1a. Phyllaries persistent, usually glabrous; inner paleae 3-lobed, lobes 1/3+ total lengths, acute; disk pappus absent or of 15–20 often gray, sometimes white, linear, fimbriate, obtuse scales 0.5–2 mm ..... 1. *G. parviflora*  
 1b. Phyllaries deciduous, usually with some stipitate glands; inner paleae entire or 2- or 3-lobed, lobes to 1/3 total lengths, blunt; disk pappus absent or of 1–5 or 14–20 white, lanceolate to oblanceolate, fimbriate, sometimes aristate, scales ..... 2. *G. quadriradiata*

**1. Galinsoga parviflora** Cavanilles, Icon. 3: 41. 1795.

牛膝菊 niu xi ju

Plants 4–60 cm. Leaf blade 7–110 × 3–70(–80) mm. Peduncles 1–40 mm; involucre campanulate, 2.5–5 mm in diam.; phyllaries persistent; outer paleae persistent with distal inner phyllaries or deciduous, elliptic to obovate, inner usually persistent, lanceolate to ovate or obovate, 2–3.5 mm, 3-lobed, lobes to 1/3+ total lengths, acute. Ray florets (3–)5(–8); corollas usually dull white or pink, lamina 0.5–1.8 × 0.7–1.5 mm. Disk florets 15–50. Ray achenes 1.5–2.5 mm; pappus absent or of 5–10 lacinate scales 0.5–1 mm; disk achenes 1.3–2.5 mm, glabrous or strigose; pappus absent or of 15–20 gray, sometimes white, linear, fimbriate, obtuse or acute scales 0.5–2 mm. Fl. Jul–Oct.  $2n = 16$ .

Fields, streamsides, sparse forests. A common weed widely distributed in China [native to South America].

**2. Galinsoga quadriradiata** Ruiz & Pavon, Syst. Veg. Fl. Peruv. Chil. 1: 198. 1798.

粗毛牛膝菊 cu mao niu xi ju

*Adventina ciliata* Rafinesque; *Galinsoga ciliata* (Rafinesque) S. F. Blake.

Plants 8–62 cm. Leaf blade 20–60 × 15–45 mm. Peduncles 5–20 mm; involucre hemispheric to campanulate, 3–6 mm in diam.; phyllaries deciduous; outer paleae deciduous, broadly elliptic to obovate, 2–3 mm, inner deciduous, linear to lanceolate, 2–3 mm, entire or 2- or 3-lobed, lobes to 1/3 total lengths, blunt. Ray florets (4 or)5(–8); corollas usually white, sometimes pink, lamina 0.9–2.5 × 0.9–2 mm. Disk florets 15–35. Ray achenes 1.5–2 mm; pappus of 6–15 fimbriate scales 0.5–1 mm; disk achenes 1.3–1.8 mm; pappus absent or of usually 14–20, rarely 1–5, white, lanceolate to oblanceolate, fimbriate, sometimes aristate, scales 0.2–1.7 mm. Fl. Jul–Oct.  $2n = 32, 48, 64$ .

Forests, roadsides. Jiangxi; recently naturalized in Taiwan [native to C Mexico but widespread naturally in South America].

The occurrence of this species in Taiwan was first reported by C. I Peng et al. (Taiwania 43: 320–329. 1998).

**214. ACANTHOSPERMUM** Schrank, Pl. Rar. Hort. Monac. 2: t. 53. 1820, nom. cons.

刺苞果属 ci bao guo shu

Annuals. Leaves cauline, opposite, petiolate or sessile; blade mostly elliptic to deltate, rhombic, or ovate, sometimes lyrate, both surfaces usually pilosulose to sericeous or scaberulose, sometimes glabrescent, usually gland-dotted, ultimate margin entire or toothed. Capitula radiate, 1(–3) in axils of leaves or in forks of branches; involucre hemispheric; phyllaries persistent (outer) or deciduous, 10–13, 2-seriate. Ray florets 5–8, female, fertile; corollas yellowish, tube shorter than to equaling lamina, lamina ovate to elliptic or linear. Disk florets 3–8(–12), functionally male; corollas yellowish, tubes shorter than funnelliform or campanulate throats, lobes 5, deltate. Achenes each enclosed within and shed with an often hardened, prickly bur; pappus absent.  $x = 11$ .

About six species: mostly tropical to warm-temperate New World; one species (introduced) in China.

**1. Acanthospermum hispidum** Candolle, Prodr. 5: 522. 1836.

刺苞果 ci bao guo

Annual herbs, coarse, erect, to 1.3 m tall. Stems poorly branched, hispid. Leaves sessile or shortly petiolate; blade oblong or obovate, 10–100 × 5–40 mm, both surfaces hispid and gland-dotted, margin subentire and repand- or coarsely dentate. Capitula ± sessile. Achenes compressed and wedge-shaped, narrowing toward base, 5–6 mm with 2 divergent terminal spines 4–5 mm, straight or somewhat hooked; fruit body covered with

shorter, hooked spines. Fl. Jun–Jul, fr. Aug–Oct.

A weed of streamsides, roadsides, and waste slopes; below 1900 m. Guangdong, Yunnan [native to South America; naturalized elsewhere].

In FRPS (75: 333. 1979) the name *Acanthospermum australe* (Loefling) Kuntze was misapplied to *A. hispidum*. True *A. australe* differs by having stems ascending or procumbent, capitula mostly pedunculate, and achenes oblong-fusiform and ribbed, with uniform-length hooked spines throughout. No Chinese material agreeing with *A. australe* has been seen by the present authors.

**215. GUIZOTIA** Cassini in F. Cuvier, Dict. Sci. Nat. 59: 237, 247, 248. 1829, nom. cons.

小葵子属 xiao kui zi shu

Annuals, perennials, subshrubs, or shrubs. Stems erect or creeping, branched. Leaves mostly cauline, opposite, sessile; blade rhombic to lanceolate or oblanceolate, both surfaces glabrous or puberulent to pilose, gland-dotted at least abaxially, margin entire or serrate. Synflorescence corymbiform or of solitary capitula. Capitula radiate; involucre campanulate or hemispheric; phyllaries persistent, 10–13, 2-seriate; receptacle conical to hemispheric; paleae oblong to lanceolate, membranous to scarious. Ray florets 6–18, female, fertile; corollas yellow. Disk florets numerous, bisexual, fertile; corollas yellow, tubes cylindric, hairy, shorter than campanulate throats, 5-lobed, deltate. Achenes weakly compressed, 3- or 4-angled, glabrous; pappus absent.  $x = 15$ .

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

See Baagøe, Bot. Tidsskr. 69(1): 1–39. 1974.

**1. Guizotia abyssinica** (Linnaeus f.) Cassini in F. Cuvier, Dict. Sci. Nat. 59: 248. 1829.

小葵子 xiao kui zi

*Polymnia abyssinica* Linnaeus f., Suppl. Pl. 383. 1782.

Annuals. Stems 30–50 cm to 1–2 m tall, subglabrous, ± pilose above. Leaves sessile (lower petiolate), oblong-ovate or lanceolate, ± shortly hairy abaxially, especially along veins, glabrous adaxially, base semiamplexicaul, apex acuminate. Capitula 2–6 cm in diam., on long or sometimes short pubescent pe-

duncles; outer phyllaries leaflike, ovate, herbaceous, inner narrower, paleaceous or scarious. Ray florets with short tube and 3-lobed lamina, pubescent or only at base of lamina and in lower part. Disk florets tubular, pubescent as in ray florets, 5-lobed. Outer achenes triquetrous, inner ± 4-angled, 3–6 × 1.5–3 mm, obpyramidal, in transverse section subrhombic or triangular, brown or black, with thin pericarp.

Cultivated in Fujian, Sichuan, and Yunnan [native to Africa (N Ethiopia); naturalized in India].

This species, originating in the Ethiopian highlands, is grown for its edible oil and seed.

## 216. SIGESBECKIA Linnaeus, Sp. Pl. 2: 900. 1753.

豨薟属 xi xian shu

Herbs, annual. Leaves opposite, petiolate, densely pubescent. Synflorescence of small terminal and axillary usually many-headed corymbs. Capitula pedunculate; involucre 2-seriate, campanulate; outer phyllaries 5, longer than inner, linear-spatulate, divaricate, with thick glandular hairs; receptacle flat with scarious paleae, enveloping achenes. Corollas yellow, marginal florets uniseriate, shortly limbed, female; disk florets tubular, bisexual. Achenes elongate-obovate, 4-angled, apex truncate; pappus absent.  $x = 15$ .

About four species: tropical and subtropical areas; three species in China.

See Humbles, Ci. Naturaleza Ci. Nat. 13: 2–19. 1972.

- 1a. Branches forked in upper part; leaves papery, irregularly lobulate ..... 1. *S. orientalis*  
 1b. Branches not forked; leaves thinly membranous, usually toothed.  
 2a. Stems and both surfaces of leaves uniformly soft pubescent; peduncle not glandular; achenes ca. 2 mm ..... 2. *S. glabrescens*  
 2b. Stems and lower surfaces of leaves densely white pubescent; peduncle usually glandular pilose;  
 achenes 2.5–3.5 mm ..... 3. *S. pubescens*

**1. Sigesbeckia orientalis** Linnaeus, Sp. Pl. 2: 900. 1753.

豨薟 xi xian

*Sigesbeckia brachiata* Roxburgh; *S. caspia* Fischer & C. A. Meyer; *S. esquirolii* H. Léveillé & Vaniot; *S. gracilis* Candolle; *S. humilis* Koidzumii; *S. iberica* Willdenow; *S. microcephala* Candolle; *S. orientalis* var. *caspia* (Fischer & C. A. Meyer) Grossheim.

Annuals. Stems erect, simple or dichotomously branched, branches opposite, obtusely angulate, 30–75(–100) cm tall, ± crisp pubescent to densely pubescent, especially in upper part. Leaves ovate-triangular, ovate, or oblong-ovate, finely and appressed pilose, especially abaxially, sometimes with sparse small glands and hairs, base cuneate or rounded to subcordate, margin largely and usually unequally toothed to sinuate-dentate, sometimes resembling reduced leaves of sunflower, apex acute or acuminate. Capitula small, ca. 5 mm wide; outer phyllaries with dense stipitate-glandular hairs, oblong-obovate or linear-spatulate, considerably longer than inner, sometimes broader and with small number of glands or shorter. Achenes dark gray or dull black, obpyramidal, sometimes with sparse, more lucid, laevigate irregular tubercles, ca. 3 × 1.2 mm, with white annular groove at apex, marginal achenes slightly curved. Fl. Apr–Sep, fr. Jun–Nov.  $2n = 30, 60$ .

Fields, thickets, forest margins, forests; 100–2800 m. Anhui, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hainan, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Shaanxi, Sichuan, Taiwan, Xizang, Yunnan, Zhejiang [Bhutan, India, Japan, Laos, Malesia, Nepal, Russia, Thailand, Vietnam; Africa, tropical America, Australia, Oceania].

**2. Sigesbeckia glabrescens** (Makino) Makino, J. Jap. Bot. 1: 25. 1917.

毛梗豨薟 mao geng xi xian

*Sigesbeckia orientalis* Linnaeus f. *glabrescens* Makino, Bot. Mag. (Tokyo) 18: 100. 1904; *S. formosana* Kitamura; *S. glabrescens* var. *leuococlada* Nakai; *S. orientalis* subsp. *glabrescens* (Makino) H. Koyama.

Annuals. Stems 35–100 cm tall, shortly appressed pilose. Median cauline leaves with winged petiole, blade ovate-deltate, 5–13 × 3.5–11 cm, irregularly toothed, upper surface shortly appressed pubescent; upper leaves sessile, oblong; uppermost leaves linear. Capitula radiate, ca. 12 mm wide; peduncle 1–3 cm, densely shortly pubescent; phyllaries spatulate, densely glandular pilose. Ray limb 1.5–2.5 mm, 3-toothed, tube 0.5–1 mm, pilose; disk corolla ca. 1.5 mm, 3-toothed, tube ca. 0.5 mm, densely pilose. Achenes ca. 2 mm. Fl. Apr–Sep, fr. Jun–Sep.  $2n = 30$ .

Roadsides, fields, thickets; 300–2500 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hainan, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Liaoning, Sichuan, Taiwan, Yunnan, Zhejiang [Japan, Korea].

**3. Sigesbeckia pubescens** (Makino) Makino, J. Jap. Bot. 1: 24. 1917.

腺梗豨薟 xian geng xi xian

*Sigesbeckia orientalis* Linnaeus f. *pubescens* Makino, Bot. Mag. (Tokyo) 18: 100. 1904; *S. orientalis* subsp. *pubescens* (Makino) H. Koyama.

Annuals. Stems 60–120 cm tall, densely white pubescent, especially on upper part. Median cauline leaves ovate to deltate-ovate, 7–19 × 6–18 cm, short appressed pubescence on both surfaces, veins on lower surface densely white pubescent. Capitula radiate, ca. 20 mm wide; peduncle 15–35 mm, densely glandular pilose; phyllaries linear, rounded at apex, glandular pilose at base. Ray limb ca. 3.5 mm, shallowly 2- or 3-toothed, tube ca.

1.5 mm; disk corolla 2–2.5 mm, 5-toothed, tube 0.5–1 mm, pilose. Achenes 2.5–3.5 mm. Fl. May–Aug, fr. Jun–Oct.  $2n = 30$ .

Mountain slopes, forest margins, thickets, grasslands; below 3400 m. Anhui, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hainan, Hebei, Henan, Hubei, Hunan, Jilin, Liaoning, Jiangsu, Jiangxi, Nei Mongol, Shaanxi, Sichuan, Taiwan, Xizang, Yunnan, Zhejiang [India, Japan, Korea].

**217. SMALLANTHUS** Mackenzie in Small, Man. S.E. Fl. 1406. 1933.

包果菊属 bao guo ju shu

Perennials, annuals, or shrubs, 1–3(–12) m tall. Stems erect. Leaves cauline, opposite, petiolate (petioles usually winged) or sessile; blade usually deltate to ovate, usually palmately lobed, both surfaces hirtellous, pilosulose, or puberulent, gland-dotted (at least abaxially), ultimate margin dentate to denticulate. Capitula radiate, borne singly or 2–5 in crowded, corymbiform arrays; involucre hemispheric, 8–15 mm in diam.; phyllaries persistent, 12 or 13(–25) in 2 series, herbaceous, inner as many as ray florets, more membranous to scarious, narrower and shorter. Receptacles flat to convex, paleate, paleae obovate to spatulate, scarious. Ray florets 7–13(–25+), female, fertile; corollas yellow, white, or orange, tubes hairy, lamina linear to elliptic or ovate. Disk florets (20–)40–80(–150), functionally male; corollas yellow or orange, tubes shorter than abruptly campanulate or funnelform throats, lobes 5, deltate. Achenes obliquely inserted on receptacle, each shed separately from subtending phyllary, obovoid [or quadrangular], somewhat compressed, finely 30–40-ribbed or -striate, not narrowed at bases, not apically beaked; pappus absent (achenes sometimes hairy at apices).  $x = 16$ .

About 23 species: Central, North, and South America; two species (both introduced) in China.

See Wells, Brittonia 17(2): 144–159. 1965. See Robinson, Phytologia 39: 47–53. 1978.

- 1a. Leaf blade usually lobed; underground stems without tubers ..... 1. *S. uvedalia*
- 1b. Leaf blade unlobed; underground stems tuberous ..... 2. *S. sonchifolius*

**1. Smallanthus uvedalia** (Linnaeus) Mackenzie in Small, Man. S.E. Fl. 1509. 1933.

包果菊 bao guo ju

*Osteospermum uvedalia* Linnaeus, Sp. Pl. 2: 923. 1753;  
*Polymnia uvedalia* (Linnaeus) Linnaeus.

Herbs, perennial, 1–3 m tall. Stems erect and hollow, purple spotted. Leaves opposite, sessile or with broad conspicuous wings to base of petiole; petiole 3–12 cm; blade ovate to deltate, 10–35(–60) × 10–35 cm, usually palmately 3–5-lobed. Capitula clustered in loose leafy cymes; phyllaries 4–6, ovate to ovate-lanceolate, 10–20 × 10–12 mm. Ray florets 7–13, female, fertile, lamina yellow, 12–30 mm. Achenes 5–6 × ca. 4 mm. Fl. Jun–Aug(–Oct).  $2n = 32$ .

Thickets, fields. Naturalized in Anhui and Jiangsu [native to Central and North America].

Known as yellow-flowered leaf-cup, this species is primarily a weed of pastures, hay fields, hedgerows, and roadsides in North America.

**2. Smallanthus sonchifolius** (Poeppig) H. Robinson, Phytologia 39: 51. 1978.

菊薯 ju shu

*Polymnia sonchifolia* Poeppig, Nov. Gen. Sp. Pl. 3: 47. 1843.

Herbs, perennial, 1–3 m tall. Stems cylindrical and hollow; underground part irregularly branched, often producing spindle-shaped tubers 100–200 mm and 30–80 mm in diam. Lower leaves broadly ovate and hastate or subhastate, connate and auriculate at base; upper leaves ovate-lanceolate, without lobes and hastate base; upper and lower surfaces densely pubescent. Synflorescence terminal, composed of 1–5 branches, each one with 3 capitula; peduncles densely pilose; phyllaries 5, 1-seriate, ovate. Corollas yellow to bright orange; ray florets female, 2- or 3-toothed, depending on clone, lamina ca. 12 × 7 mm; disk florets male, ca. 7 mm. Immature achenes purple, turning dark brown or black at maturity. Fl. Jun–Sep.

Cultivated in Fujian, Guizhou, Hainan, Hebei, Hubei, Hunan, Shandong, Taiwan, Yunnan, and Zhejiang [native to South America (Bolivia, Colombia, Ecuador, Peru)].

Known as Yacón in South America, this species is an ancient crop of the Andes with tuberous roots that can be eaten raw or cooked.

**218. BLAINVILLEA** Cassini in F. Cuvier, Dict. Sci. Nat. 29: 493. 1823.

百能葳属 bai neng wei shu

Herbs, annual or perennial. Leaves opposite or alternate in upper part, petiolate, margin serrate. Capitula small, terminal or axillary, slender and long pedunculate; involucre ovoid, ovoid-campanulate, or hemispheric; phyllaries few, outer papery; receptacle convex; paleae rigid and dry membranous. Ray florets female, 1- or 2-seriate, lamina light yellow, yellow, or rarely white, short or very short, apex 2–4-dentate. Disk florets tubular, limbs 5-dentate. Anther tails obtuse, entire or inconspicuously auriculate. Achenes gla-

brous or pubescent, apex truncate, of female florets 3-ribbed, dorsally compressed, of bisexual florets 3- or 4-ribbed, or laterally compressed; pappus 2–5, unequal, spinelike or squamalike, base connate.

About ten species: tropics; one species in China.

**1. *Blainvillea acmella*** (Linnaeus) Philipson, *Blumea* 6: 350. 1950.

百能蕨 *bai neng wei*

*Verbesina acmella* Linnaeus, *Sp. Pl.* 2: 901. 1753; *Blainvillea latifolia* (Linnaeus f.) Candolle; *Eclipta latifolia* Linnaeus f.; *Spilanthes acmella* (Linnaeus) Murray.

Herbs, annual. Stems erect, 40–60 cm tall, branched. Lower leaves opposite, with up to 1 cm petioles, blade ovate to ovate-lanceolate, 3–6 × 2–3 cm, both surfaces scabrid, base cuneate, margin sparsely serrate, apex acuminate; upper leaves smaller, usually alternate, ovate to ovate-oblong, 2–3 × 1.3–1.5 cm, base usually rounded. Capitula axillary or terminal, ca. 1 cm

in diam.; peduncles slender, 15–40 mm, with spreading hairs; phyllaries 2-seriate, outer papery, green, ovate-oblong, ca. 6 mm, dorsally densely hairy, apex shortly acute or obtuse, inner ovate to oblong-linear, ca. 5 mm, sparsely pubescent, apex acute; paleae oblong-lanceolate, ca. 5 mm, dorsally pubescent, apex aristiform. Ray florets 1-seriate, yellow or yellowish white, lamina ca. 3 mm, apex 2–4-toothed. Disk florets campanulate, limbs 5-toothed. Achenes densely pubescent, those in female florets 3-angled, ca. 4 mm, those in bisexual florets compressed, ca. 5 mm; pappus short, unequal, 2–5. Fl. Apr–Jun.

Open broad-leaved forests, grassy slopes; below 2600 m. Hainan, Sichuan, Yunnan [India, Indonesia, Malaysia, Myanmar, Nepal, Philippines, Thailand, Vietnam; Africa, Australia, South America].

## 219. *SYNEDRELLA* Gaertner, *Fruct. Sem. Pl.* 2: 456. 1791, nom. cons.

金腰箭属 *jin yao jian shu*

*Ucacou* Adanson.

Herbs, annual. Stems erect or ascending. Leaves opposite, petiolate. Capitula radiate, sessile or subsessile, in axillary glomerules or borne singly; involucre cylindrical to campanulate; phyllaries persistent, 2–5+, 1(or 2)-seriate; receptacle convex, paleate. Ray florets 1- or 2-seriate, female, fertile; corollas yellowish. Disk florets bisexual, fertile; corollas yellowish, tubes ± equaling slightly amplified cylindrical throats, 4-lobed, orbicular-deltate. Achenes dimorphic, strongly obcompressed or flattened, narrowly oval and winged or linear-cuneate and wingless; pappus of 2 triangular scales (ray) or 2 or 3 subulate scales or awns (disk), persistent.

One species: Caribbean, Central and South America, Mexico; introduced in Africa, Asia, Australia, and Pacific islands, including China.

See Turner, *Phytologia* 76(1): 39–51. 1994.

**1. *Synedrella nodiflora*** (Linnaeus) Gaertner, *Fruct. Sem. Pl.* 2: 456. 1791.

金腰箭 *jin yao jian*

*Verbesina nodiflora* Linnaeus, *Cent. Pl.* 1: 28. 1755.

Annuals, 10–80 cm tall. Stems erect or ascending, branched from bases or ± throughout. Leaves cauline, opposite, petiolate; blade ovate to elliptic, 3–10 × 2–5 cm, both surfaces ± scabrid, usually 3-veined, base cuneate to rounded, margin toothed. Capitula radiate, sessile or subsessile in axillary glom-

erules or capitula solitary; involucre cylindrical to campanulate, 3–6 mm in diam.; phyllaries persistent, 2–5+, 1(or 2)-seriate, lanceolate, herbaceous to papery; receptacle convex; paleae linear-lanceolate, scarious, flat or weakly cupped at bases. Ray florets 2–9, 1- or 2-seriate, female, fertile; corollas yellowish, ca. 2 mm; lamina ovate to linear, 2–4 mm. Disk florets 4–12+, bisexual, fertile; corollas yellowish, tubes ca. 4 mm, ± equaling slightly enlarged cylindrical throats, 4-lobed, orbicular-deltate. Fl. year-round.  $2n = 40$ .

Fields, wastelands, roadsides. Guangdong, Hainan, Taiwan, Yunnan [pantropical weed of South American origin].

## 220. *CALYPTOCARPUS* Lessing, *Syn. Gen. Compos.* 221. 1832.

金腰箭舅属 *jin yao jian jiu shu*

Herbs, annual or perennial, small, usually procumbent or prostrate. Leaves opposite, petiolate, margin crenate-serrate. Capitula solitary or in small dense clusters, radiate; phyllaries ca. 5; receptacle with flat or concave paleae. Ray florets 5–8, female, yellow. Disk florets 4- or 5-lobed, yellow. Achenes oblanceolate-obconical, dorsiventrally compressed, tuberculate or smooth; pappus of 2 stout awns.

Three species: South to North America; one species (introduced) in China.

See MacVaugh and Smith, *Brittonia* 19: 268–272. 1967.

**1. *Calyptocarpus vialis*** Lessing, *Syn. Gen. Compos.* 221. 1832.

金腰箭舅 *jin yao jian jiu*

Herbs, perennial. Stems prostrate, branched, rooting at nodes, densely appressed strigillose. Petiole 3–8 mm, narrowly winged toward blade, margin ciliate; leaf blade ovate to broadly

ovate, to 35 × 25 mm, both surfaces densely appressed strigillose, base attenuate, margin crenate-serrate, apex acute, apiculate. Capitula axillary, solitary, sessile; peduncle to 15 mm; involucre narrowly oblong-oblancheolate, 6–7 × 2.5–3.5 mm; phyllaries 4, 2-seriate, concave, lanceolate, 6–7 × 3–3.5 mm, apex acuminate and apiculate; paleae hyaline, narrowly elliptic, 3.5–4.8 × 0.8–1 mm. Ray florets 3–8, yellow; corolla 4.5–6.2 × 1.4–1.8 mm, 3-toothed; achenes oblanceolate, 3.5–4 × 1.7–2

mm; pappus of 2 ascending divergent awns, 1.2–2.4 mm. Disk florets 3–8; corolla 2.6–3.6 mm, apex 2- or 3-toothed or entire, densely papillose within; achenes similar to those of ray florets but slightly narrower and thicker, sometimes 3-angled, 1.1–1.7 mm wide, evidently muricate.  $2n = 24$ .

Naturalized weed of roadsides. Taiwan [native to Cuba, Mexico, and United States].

## 221. ELEUTHERANTHERA Poiteau, Bull. Sci. Soc. Philom. Paris 3: 137. 1802.

离药金腰箭属 li yao jin yao jian shu

*Fingalia* Schrank; *Gymnolomia* Kunth; *Kegelia* Schultz Bipontinus; *Ogiera* Cassini.

Herbs, annual. Stems erect or sprawling. Leaves opposite, petiolate; blade ovate to trullate, 3-veined. Capitula axillary, solitary, nodding, discoid; involucre campanulate; phyllaries 2- or 3-seriate, herbaceous; receptacles flat, paleaceous; paleae partially involute around outer florets. Florets bisexual, corollas yellow; anthers free, not united into a cylinder, black or golden brown; style branches tapered, apices papillose. Achenes compressed, quadrate to terete, tuberculate; pappus a small apical peg.

Two species: Neotropics, one widely adventive in the Old World; one species (introduced) in China.

**1. Eleutheranthera ruderalis** (Swartz) Schultz Bipontinus, Bot. Zeitung (Berlin) 24: 165. 1866.

离药金腰箭 li yao jin yao jian

*Melampodium ruderale* Swartz, Fl. Ind. Occid. 3: 1372. 1806, nom. cons.; *Eleutheranthera ovata* Poiteau; *Gymnopsis microcephala* Gardner; *Kegelia ruderalis* (Swartz) Schultz Bipontinus; *Verbesina foliacea* Sprengel; *Wedelia discoidea* Lessing.

Herbs, erect, to 30 cm. Stems glabrate to pilose. Petiole 1–2 cm; leaf blade ovate, 3(–8) cm, 3-veined from near base, both surfaces pubescent and glandular, base obtuse, acute, or acuminate, margin entire or crenulate-dentate, apex acute or acumi-

nate. Synflorescence terminal, of 2–5 capitula; peduncles slender, pilose, usually longer than capitulum. Capitula discoid, 4–6 mm; phyllaries 2-seriate, outer slightly imbricate, ovate, abaxially pubescent toward base, margin ciliate, apex acuminate or acute, inner paleaceous and involute around florets. Florets 2–6, ca. 2.5 mm; anthers black; style branches lanceolate, pubescent abaxially. Achenes brown, ca. 3 mm, 3-angled, body tuberculate, sparsely setuliferous; pappus an apical peg.

Recently naturalized in Taiwan [widespread in Central and South America but also found in W Africa and Australia].

The occurrence of this species in Taiwan was first reported by Sheng Z. Yang and G. P. Hsieh (Taiwania 51: 46–49. 2006).

## 222. ECLIPTA Linnaeus, Mant. Pl. 2: 157, 286. 1771, nom. cons.

鳢肠属 li chang shu

*Eupatoriophalacron* Miller.

Herbs, annual or perennial, erect, branched, strigose. Leaves opposite, toothed. Capitula terminal on stems and branches or axillary, pedunculate, heterogamous; involucre campanulate; phyllaries imbricate, ca. 2-seriate; receptacle flat or convex, paleaceous; paleae awnlike. Ray florets bisexual, mostly fertile, lamina minutely 2-lobed, white to yellowish. Disk florets bisexual, corolla tubular, greenish white to yellowish, 4- or rarely 5-lobed; anthers entire or very shortly bifid at base; style branches obtuse, mammillate at apex. Achenes thick, maturing and falling rapidly, those of ray florets 3-angled, those of disk florets compressed, 4-angled, coarsely hairy, tuberculate, margin with 1–3 minute teeth, apex truncate and depressed; pappus absent, coroniform, or of 2 or 3 awns.  $x = 11$ .

About five species: mostly warm-temperate to tropical New World, introduced in Old World; one species (introduced) in China.

**1. Eclipta prostrata** (Linnaeus) Linnaeus, Mant. Pl. 2: 286. 1771.

鳢肠 li chang

*Verbesina prostrata* Linnaeus, Sp. Pl. 2: 902. 1753; *Eclipta alba* (Linnaeus) Hasskarl; *E. alba* var. *zippeliana* (Blume) Miquel; *E. thermalis* Bunge; *E. zippeliana* Blume; *V. alba* Linnaeus.

Herbs, annual. Stems erect, ascending or prostrate, to 60(–100) cm tall, strigose-pilose, branched at base. Leaves lanceolate, 3–10 × 0.5–2.5 cm, papery, densely strigose-pubescent on both surfaces, base narrowed, sessile or shortly petiolate,

margin serrulate, apex gradually acuminate. Capitula ca. 6 mm wide; peduncle slender, 2–4.5 cm; involucre globose-campanulate, ca. 5 × 6–7 mm, enlarging to 11 mm wide in fruit; phyllaries 5 or 6, 2-seriate, oblong, acute, outer longer. Ray florets 2-seriate; lamina 2.5–3 × ca. 0.4 mm, bifid or entire. Disk florets many; corolla ca. 1.5 mm, 4-lobed. Achenes ca. 2.8 × 1.5 mm, margin ribbed. Fl. Jun–Sep.

Riversides, fields, abandoned ponds, roadsides; below 1600 m. Anhui, Fujian, Gansu, Guangxi, Guizhou, Hebei, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, Shaanxi, Shandong, Shanxi, Sichuan, Taiwan, Yunnan, Zhejiang [native to Central, North, and South America; introduced in Africa, Asia, Australia, Europe, and Pacific islands].

**223. CLIBADIUM** F. Allamand ex Linnaeus, Mant. Pl. 2: 161. 1771.苏利南野菊属 *su li nan ye ju shu*

*Baillieria* Aublet; *Trixis* Swartz (1788), not P. Browne (1756); *Oswalda* Cassini; *Orsinia* Bertoloni ex Candolle; *Trichapium* Gilli.

Shrubs or small trees. Leaves opposite, sessile or petiolate; blade lanceolate to broadly cordate, 3-veined, leathery. Synflorescence of terminal lax or congested panicles or corymbs, sometimes of glomerule-like cymes. Capitula disciform; involucre cylindrical, campanulate, or hemispheric; phyllaries 2–6-seriate, subequal, imbricate, membranous, scarious, inner enclosing marginal achenes, greenish to purple, sometimes white; receptacles flat to shallowly convex, usually paleaceous; paleae subtending female florets resembling inner phyllaries, ovate or orbicular, 3–9-veined, paleae subtending disk florets membranous, lanceolate, 1–3-veined, margin remotely ciliate. Marginal florets female, 1(or 2)-seriate; corollas inconspicuous, white, greenish white, or yellowish white, 2–5-lobed. Disk florets functionally male; corollas white or greenish white, 4- or 5-lobed; anther black, anther appendage with glandular trichomes; style branches acuminate. Achenes obcompressed, obovoid to obpyriform, sometimes drupelike, glabrous to variously setuliferous, especially at apices; pappus absent.  $x = 16$ .

About 24 species: Neotropics; one species (introduced) in China.

For more on the genus, see Schulz (Bot. Jahrb. Syst. 46(5): 613–628. 1912) and Arriagada (Brittonia 55: 245–301. 2003).

**1. Clibadium surinamense** Linnaeus, Mant. Pl. 2: 294. 1771.苏利南野菊 *su li nan ye ju*

*Baillieria aspera* Aublet; *Clibadium asperum* (Aublet) Candolle; *C. caracasenum* Candolle; *C. lanceolatum* Rusby; *C. lehmannianum* O. E. Schulz; *C. surinamense* Linnaeus var. *macrophyllum* Steyermark; *C. trinitatis* Candolle; *C. villosum* Benthams; *Oswalda baillierioides* Cassini; *Trixis aspera* (Aublet) Swartz.

Shrubs, 1.5–4(–5) m. Stems hispidulous to scabrid. Leaves petiolate; petiole 1.5–5 cm; blade lanceolate to broadly ovate, 5–12(–20) × 2–6(–12) cm, both surfaces hispidulous, base ob-

tuse, margin serrate, or serrate-dentate, apex acute to acuminate. Synflorescence thyrsoid or paniculiform. Capitula sessile; phyllaries 3 or 4, leathery, broadly ovate, 5-veined, apex acute. Female florets 3–5; paleae ovate, ca. 4 × 3–4 mm, 5-veined. Disk florets 10–14; corolla ca. 3 mm, 4-lobed. Achenes ca. 2.5 × 2 mm, setuliferous in upper half.

Recently naturalized in Taiwan [native to and widely distributed in Central and South America; introduced in Indian Ocean islands (Mauritius) and Indonesia (Borneo, Java, Sumatra)].

The occurrence of this species in Taiwan was first reported by Y. H. Tseng et al. (Taiwania 53: 103–106. 2008).

**224. SPHAGNETICOLA** O. Hoffmann, Notizbl. Königl. Bot. Gart. Berlin 3: 36. 1900.蟛蜞菊属 *peng qi ju shu*

Herbs, perennial, woody, subfleshy, with prostrate stems, often rooting at nodes. Leaves opposite, shortly petiolate, often appearing sessile, blade often 3-lobed, margin lobed to serrate. Capitula solitary, terminal, often appearing axillary because of sympodial growth, long pedunculate, radiate, heterogamous; involucre broadly campanulate; outer phyllaries 3–5, herbaceous, often longer than inner, apices reflexed, inner phyllaries 10–12, thinly herbaceous or scarious; receptacle convex to conical; paleae persistent, scarious, conduplicate about ray achenes. Ray florets 1- or 2-seriate, female, fertile; corollas orange to yellow; lamina narrowly oblong, apices 3-lobed. Disk florets numerous, bisexual; corollas tubular, 5-lobed, lobes with hairlike papillae along inner margin; anther thecae and anther appendages blackish with scattered glandular dots. Achene body smooth to roughened or tuberculate, blackish, ray achenes triangular, disk achenes compressed, margin sometimes obscurely winged, apex shortly rostrate with a corona of erose to fimbriate pappus setae.

About four species: New World tropics and subtropics; two species (one introduced) in China.

See Pruski, Novon 6: 404–418. 1996.

- 1a. Leaves usually 3-lobed ..... 1. *S. trilobata*  
1b. Leaves sparsely serrulate ..... 2. *S. calendulacea*

**1. Sphagneticola trilobata** (Linnaeus) Pruski, Mem. New York Bot. Gard. 78: 114. 17 Dec 1996.南美蟛蜞菊 *nan mei peng qi ju*

*Silphium trilobatum* Linnaeus, Syst. Nat., ed. 10, 2: 1233. 1759; *Thelechitonia trilobata* (Linnaeus) H. Robinson & Cuatrecasas; *Wedelia trilobata* (Linnaeus) Hitchcock.

Herbs, perennial, procumbent. Stems stout, glabrous or pubescent, seldom scabrid. Leaves opposite, somewhat succulent; petiole distinct but less than 5 mm; blade elliptic or lanceolate, to 18 cm, often with triangular lobes and conspicuous marginal teeth, glabrous or sparsely pubescent, sometimes scabrid, base cuneate, apex acute. Capitula solitary on elongate peduncle, radiate; involucre green; phyllaries lanceolate, 10–15 mm, cili-

ate, obscurely veined, innermost narrower. Ray florets 4–8, showy, yellow, 15–20 mm, 3- or 4-denticulate, fertile. Disk florets numerous, yellow, ca. 2 cm; corolla 5–6 mm. Achenes blackish, sometimes mottled, clavate, angled, ca. 5 mm; pappus of fused scales, coroniform.

Cultivated as an ornamental ground cover and escaped in many countries, occasionally naturalized on slopes and along roadsides at lower elevations. Guangdong, Taiwan [native to the New World tropics but widespread in the Old World tropics].

**2. *Sphagnetica calendulacea*** (Linnaeus) Pruski, *Novon* 6: 411. 1996.

虻蛄菊 peng qǐ ju

*Verbesina calendulacea* Linnaeus, *Sp. Pl.* 2: 902. 1753; *Complaya chinensis* (Osbeck) Strother; *Jaegeria calendulacea* (Linnaeus) Sprengel; *Seruneum calendulaceum* (Linnaeus) Kuntze; *Solidago chinensis* Osbeck; *Thelechitonina chinensis* (Osbeck) H. Robinson & Cuatrecasas; *Wedelia calendulacea*

(Linnaeus) Lessing (1832), not Richard (1807); *W. chinensis* (Osbeck) Merrill.

Stems prostrate with ascending tips, elongate, rooting from lower nodes, appressed pilose. Leaves sessile or shortly petiolate; blade linear-oblong to lanceolate, 2–10 cm × 6–20 mm, papery, appressed pilose on both surfaces, base narrowed, margin sparsely mucronulate-serrulate, apex acute. Capitula 2–2.5 cm wide, solitary on erect branches; peduncle 6–12 cm; involucre hemispheric, 8–9 mm; phyllaries 5, subequal in length, 1-seriate, oblong, shortly appressed pubescent, apex acute or sometimes obtuse. Ray florets 1-seriate, yellow; corolla 9–11 × 3–3.5 mm, 2- or 3-dentate. Disk corolla 4–4.5 mm, 5-lobed. Achenes obovoid, ca. 3.5 × 1.5–2 mm, coarsely hairy at tip; pappus vase- or cup-shaped. Fl. Mar–Sep.

Paddy ridges, in grassy fields and moist lowland depressions in the north, also common in littoral areas. Fujian, Guangdong, Liaoning, Taiwan [India, Indonesia, Japan, Myanmar, Philippines, Sri Lanka, Thailand, Vietnam].

**225. MELANTHERA** Rohr, *Skr. Naturhist.-Selsk.* 2(1): 213. 1792.

鹵地菊属 lu di ju shu

Perennial herbs or weak shrubs. Leaves opposite, slightly fleshy. Synflorescence terminal, of solitary capitula or corymbose. Capitula radiate; involucre 2-seriate; paleae strongly veined. Ray florets female. Disk florets bisexual. Achenes of ray florets obconical, 3-angled, those of disk florets obconical, 4-angled; pappus absent or of 1 short awn.

About 20 species: Africa, Asia, Central, North, and South America, Pacific islands; one species in China.

See Fosberg and Sachet (*Smithsonian Contr. Bot.* 45: 1–40. 1980) and Ohashi and Ohashi (*J. Jap. Bot.* 85(1): 59–63. 2010).

**1. *Melanthera prostrata*** (Hemsley) W. L. Wagner & H. Robinson, *Brittonia* 53: 557. 2002.

鹵地菊 lu di ju

*Wedelia prostrata* Hemsley, *J. Linn. Soc., Bot.* 23: 434. 1888, based on *Verbesina prostrata* Hooker & Arnott, *Bot. Beechey Voy.* 195. 1837, not Linnaeus (1753); *Eclipta dentata* H. Léveillé & Vaniot; *Melanthera robusta* (Makino) K. Ohashi & H. Ohashi; *W. prostrata* var. *robusta* Makino; *W. robusta* (Makino) Kitamura; *Wollastonia prostrata* Hooker & Arnott (1838), not Candolle (1836).

Stems long creeping, rooting at nodes, coarsely hirsute; flowering branches ascending, leafy, densely strigose. Cauline leaves with 2–8 mm petiole, oblong, sometimes ovate or lanceolate, thickly leathery, coarsely strigose on both surfaces, 3-

veined, base cuneate, margin loosely dentate, apex acute. Capitula 5–22 × 16–22 mm, usually solitary, terminal; peduncle 1–7 cm; involucre hemispheric, 10–12 × 5–6 mm; phyllaries 1-seriate, ovate to ovate-oblong, 2–3.5 mm wide, coarsely strigose, apex acute to obtuse. Ray corollas yellow, 8–11 × ca. 4 mm. Disk corollas tubular, 5–6 mm, 5-lobed. Achenes 3.5–4 × ca. 2 mm, apically strigillose, 3- or 4-angled; pappus bristles 1 or 2, or obsolete. *2n* = 30.

Littoral sand dunes, sandy seashores. Guangdong, Taiwan [Japan, Korea, Thailand, Vietnam].

Wagner and Robinson (*Brittonia* 53: 557. 2001) noted that “*Melanthera prostrata* var. *robusta* Makino” (a combination that does not exist) is thought to represent a hybrid between *M. prostrata* and *M. biflora* (here treated as *Wollastonia biflora*), q.v. C. I Peng et al. (*Fl. Taiwan*, ed. 2, 4: 1094, 1097. 1998, as *Wedelia prostrata* var. *robusta*). This is not recognized here, q.v. Wagner and Robinson (loc. cit.).

**226. WOLLASTONIA** Candolle ex Decaisne, *Nouv. Ann. Mus. Hist. Nat.* 3: 414. 1834.

孛花菊属 luan hua ju shu

Perennial herbs or weak shrubs. Leaves opposite; blade ovate, 3-veined. Synflorescence of solitary terminal capitula or open paniculate cymes. Capitula radiate; involucre hemispheric to campanulate; phyllaries 2-seriate; receptacle convex. Ray florets female; lamina yellow. Disk florets bisexual; corollas yellow or greenish yellow; anthers brown to black. Ray achenes cuneiform, 3-angled, base setuliferous, apex truncate. Disk achenes compressed and obscurely 4-angled, base setuliferous; pappus absent or usually a single awn.

Probably two species: Indo-Pacific coastal region and montane areas; two species in China.

See Fosberg and Sachet, *Smithsonian Contr. Bot.* 45: 1–40. 1980.

- 1a. Capitula usually (1 or)3–6, 20–30 mm in diam.; stems scandent ..... 1. *W. biflora*
- 1b. Capitula always solitary, ca. 15 mm in diam.; stems erect ..... 2. *W. montana*

**1. *Wollastonia biflora*** (Linnaeus) Candolle, Prodr. 5: 546. 1836.

李花菊 luan hua ju

*Verbesina biflora* Linnaeus, Sp. Pl., ed. 2, 2: 1272. 1763; *Acmella biflora* (Linnaeus) Sprengel; *Melanthera biflora* (Linnaeus) Wild; *M. biflora* var. *ryukyuensis* (H. Koyama) K. Ohashi & H. Ohashi; *Stemmodontia biflora* (Linnaeus) W. Wight; *Wedelia biflora* (Linnaeus) Candolle; *W. biflora* var. *ryukyuensis* H. Koyama; *W. wallichii* Lessing var. *megalantha* H. Chuang; *Wollastonia scabriuscula* Candolle ex Decaisne, nom. illeg. superfl.

Subshrubs or somewhat woody herbs. Stems elongate, branched, scandent, coarsely appressed strigose. Cauline leaves long petiolate; petiole 1.2–2.3 cm; blade ovate, 7–14 × 3–8 cm, thickly papery, appressed strigose, base rounded, margin serrate, apex acuminate. Capitula (1 or) 3–6, terminal, 2–3 cm wide; peduncles 1.5–5.5(–8) cm, slender or thick; involucre 10–13 × 5–7 mm; phyllaries ovate-lanceolate or narrowly ovate, densely appressed strigose, gradually narrowed to tip. Ray florets 14 or 15, yellow, 1-seriate; corolla 9–13 mm, 2- or 3-dentate. Disk florets yellow; corolla ca. 5 mm, apex 5-lobed. Achenes 3–3.5 × 2–2.5 mm, cuneate at base, often 3-angled, coarsely strigose toward tip; pappus bristles 2 or 3, 2–2.5 mm, sometimes absent. Fl. year-round.  $2n = 30, 45, 50, 75$ .

Seasides. Guangdong, Guangxi, Guizhou, Hainan, Hubei, Hunan, Jiangxi, Sichuan, Taiwan, Xizang, Yunnan [India, Indonesia, Japan, Malaysia, Philippines, Vietnam; Pacific islands].

Under *Wedelia biflora* the variety *W. biflora* var. *ryukyuensis* was recognized by Koyama (Acta Phytotax. Geobot. 33: 245. 1982), differing from the typical variety by degree, in having larger capitula with more ray and disk florets, larger leaf blade with a longer petiole, and a chromosome number of  $2n = 45$  (see also C. I. Peng et al., Fl. Taiwan,

ed. 2, 4: 1093–1094. 1998). However, in their recent synopsis of the genus, Wagner and Robinson (Brittonia 53: 539–561. 2001) recognized only a variable species without infraspecific taxa.

**2. *Wollastonia montana*** (Blume) Candolle, Prodr. 5: 547. 1836.

山蟛蜞菊 shan peng qi ju

*Verbesina montana* Blume, Bijdr. 911. 1826; *Wedelia montana* (Blume) Boerlage; *W. montana* var. *pilosa* H. Koyama; *W. montana* var. *wallichii* (Lessing) H. Koyama; *W. urticifolia* Candolle; *W. urticifolia* var. *wallichii* (Lessing) Candolle; *W. wallichii* Lessing.

Perennial herbs. Stems erect, stout, glabrous or scabrid. Leaves petiolate; petiole 1–2 cm; blade ovate or ovate-lanceolate, (3–)5–9 × (1–)3–4 cm, both surfaces scabrid, base rounded or cuneate, margin crenulate, apex acuminate. Capitula ca. 15 mm in diam., solitary on elongate peduncle; involucre campanulate, 7–10 × 4–5 mm; outer phyllaries papery, green, oblong, ca. 10 mm, dorsally scabrid, apex obtuse or shortly acute, inner phyllaries oblong to lanceolate, ca. 7 mm, dorsally pubescent in upper part, apex acuminate; paleae oblong, sparsely pubescent. Ray florets 1-seriate, yellow; lamina oblong, 4–6 × ca. 2 mm, apex 2- or 3-toothed. Disk florets tubular, yellow. Achenes red-brown, obovoid-trigonal, slightly compressed, ca. 5 mm; pappus elements 2 or 3. Fl. Apr–Oct.

Streamsides, roadsides; 500–1200(–3000) m. Guangdong, Guangxi, Guizhou, Hainan, Sichuan, Yunnan [Bhutan, India, Myanmar, Nepal, Thailand].

Two taxa are represented among the material cited by Candolle under *Wollastonia montana*. That representing Blume's concept of *Verbesina montana* certainly does not belong to *Melanthera*, and it is felt better to include it here within the concept of *Wollastonia*. It should also be noted that *Wedelia wallichii* var. *megalantha* is not conspecific with type material of *W. wallichii* but appears to be *Wollastonia biflora*.

## 227. **SCLEROCARPUS** Jacquin, Icon. Pl. Rar. 1: 17. 1781.

硬果菊属 ying guo ju shu

Annuals, perennials, or subshrubs. Stems sprawling to erect, branched. Leaves mostly cauline, opposite (proximal) or alternate, petiolate [or sessile]; blade ovate to rhombic or lanceolate, both surfaces glabrous or ± scabrid, 3-veined, base cuneate to rounded, margin coarsely toothed. Capitula radiate, solitary; involucre rotate to hemispheric, 12–20 mm in diam.; phyllaries persistent, 5–8(–21), 1(or 2)-seriate; receptacle low conical; paleae each closely investing subtended floret, each forming a hard perigynium around fruit and shed with it. Ray florets 5–8, neuter; corollas yellow to orange. Disk florets 10–50, bisexual, fertile; corollas usually yellow to orange, sometimes with purple, tubes much shorter than cylindrical throats, lobes 5, linear-lanceolate. Achenes weakly compressed, glabrous, obliquely obovoid or arcuate; pappus absent, or coroniform of distinct or connate scales or bristles.  $x = 12$ .

About 12 species: mainly in Mexico, United States, and Central America, one species in tropical Africa and Asia; one species (introduced) in China.

**1. *Sclerocarpus africanus*** Jacquin, Icon. Pl. Rar. 1: 17. 1781.

硬果菊 ying guo ju

Herbs, annual. Stems 25–50[–120] cm tall, white hirsute. Leaves opposite, alternate in upper part; blade ovate, 3.5–7 × 1.5–2 cm, both surfaces scabrid, base decurrent to petiole, margin serrate, apex acute or obtuse. Capitula solitary, 8–12 mm in

diam.; involucre campanulate; outer phyllaries ovate, ca. 1 cm, apex acuminate, inner ovate-oblong, shorter than outer, abaxially densely tomentose. Ray florets 1-seriate; lamina broadly elliptic, apex 2-lobed. Disk florets puberulent. Achenes oblong; pappus coroniform, of distinct or connate scales.

Naturalized in Xizang [native to tropical Africa and Asia].

**228. LAGASCEA** Cavanilles, *Anales Ci. Nat.* 6: 331. 1803 [*“Lagasca”*], nom. cons.

单花葵属 dan hua kui shu

Annual herbs or perennial shrubs. Stems terete, glabrous to pilose and often stipitate glandular. Leaves opposite, petiolate or sessile; blade ovate to oblanceolate, subglabrous to sericeous abaxially, subglabrous to strigose adaxially, base obtuse to subauriculate, margin obscurely to markedly serrate, apex acute to acuminate. Synflorescence globose to campanulate, of 1-flowered (rarely 2- or 3-flowered) capitula aggregated secondarily, sometimes to third degree, solitary, cymose, or racemose clusters; receptacle convex; secondary phyllaries separate, herbaceous, lanceolate to obovate, abaxially subglabrous to pilose and sometimes stipitate glandular; primary phyllaries laterally connate into an involucre tube, abaxially subglabrous to densely pilose, with 1–3 rows of resinous glands, apices acute to acuminate and sometimes stipitate glandular. Florets bisexual; corollas yellow, white, pink, or red, narrowly funnellform, lobes 5; anthers yellow, tan, brown, black, pink, or red; style bifid, style branches tapering toward apices. Achenes brown to black, narrowly cylindrical to obovoid, minutely grooved, glabrous or setuliferous; pappus an erose pubescent crown or of short pubescent awns.

About nine species: mainly in Mexico and Central America, one species is a widespread pantropic weed; one species (introduced) in China.

See Stuessy, *Fieldiana, Bot.* 38(8): 75–133. 1978.

**1. Lagascea mollis** Cavanilles, *Anales Ci. Nat.* 6: 332. 1803.

单花葵 dan hua kui

Herbs, annual, to 1 m tall, rarely perennial, creeping or straggling, to 90 cm tall or long, sometimes rooting at nodes, sometimes mat-forming. Stems sometimes purplish, with stipitate glandular hairs on young parts. Leaves opposite; petiole 5–27 mm; blade narrowly ovate or ovate, 1–7 × 0.5–4 cm, shortly pubescent to slightly scabridulous, 3–5-veined from base, base obtuse to attenuate, margin subentire to serrate, apex acute to

acuminate. Glomerules solitary and terminal, campanulate, 8–13 × 8–30 mm, with 8–25 1-flowered capitula; subtending bracts lanceolate to obovate, 5–15 × 1–6 mm; involucre of capitula 4–5 × ca. 1 mm, stipitate glandular. Florets white or with blue tinge, 4–5 mm. Achenes brown or black, ca. 3 mm, setuliferous near apex; pappus a minute crown, pubescent; achene usually surrounded by connate phyllaries topped by scales, 2–2.5 mm.

Hong Kong [probably native to Central America; widespread throughout the tropics].

**229. RUDBECKIA** Linnaeus, *Sp. Pl.* 2: 906. 1753.

金光菊属 jin guang ju shu

Annuals, biennials, or perennials. Leaves alternate, rarely opposite; blade ovate to broadly ovate, unlobed or pinnatifid, rarely sessile and cordate. Capitula in terminal, paniculiform cymes, radiate, rarely discoid; involucre flat to reflexed, rarely hemispheric; phyllaries persistent, in 1 or 2(or 3) series; receptacle conical to columnar; paleae scarious, conduplicate or concave, ± enclosing florets. Ray florets neuter; corolla golden to lemon-yellow, orange, or reddish, or bicolored. Disk florets: corolla yellow to purplish, often bicolored. Achenes oblong to obpyramidal, 4-angled, glabrous or with some thick, multicellular trichomes on radial angles; pappus a small crown of minute scales, or of 2–4 small scales, or absent.

About 17 species: North America; two species (both introduced) in China.

*Rudbeckia amplexicaulis* Vahl, *R. fulgida* Aiton, *R. fulgida* var. *speciosa* (Wenderoth) Perdue, *R. maxima* Nuttall, and *R. triloba* Linnaeus are cultivated in China.

1a. Leaf blades usually 1- or 2-pinnatifid or pinnately lobed, glabrous or hairy; disk corollas yellow to yellowish

green ..... 1. *R. laciniata*

1b. Leaf blades entire or serrate, with coarse stiff hairs; disk corollas yellowish green, distally brown-purple ..... 2. *R. hirta*

**1. Rudbeckia laciniata** Linnaeus, *Sp. Pl.* 2: 906. 1753.

金光菊 jin guang ju

Perennials, 50–200 cm tall. Leaves green; blade broadly ovate to lanceolate, all but distalmost ones 1- or 2-pinnatifid or pinnately compound; leaflets or lobes 3–11, glabrous or hairy, base cuneate to attenuate or cordate, margin entire or dentate, apex acute to acuminate; basal leaves petiolate, 15–50 × 10–25 cm; cauline leaves petiolate or sessile, mostly lobed to pinnatifid, sometimes not lobed, 8–40 × 3–20 cm. Capitula 2–25 in loose, corymbiform arrays; phyllaries 8–15, ovate to lanceolate, glabrous or hairy, margin mostly ciliate; receptacle hemispheric or ovoid to globose; paleae 3–7 mm, abaxially densely hairy at apex, apex truncate or rounded. Ray florets 8–12; corolla limb elliptic to oblanceolate, 15–50 × 4–14 mm, abaxially hairy. Disk 0.9–3 × 1–2.3 cm; disk florets numerous; corolla yellow to yellowish

green, 3.5–5 mm; style branches 1–1.5 mm, apex acute to rounded. Achenes 3–4.5 mm; pappus coroniform or of 4 scales, to 1.5 mm. Fl. Jul–Sep.

Widely cultivated and naturalized in China [native to North America].

**2. Rudbeckia hirta** Linnaeus, *Sp. Pl.* 2: 907. 1753.

黑心菊 hei xin ju

Annuals, biennials, or perennials. Stems hispid to hirsute. Leaf blade elliptic, lanceolate, or ovate, hispid to hirsute, base attenuate to cuneate, margin entire or serrate, apex acute; basal leaves petiolate, blade 8–30 × 0.5–7 cm; cauline leaves petiolate or sessile, blade 3–20 × 0.4–4 cm. Capitula solitary or 2–5 in loose, corymbiform arrays; phyllaries to 3 cm; receptacle

hemispheric to ovoid; paleae 4–6 mm, abaxially hirsute to hispid at apex, apex acute, often attenuate. Ray florets 8–16; corolla limb usually uniformly yellow to yellow-orange or with a basal maroon splotch, sometimes mostly maroon, elliptic to oblong or oblanceolate, 15–45 × 5–10 mm, abaxially hispid to hirsute. Disk 1.2–2.2 × 1–2 cm; disk florets numerous; corolla proximally yellowish green, distally brown-purple, 3–4.2 mm;

style branches ca. 1.5 mm, apex subulate. Achenes 1.5–2.7 mm; pappus absent. Fl. Jun–Sep.

Widely cultivated and naturalized in China [native to North America].

*Rudbeckia bicolor* Nuttall is listed in some Chinese floras; it is now treated as a synonym of *R. hirta* var. *pulcherrima* Farwell.

### 230. TITHONIA Desfontaines ex Jussieu, Gen. Pl. 189. 1789.

肿柄菊属 zhong bing ju shu

Annuals, perennials, subshrubs, or shrubs. Stems erect, branched. Leaves all or mostly cauline, opposite (proximal) or mostly alternate, petiolate or sessile; blade mostly deltate or pentagonal, sometimes 3- or 5-lobed, often (1 or)3- or 5-veined, both surfaces glabrous, ± hirsute, pilose, soft pubescent, or villous, often gland-dotted, base truncate or auriculate, ultimate margin serrate to crenate. Capitula borne singly; peduncles usually distally dilated, fistulose; involucre campanulate to hemispheric; phyllaries persistent, 2–5-seriate; receptacles hemispheric to convex, paleate. Ray florets 8–30, neuter; corollas yellow or orange. Disk florets bisexual, fertile; corollas yellow, tubes shorter than throats, lobes 5, triangular. Achenes compressed or flattened, often 3- or 4-angled or biconvex, cuneiform in silhouette, sometimes with basal elaiosomes; pappus absent or coroniform, of connate scales, 1 or 2 scales sometimes subulate to aristate.  $x = 17$ .

About 11 species: Mexico, SW United States; Central America; one species (introduced) in China.

See La Duke, *Rhodora* 84: 463–522. 1982.

*Tithonia rotundifolia* (Miller) S. F. Blake is cultivated in China.

**1. *Tithonia diversifolia*** (Hemsley) A. Gray, Proc. Amer. Acad. Arts 19: 5. 1883.

肿柄菊 zhong bing ju

*Miracalia diversifolia* Hemsley, Biol. Cent.-Amer., Bot. 2: 168. 1881.

Perennials, subshrubs, or shrubs, to 250(–500) cm. Petiole 2–6 cm; blade ± deltate to pentagonal, 7–33 × 7–22 cm, sometimes 3- or 5-lobed, abaxially glabrous to hispid-pilose. Pedun-

cles 7–24 cm; phyllaries 16–28, (3 or)4-seriate, oblong to ovate, outer phyllaries 6–10 × 4–7 mm, abaxially usually glabrous, apex rounded to acute, inner 10–20 × 3–10 mm, abaxially glabrous, apex rounded to acute; paleae 10–13 × 2–3 mm, mucros 1.5–2.5 mm. Ray florets 7–14; corollas yellow, lamina linear, 48–69 × 9–16 mm. Disk florets 80–120+. Achenes 4–6 mm. Fl. Sep–Jan.  $2n = 34$ .

Introduced and naturalized in Guangdong, Taiwan, and Yunnan [native to Mexico].

### 231. HELIANTHUS Linnaeus, Sp. Pl. 2: 904. 1753.

向日葵属 xiang ri kui shu

Annuals or perennials. Stems erect or ascending to decumbent or procumbent, usually branched distally. Leaves basal and/or cauline, opposite, opposite (proximal) and alternate, or alternate, petiolate or sessile; blade mostly deltate, linear-lanceolate, lanceolate, ovate-lanceolate, linear, or ovate, both surfaces glabrous or hairy, often gland-dotted, base cordate to narrowly cuneate, margin usually entire or serrate, rarely lobed. Synflorescence of solitary capitula or of corymbs, panicles, or spikes. Capitula usually radiate or sometimes discoid; involucre usually hemispheric, sometimes campanulate or cylindrical; phyllaries persistent, in 2 or 3+ series, subequal to unequal; receptacle flat to slightly convex or conical; paleae conduplicate, usually rectangular-oblong, usually 3-toothed, sometimes entire, apices sometimes reddish or purplish. Ray florets usually 5–30, rarely 0, neuter; corollas usually yellow. Disk florets numerous, bisexual, fertile; corollas yellow or reddish, tubes shorter than campanulate throats, lobes 5, triangular. Achenes usually purplish black, sometimes mottled, ± obpyramidal, ± compressed; pappus absent or readily falling, of 2(or 3) usually lanceolate, aristate, or erose scales plus 0–8 usually shorter scales, 0.2–2 mm.  $x = 17$ .

About 52 species: North America; three species (all introduced) in China.

See Heiser et al., Mem. Torrey Bot. Club 22(3): 1–218. 1969.

*Helianthus angustifolius* Linnaeus, *H. argophyllus* Torrey & A. Gray, *H. atrorubens* Linnaeus, *H. decapetalus* Linnaeus, *H. ×laetiflorus* Persoon, *H. maximiliani* Schrader, and *H. mollis* Lamarck are cultivated in China.

1a. Capitula large, 10–30 cm in diam.; disk florets brown or purple ..... 1. *H. annuus*

1b. Capitula small, 2–5 cm in diam.; disk florets yellow or reddish.

2a. Rootstock tuberous; perennial herbs; disk floret corollas yellow; leaves gland-dotted abaxially ..... 3. *H. tuberosus*

2b. Rootstock entirely fibrous; annual or perennial herbs; disk floret corollas usually reddish;

leaves not gland-dotted abaxially ..... 2. *H. debilis*

**1. *Helianthus annuus*** Linnaeus, Sp. Pl. 2: 904. 1753.向日葵 *xiang ri kui*

*Helianthus annuus* subsp. *jaegeri* (Heiser) Heiser; *H. annuus* subsp. *lenticularis* (Douglas ex Lindley) Cockerell; *H. annuus* var. *lenticularis* (Douglas ex Lindley) Steyermark; *H. annuus* var. *macrocarpus* (Candolle) Cockerell; *H. annuus* subsp. *texanus* Heiser; *H. aridus* Rydberg; *H. jaegeri* Heiser; *H. lenticularis* Douglas ex Lindley; *H. macrocarpus* Candolle.

Annuals, 100–300 cm. Stems erect, usually hispid. Leaves mostly cauline, mostly alternate; petiole 2–20 cm; blade ovate-lanceolate to ovate, 10–40 × 5–40 cm, abaxially usually ± hispid, sometimes gland-dotted, base cuneate to subcordate or cordate, margin serrate. Capitula 1–9; peduncles 2–20 cm; involucre hemispheric or broader, 15–40(–200) mm in diam.; phyllaries 20–30(–100), ovate to ovate-lanceolate, 13–25 × (3–)5–8 mm, abaxially usually hirsute to hispid, rarely glabrate or glabrous, usually gland-dotted, margin usually ciliate, apex abruptly narrowed, long acuminate; paleae 9–11 mm, 3-toothed, middle teeth long acuminate, glabrous or hispid. Ray florets (13–)17–30(–100+); lamina 25–50 mm. Disk florets 150–1000; corollas 5–8 mm, throats bulbous at bases, lobes usually reddish, sometimes yellow; anthers brownish to black, appendages yellow or dark. Achenes (3–)4–5(–15) mm, glabrate; pappus of 2 lanceolate scales 2–3.5 mm plus 0–4 obtuse scales 0.5–1 mm. Fl. Jul–Sep, fr. Aug–Oct.  $2n = 34$ .

Open areas. Widely cultivated in China [native to North America].

*Helianthus annuus* is a major agronomic crop, introduced nearly worldwide.

**2. *Helianthus debilis*** Nuttall subsp. ***cucumerifolius*** (Torrey & A. Gray) Heiser, Madroño 13: 160. 1956.瓜叶葵 *gua ye kui*

*Helianthus cucumerifolius* Torrey & A. Gray, Fl. N. Amer. 2: 319. 1842.

Herbs, annual or perennial, 40–200 cm. Stems erect, glabrous, hirsute, or puberulent. Leaves cauline, mostly alternate; petiole 1–7 cm; blade deltate-ovate, lanceolate-ovate, or ovate, 2.5–14 × 1.8–13 cm, abaxially glabrous to hispid, not gland-dotted, base cordate to truncate or broadly cuneate, margin subentire to serrate, apex acute. Capitula 1–3, radiate; peduncles 9–

30 cm; involucre hemispheric, 10–22 mm in diam.; phyllaries lanceolate 8–17 × 1–3 mm, abaxially glabrous or hispid, apex acute to long attenuate; paleae 7.5–8 mm, apex 3-toothed. Ray florets 11–23; corollas yellow. Disk florets ca. 30; corollas reddish, sometimes yellow, 4.5–5 mm; style branches reddish or yellow. Achenes 5–12 mm, glabrous or sparsely setuliferous; pappus of 2 lanceolate or linear-lanceolate awns, 1.2–2.5 mm.

Roadsides, roadside ditches, seashores. Recently introduced and naturalized in Taiwan; also cultivated in Beijing and Shanghai and sometimes naturalized [native to North America].

The occurrence of this taxon in Taiwan was first reported by Y. H. Tseng et al. (Taiwania 53: 316–320. 2008).

**3. *Helianthus tuberosus*** Linnaeus, Sp. Pl. 2: 905. 1753.菊芋 *ju yu*

*Helianthus tomentosus* Michaux; *H. tuberosus* var. *subcanescens* A. Gray.

Herbs, perennial, 50–200 cm, rhizomatous, producing tubers late in growing season. Stems erect, scabrid-hispid to hirsute, sometimes glaucous. Leaves mostly cauline, opposite or alternate proximally, usually alternate distally; petiole 2–8 cm, often ± winged; blade lanceolate to ovate, 10–23 × 7–15 cm, 3-veined from near base, abaxially puberulent or hirsutulous to tomentulose and gland-dotted or ± scabrid, base broadly to narrowly cuneate, margin entire or serrate. Capitula 3–15; peduncles 1–15 cm; involucre hemispheric, 10–25 × 8–12 mm; phyllaries often dark green, drying nearly black, 22–35, subequal, lanceolate, 8.5–15 × 2–4 mm, abaxially hispidulous or puberulent, gland-dotted, base appressed, margin ciliate, apex ± spreading, sometimes reflexed in fruit, acuminate; paleae 8–9 mm, 3-toothed, apices hairy. Ray florets 10–20; lamina 25–40 mm. Disk florets 60+; corollas 6–7 mm, lobes yellow; anthers dark brown or black, appendages dark or yellowish. Achenes 5–7 mm, glabrous or apically hairy; pappus of 2 aristate scales 1.9–3 mm plus 0–1 deltate scales 0.5–0.8 mm. Fl. Aug–Sep.  $2n = 102$ .

Roadsides, fields, wastelands. Widely cultivated and sometimes naturalized in China [native to North America; widely cultivated in temperate areas].

*Helianthus tuberosus* is a vegetable crop and widely naturalized.

**232. XANTHIUM** Linnaeus, Sp. Pl. 2: 987. 1753.苍耳属 *cang er shu*

Annuals. Stems erect, branched. Leaves cauline, mostly alternate (proximal 2–6 sometimes opposite), petiolate; blade lanceolate, linear, ovate, orbicular-deltate, or suborbicular, often palmately or pinnately lobed, both surfaces hirtellous or ± strigose, usually gland-dotted as well, ultimate margin entire or ± toothed. Capitula discoid, either female (proximal) or functionally male (distal), in racemiform to spiciform arrays or borne singly (in axils). Female capitula: involucre ± ellipsoid, 2–5 mm in diam. at anthesis; phyllaries in 6–12 series, outer 5–8 distinct, remainder (sometimes interpreted as paleae) proximally connate, their distinct tips mostly ± hooked (distal 1–3 usually longer, stouter, and not hooked), whole becoming a hard, prickly perigynium (a bur); florets 2, corollas 0. Male capitula: involucre saucer-shaped, 3–5 mm in diam.; phyllaries in 1 or 2 series, distinct to bases; receptacle conical to columnar; paleae spatulate to cuneiform or linear, membranous, apically villous or hirtellous; florets 20–50, corollas whitish, funnel-form, lobes 5, erect or reflexed; filaments connate, anthers free or weakly coherent. Achenes black, fusiform, enclosed in obovoid to ellipsoid, hard, prickly, 2-chambered burs; pappus absent.  $x = 18$ .

Two or three species: New World, introduced nearly worldwide; two species (both introduced) in China.

For more on the genus, see Widder (Repert. Spec. Nov. Regni Veg. Beih. 20: 1–222. 1923; Phytion (Horn) 11: 69–82. 1964), Löve and Dansereau (Canad. J. Bot. 37: 172–208. 1959), and Löve (Lagascalia 5: 55–71. 1975).

- 1a. Nodal spines (1–)3-lobed, 15–30+ mm; leaf blades ± lanceolate to ovate or lanceolate-linear ..... 1. *X. spinosum*  
 1b. Nodal spines absent; leaf blades suborbicular to pentagonal or deltate ..... 2. *X. strumarium*

**1. *Xanthium spinosum* Linnaeus, Sp. Pl. 2: 987. 1753.**

刺苍耳 ci cang er

*Acanthoxanthium spinosum* (Linnaeus) Fourreau; *Xanthium cloessplateaum* D. Z. Ma; *X. spinosum* var. *inerme* Bel.

Herbs, annual, 10–60(–120) cm; nodal spines usually in pairs, simple or 2- or 3-partite, 15–30 mm. Petiole 1–15(–25) mm; leaf blade ± ovate to lanceolate or lanceolate-linear, 4–8(–12) × 1–3(–5) cm, often pinnately 3(–7)-lobed, abaxially gray to white, densely strigose. Burs 10–12(–15) mm. Fl. Jul–Oct.  $2n = 36$ .

Damp or seasonally wet alkaline soils, wastelands, margins of agricultural land. Beijing, Henan [native to North and South America].

The synonymy of *Xanthium spinosum* is far more extensive than is indicated here. *Xanthium ambrosioides* Hooker & Arnott is sometimes included within the synonymy of this species. It is, however, a very distinctive taxon from Argentina (Patagonia) that should perhaps be recognized as a separate species.

**2. *Xanthium strumarium* Linnaeus, Sp. Pl. 2: 987. 1753.**

苍耳 cang er

*Xanthium americanum* Walter; *X. chasei* Fernald; *X. chinense* Miller; *X. curvescens* Millspaugh & Sherff; *X. cylindricum* Millspaugh & Sherff; *X. echinatum* Murray; *X. echinellum* Greene ex Rydberg; *X. globosum* C. Shull; *X. inaequilaterum* Candolle; *X. indicum* J. Koenig ex Roxburgh var. *inaequilaterum* (Candolle) Miquel; *X. inflexum* Mackenzie & Bush; *X.*

*italicum* Moretti; *X. japonicum* Widder; *X. mongolicum* Kitagawa; *X. orientale* Linnaeus; *X. oviforme* Wallroth; *X. pensylvanicum* Wallroth; *X. sibiricum* Patrín ex Widder; *X. sibiricum* var. *jingyuanense* H. G. Hou & Y. T. Lu; *X. sibiricum* var. *subinerme* Widder; *X. speciosum* Kearney; *X. strumarium* var. *canadense* (Miller) Torrey & A. Gray; *X. strumarium* var. *glabratum* (Candolle) Cronquist; *X. strumarium* var. *japonicum* (Widder) H. Hara; *X. strumarium* subsp. *sibiricum* (Patrín ex Widder) Greuter; *X. varians* Greene; *X. wootonii* Cockerell.

Herbs, annual, 20–120 cm; nodal spines absent. Petiole 3.5–10 cm, not winged; median cauline leaves ovate-deltate, 9–25 cm, papery, densely scabrid on both surfaces, base shallowly cordate to broadly cuneate, margin irregularly dentate, often obsoletely 3-lobed, apex acute. Capitula monoecious. Male capitula in terminal umbels; phyllaries 1-seriate, oblong-lanceolate, ca. 2.2 mm; outer paleae oblong-lanceolate, inner paleae lanceolate, ca. 2.2 mm; corolla white, tubular, ca. 2.5 mm, 5-dentate. Female capitula axillary; phyllaries 1-seriate, oblong-lanceolate, ca. 3 mm, inner bracts connate with outer paleae. Burs sessile, oblong, ellipsoid, or ovoid, 10–18 × 6–12 mm, densely puberulent, 2-beaked. Fl. Jul–Aug, fr. Sep–Oct.  $2n = 36$ .

Damp or seasonally wet often alkaline soils, wastelands, margins of agriculture, common weed. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi, Sichuan, Taiwan, Xinjiang, Xizang, Yunnan, Zhejiang [a pantropical weed, known to be widely distributed in both Old and New Worlds, but most probably originating in the New World].

**233. AMBROSIA Linnaeus, Sp. Pl. 2: 987. 1753.**

豚草属 tun cao shu

Annuals, perennials, or shrubs. Stems erect, decumbent, or prostrate, branched. Leaves usually cauline, opposite throughout or opposite (proximal) and alternate or mostly alternate, sessile or petiolate; blade deltate, elliptic, filiform, lanceolate, linear, obovate, ovate, or rhombic, usually pinnately, sometimes palmately, lobed, both surfaces hairy or glabrate, usually gland-dotted or stipitate glandular, ultimate margin entire or toothed. Capitula discoid, unisexual, female proximal to or intermixed with male, male capitula usually arranged in racemes or spikes; rarely single plants all or mostly male or female. Female capitula: phyllaries 1–8-seriate, outer (1–)5–8 distinct or connate, herbaceous, remainder connate, usually with free tips forming tubercles, spines, or wings; florets 1(–5); corollas 0. Male capitula: involucre cup-shaped to saucer-shaped, 1.5–6 mm in diam.; phyllaries 1-seriate, connate; receptacle flat or convex; paleae spatulate to linear, membranous, sometimes villous, hirtellous, and/or gland-dotted or stipitate glandular, sometimes absent; florets 5–60; corollas whitish or purplish, funnelform, 5-lobed, erect or incurved; staminal filaments connate, anthers free or weakly coherent. Achenes black, ovoid or fusiform, enclosed within globose to obovoid, pyramidal, pyriform, obconical, or fusiform, hard, smooth, tuberculate, spiny, or winged burs; pappus absent.  $x = 18$ .

About 43 species: tropical to subtropical and temperate New World, mostly North America; three species (all introduced) in China.

See Payne, J. Arnold Arbor. 45(4): 401–438. 1964.

- 1a. Leaves palmately 3–5-lobed, sometimes undivided ..... 2. *A. trifida*  
 1b. Leaves once or more commonly twice pinnatifid/pinnatisect.  
 2a. Annuals; involucre of male capitula 2–3 mm in diam.; burs 2–3 mm; male florets 12–20 ..... 1. *A. artemisiifolia*  
 2b. Perennials; involucre of male capitula 3–5 mm in diam.; burs 3–4 mm; male florets 15–25 ..... 3. *A. psilostachya*

**1. *Ambrosia artemisiifolia* Linnaeus, Sp. Pl. 2: 988. 1753.**

豚草 tun cao

*Ambrosia artemisiifolia* var. *elatior* (Linnaeus) Descourtilz; *A. elatior* Linnaeus.

Annuals, 20–150 cm. Stems erect. Leaves opposite and alternate; petiole 2.5–3.5(–6) cm; blade deltate to lanceolate or elliptic, 2.5–5.5(–9) × 2–3(–5) cm, pinnately 1- or 2-lobed, abaxially sparsely pilosulose to strigillose, adaxially strigillose, both surfaces gland-dotted, base cuneate, ultimate margin entire or toothed. Female capitula clustered, proximal to male; floret 1. Male capitula: peduncles 0.5–1.5 mm; involucre shallowly cup-shaped (usually without black veins), 2–3 mm in diam., glabrous or hispid to pilosulose; florets 12–20. Burs ± globose to pyriform, 2–3 mm, ± pilosulose, spines or tubercles 3–5, near middle or apex, conical to acerose, 0.1–0.5 mm, tips straight. Fl. Jul–Oct, fr. Sep–Oct.  $2n = 34, 36$ .

Introduced noxious weed of wet to dry soils; below 1000 m. Widely distributed in China [native to Central and North America; introduced and widely distributed in Asia and Europe].

**2. *Ambrosia trifida* Linnaeus, Sp. Pl. 2: 987. 1753.**

三裂叶豚草 san lie ye tun cao

Annuals, 30–150 cm. Stems erect. Leaves mostly opposite; petiole 10–30(–70) mm; blade orbicular-deltate to ovate or elliptic, 4–15(–25) × 3–7(–20) cm, usually some palmately 3(–5)-lobed, both surfaces scaberulose and gland-dotted, base truncate to cuneate, sometimes decurrent onto petiole, margin usually toothed, rarely entire. Female capitula clustered, proximal to male; floret 1. Male capitula: peduncles 1–3 mm; involucre saucer-shaped, 2–4 mm in diam., scaberulose; florets 3–25. Bur pyramidal, 3–5(–7) mm, glabrous or glabrate, spines

4 or 5, apical, acerose, 0.5–1 mm, tips straight. Fl. Jul–Aug, fr. Sep–Nov.  $2n = 24, 48$ .

Weed of disturbed sites, wastelands, damp soils; below 1600 m Hebei, Heilongjiang, Hunan, Jiangxi, Jilin, Liaoning, Shandong, Sichuan, Zhejiang [native to North America].

**3. *Ambrosia psilostachya* Candolle, Prodr. 5: 526. 1836.**

裸穗豚草 luo sui tun cao

*Ambrosia coronopifolia* Torrey & A. Gray.

Herbs, perennial, to 75(–100) cm tall. Stems leafy, glabrescent below, simple or with ascending branches from above middle. Leaves opposite below, alternate on branches, petiolate below, upper sessile; petiole 1–3 cm; blade ovate in outline, 4–10 × (2–)4–9 cm, 1 or 2 times pinnatisect, large segments 2–4 cm, divergent or ascending, linear or elliptic-oblong, central rachis 2–6 mm wide. Synflorescences terminal, spiciform, 10–20 cm × ca. 10 mm, usually surrounded by smaller secondary spikes terminating axillary branches, spike primarily of 50–100 male capitula. Male capitula: involucre cup-shaped or turbinate, 3–5 mm in diam.; paleae filiform, apices expanded and pubescent; florets 15–25; corollas pale yellow or greenish yellow, 2–2.5 mm; anthers white, inflexed-subulate, bases obtuse. Female capitula few and inconspicuous, solitary or 2–5 together in sessile leafy-bracteate axillary clusters on nodes beneath male part of spike; floret 1. Bur ± obovoid, 3–4 mm (including beak), 2–3 mm wide including blunt spines, spines 0.5–0.8 mm and thick, body rounded and coarsely reticulate above spines, beak tapering, 0.7–1 mm.

Recently naturalized in Taiwan [native to temperate North America and parts of South America].

The occurrence of this species in Taiwan was first reported by Y. H. Tseng and C. I Peng (Endemic Sp. Res. 6: 71–74. 2004).

**234. PARTHENIUM Linnaeus, Sp. Pl. 2: 988. 1753.**

银胶菊属 yin jiao ju shu

Annuals, biennials, perennials, subshrubs, or shrubs. Stems erect, usually branched. Leaves usually cauline, sometimes in rosettes, alternate, petiolate or sessile; blade elliptic, lanceolate, linear, lyrate, oblanceolate, obovate, ovate, orbicular-deltate, or spatulate, sometimes pinnately (1 or)2-lobed, both surfaces usually hairy and gland-dotted (at least abaxial), ultimate margin entire or toothed. Capitula usually radiate, sometimes ± disciform; involucre hemispheric; phyllaries deciduous, 2-seriate, outer 5(–8) herbaceous to scarious, inner 5–8 scarious to membranous; receptacle flat to conical; paleae cuneate to flabelliform, scarious or membranous, distally papillate and/or fimbriate, all or peripheral each ± enfolding a disk floret. Ray female florets 5(–8), fertile; corollas ochroleucous, tubes stout, glandular. Disk florets functionally male; corollas ochroleucous, funnelform, lobes 5. Achenes oblanceolate, obovate, or pyriform, often obcompressed; pappus absent.  $x = 9$ .

About 16 species: North America to South America, including the Caribbean; one species (introduced) in China.

*Parthenium argentatum* A. Gray is cultivated in China.

See Rollins, Contr. Gray Herb. 172: 1–73. 1950.

**1. *Parthenium hysterophorus* Linnaeus, Sp. Pl. 2: 988. 1753.**

银胶菊 yin jiao ju

Herbs, annual, 30–120 cm tall. Leaf blade ovate to elliptic, 3–18 × 1–5(–9) cm, pinnately (1 or)2-lobed, ultimate lobes lanceolate to linear, 3–50 × 2–15 mm, both surfaces sparsely to densely scaberulose and gland-dotted. Synflorescences of open panicles. Capitula obscurely radiate; peduncles 1–8(–15+) mm; outer phyllaries 5(or)6, elliptic-lanceolate, 2–4 mm, inner

5(or)6 ovate to orbicular, 2.5–4 mm. Female florets 5(or)6; corolla limbs reniform or orbicular to oblong, 0.3–1 mm. Disk florets 12–30(–60). Achenes obovoid, 1.5–2(–3.5) mm; pappuslike enations erect, deltate to ovate, 0.5–1 mm. Fl. Apr–Aug.  $2n = 34$ .

Fields, roadsides; below 1500 m. Guangdong, Guangxi, Guizhou, Yunnan [native to tropical America; a widely introduced weed in the tropics].

**235. GAILLARDIA** Fougereux, *Observ. Phys.* 29: 55. 1786 [“*Gaillarda*”].

天人菊属 *tian ren ju shu*

Annuals, perennials, or subshrubs. Stems usually erect, usually branched. Leaves petiolate or sessile; leaf blade entire to pin-natifid, sometimes semisucculent. Capitula terminal or axillary, solitary, radiate or discoid; involucre hemispheric to broadly hemispheric; phyllaries persistent, in 2 or 3 or more series, subequal, herbaceous or papery; receptacle convex to hemispheric, densely setose. Ray florets usually neuter, rarely female and fertile or styliferous and sterile; corolla yellow to white or orange to red, purplish, or brown, often bicolored. Disc florets bisexual, fertile; corolla yellow or orange to red, purplish, or brown; tube much shorter than throat; throat ampliate, campanulate to cylindrical, or urceolate; lobes 5, broadly deltate or ovate. Achenes obpyramidal to clavate, sparsely to densely hairy; pappus usually persistent, of 6–12 medially thickened, laterally scarious scales in 1 or 2 series, rarely of linear scales with erose margins.

Twenty species: North and South America; one species (introduced) in China.

See Biddulph, *Res. Stud. State Coll. Washington* 12: 195–256. 1944.

*Gaillardia amblyodon* J. Gay and *G. aristata* Pursh are cultivated in China.

**1. *Gaillardia pulchella*** Fougereux, *Hist. Acad. Roy. Sci. Mém. Math. Phys.* (Paris, 4to). 1786: 5. 1788.

天人菊 *tian ren ju*

Herbs, annual, 10–60 cm. Leaves cauline, sessile to subsessile; blade linear, oblong, or spatulate, 5–10 cm × 4–12(–35) mm, densely strigillose or hirtellous to ± villous, margin usually entire, sometimes toothed or lobed. Phyllaries 18–28, narrowly triangular-attenuate to linear-attenuate, 6–14 mm, margin usually ciliate with jointed hairs. Receptacular setae 1.5–3 mm.

Ray florets usually 8–14; corolla usually reddish to purplish proximally, yellow to orange distally, rarely yellow, reddish, or purplish throughout, 13–30 mm. Disk florets numerous; corolla yellowish to purple or brown, often bicolored; tube 0.8–1.2 mm; throat campanulate to urceolate, 3–4 mm; lobes deltate to ovate, often attenuate. Achenes obpyramidal, 2–2.5 mm; hairs 1.5–2 mm, inserted at base and on angles; pappus of 7 or 8 deltate to lanceolate, aristate scales 4–7 mm. Fl. May–Aug.  $2n = 34$ .

Widely cultivated and naturalized in China [native to North America].