

VIOLACEAE

堇菜科 jin cai ke

Chen Yousheng (陈又生)¹, Yang Qiner (杨亲二)¹; Hideaki Ohba², Vladimir V. Nikitin³

Herbs annual or perennial, shrubs, or subshrubs, sometimes scandent, rarely small trees. Leaves simple, usually alternate, sometimes opposite, with small or leaflike stipules, petiolate, margin entire, serrate, or dissected. Flowers bisexual or unisexual, rarely polygamous, actinomorphic or zygomorphic, solitary or in axillary or terminal, spicate, paniculate, or racemose inflorescences, 2-bracteolate, sometimes cleistogamous. Sepals 5, equal or unequal, imbricate, persistent. Petals 5, imbricate or convolute, unequal, anterior one usually larger than others, saccate, gibbous or spurred at base. Stamens 5; anthers erect, free or connivent or connate, connectives often dilated into membranous appendages; filaments very short or absent, anterior 2 stamens with spurlike nectary at base. Ovary superior, 1-loculed, 3–5-carpelled, syncarpous, with 3–5 parietal placentae each with 1 to many anatropous ovules; style simple; stigmas variously shaped. Fruit a loculicidal capsule, usually with elastic and abaxially carinate valves, rarely baccate. Seeds often carunculate; testa hard, nitid, often with oily bodies, sometimes alate; endosperm copious, fleshy; embryo erect.

Twenty-two genera and 900–1000 species: worldwide, but particularly in tropical regions; three genera and 101 species (36 endemic, three introduced) in China.

Wang Chingrui. 1991. Violaceae. Fl. Reipubl. Popularis Sin. 51: i–v, 1–148.

- 1a. Shrubs or trees; inflorescences mostly more than 5-flowered; flowers actinomorphic, not spurred, not cleistogamous 1. *Rinorea*
- 1b. Herbs or subshrubs; inflorescences 1–3-flowered; flowers distinctly zygomorphic (lowest petal spurred), or cleistogamous.
 - 2a. Subshrubs; sepals basally not auriculate 2. *Hybanthus*
 - 2b. Herbs; sepals basally auriculate 3. *Viola*

1. RINOREA Aublet, Hist. Pl. Guiane, 235. 1775, nom. cons.

三角车属 san jiao che shu

Conohoria Aublet.

Shrubs or small trees. Leaves alternate, rarely opposite, margin entire or serrate; stipules deciduous. Inflorescences axillary or terminal, racemose, paniculate, or sometimes cymose, rarely flowers solitary. Flowers bisexual, actinomorphic, small. Sepals subequal, leathery. Petals equal or subequal, not spurred. Filaments free or ± connate, inserted inside at top of disk; connectives dilated abaxially from base or from apex into thin, scarious appendages exceeding anthers. Disk circular, slightly 5-lobed. Ovary ovoid, with few or numerous ovules; styles erect; stigmas terminal, not divided. Capsule usually 3-valved, rarely 2-valved. Seeds few, ellipsoid, glabrous or pubescent.

About 340 species: tropical Africa, tropical America, and tropical Asia; four species (one endemic) in China.

- 1a. Disk 5-lobed; stigmas slightly 3-lobed; stamens without filaments, connectives with granular scales 4. *R. virgata*
- 1b. Disk dilated and circular; stigmas not divided; stamens with filaments, connectives without abaxial scales.
 - 2a. Appendages at top of connectives narrowly triangular, less than 1 mm, anthers lanate at base adaxially, apex barbate; stipules later deciduous; petioles 2–5 mm 3. *R. erianthera*
 - 2b. Appendages at top of connectives not narrowly triangular, anthers without cushionlike tomentum at base adaxially, apex not barbate; stipules caducous; petioles 7–12 mm.
 - 3a. Leaf veins raised on both surfaces, very conspicuous; pedicels to 1 cm; fruit small, less than 1 cm; seeds with brown dots 1. *R. bengalensis*
 - 3b. Leaf veins slightly raised abaxially, not very conspicuous; flowers subsessile; fruit large, ca. 2 cm; seeds creamy-white 2. *R. longiracemosa*

1. *Rinorea bengalensis* (Wallich) Kuntze, Revis. Gen. Pl. 1: 42. 1891. *glandulosa* Merrill (1928), not Merrill (1917); *R. wallichiana* (J. D. Hooker & Thomson) O. Kuntze.

三角车 san jiao che

Alsodeia bengalensis Wallich, Trans. Med. Soc. Calcutta 7: 224. 1835; *A. wallichiana* J. D. Hooker & Thomson; *Rinorea*

Shrubs or small trees, 1–5 m tall. Young branches with conspicuous leaf scars, greenish, glabrous or with very few hairs; old branches dark brown. Leaves alternate, old ones subleathery, slightly nitid; stipules lanceolate, 1–1.7 cm, apex

¹ Institute of Botany, Chinese Academy of Sciences, 20 Nanxincun, Xiangshan, Beijing 100093, People's Republic of China.

² University of Tokyo, 7–3–1 Hongo, Bunkyo-ku, Tokyo, Tokyo 113–0033, Japan.

³ V. L. Komarov Botanical Institute, Prof. Popov Street 2, 197376 Saint Petersburg, Russia.

acuminate, fugacious, scar circular; petiole 5–12 mm, glabrous; leaf blade elliptic-lanceolate or elliptic, (2.5–)5–12(–17) × 1.5–6 cm, veins raised on both sides, lateral veins alternate, 6–9-paired, veinlets reticulate, dense and conspicuous, base cuneate, rarely subrounded, margin serrulate, remotely toothed near base or subentire, apex acuminate. Flowers white, in axillary contracted racemes; peduncles absent; pedicel to 1 cm, slightly yellow tomentose. Sepals broadly lanceolate, ca. 2 mm, abaxially yellow-brown tomentose. Petals ovate-oblong, ca. 5 mm, apex recurved. Stamens with short filaments; anthers 2-loculed, oblong, longitudinally dehiscent, appendages at top of connectives broadly ovate. Capsule subglobose, 3-valved. Seeds broadly ovoid, glaucous, with brown dots. Fl. Apr–May and Oct, fr. Sep. $2n = 16$.

Thickets, dense forests; below 600 m. SW Guangxi, Hainan [India, Malaysia, Myanmar, Sri Lanka, Thailand, Vietnam; NW Australia].

2. *Rinorea longiracemosa* (Kurz) Craib, Fl. Siam. 1: 90. 1925.

短柄三角车 duan bing san jiao che

Alsodeia longiracemosa Kurz, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 39(2): 63. 1870.

Shrubs or small trees, 1–2 m tall. Young branches inconspicuously cicatricate, yellow-brown tomentose; old branches gray-white, glabrous. Leaves alternate; stipules dark brown, narrowly lanceolate or subulate, ca. 4 mm, slightly hairy, fugacious; petiole ca. 7 mm, yellow-brown puberulous when young, sparsely puberulous when old; leaf blade elliptic or elliptic-lanceolate, (7–)12–14(–16) × (1.5–)3.5–4.5(–6) cm, glabrous, veins not very conspicuous, slightly raised abaxially, midvein yellow-brown hairy near base, margin remotely serrate, teeth denser in upper half, apex caudate or long acuminate. Flowers glaucous, subsessile, in axillary contracted-racemes. Sepals 5, persistent, subtriangular. Corolla campanulate; petals 5, persistent, subequal, elliptic. Stamens with short filaments. Capsule subglobose, ca. 2 cm. Seeds creamy-white, subglobose. Fl. unknown, fr. May.

Lowland primary or secondary forests; below 1000 m. Hainan (Lingshui) [Cambodia, Indonesia, Laos, Malaysia, Myanmar, Thailand, Vietnam].

In FRPS (51: 4. 1991), the name *Rinorea sessilis* (Loureiro) Kuntze was misapplied to this species.

Rinorea longiracemosa is very rare in China.

3. *Rinorea erianthera* C. Y. Wu & Chu Ho, Acta Bot. Yunnan. 1(1): 149. 1979.

毛蕊三角车 mao rui san jiao che

Shrubs deciduous, 2–3 m tall. Young branchlets yellow-brown, puberulous; old ones purplish brown, glabrous, dotlike lenticellate. Leaves on long branches of current year larger and sparse; leaves on short branches of previous year smaller and

clustered, petioles and stipules puberulous when young; stipules deciduous, narrowly triangular-lanceolate, subequaling petioles; petiole very short, 2–5 mm; leaf blade yellow-green, rhombic-elliptic to obovate-elliptic, 1.5–6.5 × 0.6–2.5 cm, membranous, base cuneate, margin serrulate, apex acute to shortly acuminate. Flowers 1–3 in cymes, axillary in long branches; pedicels 1–1.5 cm, slender, hairy, with 2 bracteoles less than 1 mm at middle or below. Sepals 5, yellow-green, 4.5–6 × 2–5.5 mm, imbricate; outer 3 suborbicular, densely veined, apex apiculate; inner 2 elliptic, inconspicuously veined, hairy abaxially, margin ciliate. Petals 5, white, brownish when dry, narrowly lanceolate, 9–11 × 1.5–2 mm, hairy above middle abaxially, margin ciliate, reflexed after anthesis. Stamens yellowish white, ca. 9 mm; filaments linear, 2.5–3.5 mm; anthers linear, equaling or slightly exceeding filaments, lanate at base adaxially, thecae acuminate at apex, barbate, appendages at top of connectives narrowly triangular, less than 1 mm. Ovary narrowly globose, 3–5-angled; styles straight or curved, slender. Seeds (immature) brown, orbicular-reniform, compressed-flat, smooth, not nitid. Fl. Jun–Jul, fr. unknown.

• Thickets; ca. 1300 m. SW Sichuan (Jinyang).

4. *Rinorea virgata* (Thwaites) Kuntze, Revis. Gen. Pl. 1: 42. 1891.

鳞隔堇 lin ge jin

Scyphellandra virgata Thwaites, Enum. Pl. Zeyl. 21. 1858; *Alsodeia virgata* (Thwaites) J. D. Hooker & Thomson; *Rinorea pierrei* (H. Boissieu) Melchior; *S. pierrei* H. Boissieu.

Shrubs erect, ca. 1 m tall. Young branches puberulous; old ones gray-white, glabrous. Lower leaves often 2- or 3-clustered, upper ones alternate; stipules small, shorter than petioles, lanceolate or subtriangular, slightly raised abaxially, pubescent; petiole short, ca. 3 mm, tomentose; leaf blade ovate or elliptic, highly variable in size, (1.5–)3–4(–5) × (0.8–)1.5–2(–2.5) cm, veins slightly raised, slightly puberulous, margin serrulate, apex obtuse or ± acute. Flowers small, unisexual, actinomorphic, axillary, solitary or clustered. Staminate flowers: pedicels ca. 5 mm, slender, slightly hairy or glabrous; sepals 5, subtriangular, shortly hairy; petals 5, oblong, outside slightly hairy, apex acuminate; stamens subequaling petals, anthers 2-thecate, longitudinally dehiscent, connectives yellow, subulate; ovary reduced. Pistillate flowers: pedicels ca. 3 mm, glabrous, with 3 or 4 subtriangular bracteoles at base; sepals persistent, subtriangular, margin ciliolate; petals oblong, outside slightly hairy; stamens reduced, connectives lanceolate, conspicuous, anthers absent; ovary ovoid-orbicular, glabrous, styles erect, stigmas capitate, 3-lobed. Capsule oblong, 3-valved, rarely 2-valved, apex caudate. Fl. spring–summer, fr. summer–autumn.

Forest margins, thickets; below 600 m. Hainan [Laos, Myanmar, Sri Lanka, Thailand, Vietnam].

2. HYBANTHUS Jacquin, Enum. Syst. Pl. 2, 17. 1760, nom. cons.

鼠鞭草属 shu bian cao shu

Small shrubs [or herbs]. Leaves alternate, ± sessile; stipules in pairs, small; leaf blade narrowly elliptic to almost needle-shaped, margin entire to incised. Flowers axillary, bisexual, zygomorphic, solitary, with a pair of bracteoles at joint of peduncle and pedicel.

Sepals persistent, ± triangular, nearly equal, margin entire, without appendages at base. Petals unequal, posterior ones straight and small, anterior one extended into a lip, with a short spur at base. Stamens connivent around gynoecium; filaments free, short; anthers 2-celled, with a distinct membranous connective appendage, lower two with a patent gland at base. Ovary: ovules numerous, on 3 parietal placentas; style simple, geniculate at base, conspicuously clavate, with an anterior opening stigmatic cavity. Fruit a 3-valved capsule, subglobose, valves leathery. Seeds numerous, ellipsoid, with longitudinal ribs.

About 150 species: chiefly in tropical and subtropical regions of the world; one species in China.

1. *Hybanthus enneaspermus* (Linnaeus) F. Mueller, Fragm. 10: 81. 1876.

鼠鞭草 shu bian cao

Viola enneasperma Linnaeus, Sp. Pl. 2: 937. 1753; *Hybanthus suffruticosus* (Linnaeus) Baillon; *Ionidium enneaspermum* (Linnaeus) Ventenat; *I. suffruticosum* (Linnaeus) Gingins; *V. suffruticosa* Linnaeus.

Subshrubs, with a long, slender tap root. Stems numerous, procumbent, usually 10–20 cm tall, rarely to 40 cm. Young branches canaliculate, ± puberulous. Leaves alternate, sessile or subsessile; stipules greenish, triangular or subulate, very small, ciliate; leaf blade linear-lanceolate, linear-oblong, or narrowly spatulate, unequal in size, 0.5–3.5 × 0.2–0.5 cm, midvein slightly raised abaxially, lateral veins inconspicuous, base cuneate, decurrent, margin entire, sparsely 1–3-serrulate, apex acute, rarely acuminate, mucronulate. Flowers solitary in leaf axils,

blue-purple; pedicels not exceeding leaves, 2-bracteolate near flower; bracteoles opposite, lanceolate or subtriangular, membranous, ciliate. Sepals subequal, lanceolate, 2–3 mm, margin membranous, white, ciliate. Petals irregular, upper 2 smallest, oblong, apex acute, lateral 2 ovate-orbicular, apex slightly recurved, lower 1 largest, 6–7 mm, ca. 2 × as large as others, anterior half broadest, 2 lateral sides incurved, more deeply colored, shortly spurred. Stamens free; filaments short, 2 with curved calcarlike (spurlike) appendages; anthers longitudinally dehiscent, appendages at top of connectives yellow-brown, membranous. Ovary subglobose; styles clavate, base dilated, slightly curved in upper narrow part; stigmas slightly incurved. Capsule pendulous, globose. Seeds creamy-yellow, ovoid-orbicular, conspicuously longitudinally striate. Fl. Jun–Jul, fr. Jul–Aug. $2n = 16^*$.

Thickets along river banks, open grasslands, sandy places near seashores; below 500 m. S Guangdong, Hainan, S Taiwan [tropical Africa, tropical Asia, Australia].

3. *VIOLA* Linnaeus, Sp. Pl. 2: 933. 1753.

堇菜属 jin cai shu

Herbs perennial or biennial, rarely subshrubs, rhizomatous. Stem developed or absent, sometimes with creeping branches. Leaves simple, alternate or basal, margin entire, dentate, or dissected; stipules small or large, leaflike, free or ± adnate to petioles. Flowers bisexual, zygomorphic, solitary, often dimorphic (cleistogamous flowers later than chasmogamous ones); pedicels axillary, 2-bracteolate. Sepals slightly equal, usually basally auriculate. Petals unequal, anterior petal largest and basally spurred. Filaments free, very short; anthers free or mostly connivent into a sheath around ovary, 2 anterior ones with spurlike or wartlike and nectariferous appendages at base, these extending into anterior spur, connectives produced apically into conspicuous, membranous appendages. Ovary 3-carpelled, with many ovuled parietal placentae; styles nearly erect or usually ± curved downward, ± thickened or sometimes gradually tapering toward apex, entire or variously appendaged; style apex and stigma variously shaped. Capsule loculicidally and elastically 3-valved, valves carinate and abaxially thickened. Seeds globose-ovoid, arillate or not, usually smooth; endosperm abundant; embryo straight; cotyledons rather thick, plano-convex.

About 550 species: cosmopolitan, chiefly in temperate regions of the N hemisphere; 96 species (35 endemic, three introduced) in China.

The identity of *Viola curvicalcarata* W. Becker & H. Boissieu (Bull. Herb. Boissier, sér. 2, 8: 740. 1908), described from Shaanxi, cannot be ascertained in this treatment because we have not seen any specimens of it.

- 1a. Anterior petal shallowly saccate but not spurred; stipules free and small; flowers white to violet 5. *V.* subg. *Erpetion*
 1b. Anterior petal spurred; stipules adnate or free; flowers violet, purple, rose, yellow, or white.
 2a. Stipules large, free, leaflike, deeply lobed; anterior petal broadly cuneate, with aerial stem 4. *V.* subg. *Melanium*
 2b. Stipules small, entire or fimbriate; anterior petal narrowly ovate to linear-oblong, with or without aerial stem.
 3a. Flowers purple or white, never yellow; style beaked at apex; stipules adnate or free; plant with or without aerial stem 1. *V.* subg. *Viola*
 3b. Flowers yellow, never purple; style not beaked at apex; stipules free; plant with aerial stem.
 4a. Lateral petals and stigmas beardless; stigmas bilobed; spur short or long 2. *V.* subg. *Dischidium*
 4b. Lateral petals and stigmas bearded; stigmas capitate; spur very short 3. *V.* subg. *Chamaemelianum*

1. *Viola* subg. *Viola*

堇菜亚属 jin cai ya shu

Plant with or without aerial stem. Stipules adnate to petioles or free. Flowers violet, purple, pink or white. Anterior petal spurred. Style bearded at apex.

About 185 species: mainly in the N hemisphere, occasionally in Oceania; 78 species (27 endemic) in China.

- 1a. Plants with or rarely without aerial stem in young plants; stipules free (except in *V. moupinensis*).
- 2a. Leaves, stipules, and capsules without brown glandular dots; margins of stipules usually entire or remotely denticulate.
 - 3a. Cauline leaves cordate or reniform.
 - 4a. Cauline leaves basally shallowly cordate; stipules brown, margin entire; flowers violet; fruit 10–14 mm 1. *V. mirabilis*
 - 4b. Cauline leaves basally usually deeply cordate; stipules green, margin entire or dentate; flowers usually white or purplish; fruit 6–8 mm 2. *V. arcuata*
 - 3b. Cauline leaves ovate to triangular, oblong-triangular, triangular-cordate, or ovate-cordate.
 - 5a. Cauline leaves ovate-lanceolate, base rounded or shallowly cordate 3. *V. henryi*
 - 5b. Cauline leaves triangular, base shallowly hastate, cordate, or truncate.
 - 6a. Cauline leaves basally hastate, shallowly cordate, or subtruncate; stipules leaflike, 1.5–4 cm 4. *V. raddeana*
 - 6b. Cauline leaves basally cordate or truncate; stipules less than 1 cm 5. *V. triangulifolia*
- 2b. Leaves, stipules, and capsules with brown glandular dots on both sides; margins of stipules usually fimbriate-laciniate or fimbriate-serrate.
 - 7a. Cauline leaves lanceolate.
 - 8a. Cauline leaves lanceolate or ovate-lanceolate, base truncate or rounded; lower and middle stipules subequaling or shorter than petioles, upper ones exceeding petioles 6. *V. montana*
 - 8b. Cauline leaves lanceolate or broadly lanceolate, base cuneate; lower stipules membranous, elliptic-lanceolate, base amplexicaul, margin usually remotely serrulate, upper ones lanceolate, apex acute, adnate to petiole at base, margin usually pinnatifid 7. *V. websteri*
 - 7b. Cauline leaves cordate, ovate-cordate, triangular-ovate, or ovate.
 - 9a. Basal leaves absent at anthesis 8. *V. acuminata*
 - 9b. Basal leaves present at anthesis.
 - 10a. Cauline leaves triangular-ovate, base broadly cuneate or truncate, decurrent to petiole 9. *V. stewardiana*
 - 10b. Cauline leaves orbicular-cordate, triangular-cordate, ovate-cordate, ovate, or reniform, base \pm cordate.
 - 11a. Cauline leaves orbicular-cordate or reniform, apex acute to rounded.
 - 12a. Plant puberulous; auricles of sepals 0.5–1.5 mm; lateral petals bearded 10. *V. rupestris*
 - 12b. Plant glabrous; auricles of sepals 2–3 mm; lateral petals glabrous 11. *V. sacchalinensis*
 - 11b. Cauline leaves triangular-ovate, triangular-cordate, or narrowly ovate-cordate, apex acute to acuminate.
 - 13a. Spur 6–8 mm 12. *V. grypoceras*
 - 13b. Spur 2–3 mm.
 - 14a. Lateral petals beardless; margin of leaf blade crenate 16. *V. obtusa*
 - 14b. Lateral petals bearded; margin of leaf blade serrulate.
 - 15a. Rhizome short 13. *V. kosanensis*
 - 15b. Rhizome stout and long.
 - 16a. Rhizome very stout and very long; leaves relatively larger, usually glabrous, base truncate or slightly cordate; capsule large 14. *V. pendulicarpa*
 - 16b. Rhizome densely noddied; leaves relatively smaller, pubescent, base cordate; capsule very small 15. *V. serrula*
 - 1b. Plants usually without aerial stem; stipules free or adnate to petioles at base.
 - 17a. Capsules nearly globose, puberulous, rarely glabrous; peduncle prostrate when mature.
 - 18a. Plant without stolons.
 - 19a. Leaf blade broadly ovate or orbicular, to 8 cm; margin of stipules remotely fimbriate-denticulate; flowers blue-purple with white throat 20. *V. collina*
 - 19b. Leaf blade oblong-ovate, rarely orbicular, to 6 cm; margin of stipules shortly fimbriate; flowers blue to deep purple 21. *V. hirta*
 - 18b. Plant with stolons.
 - 20a. Stolons underground; flowers fragrant 17. *V. odorata*
 - 20b. Stolons aerial.
 - 21a. Leaf blade cordate, apex acuminate, margin obtusely dentate; sepals lanceolate, base auricles 2–2.5 mm; lateral petals bearded 18. *V. pilosa*
 - 21b. Leaf blade broadly ovate or reniform, apex rounded, margin crenate; sepals ovate, base auricles ca. 1 mm; lateral petals usually glabrous 19. *V. hondoensis*
 - 17b. Capsules oblong to ellipsoid, glabrous; peduncle erect.
 - 22a. Plant with underground stolons.

- 23a. Plant with bulbs 22. *V. bulbosa*
 23b. Plant without bulbs.
 24a. Rhizome slender; leaves small, reniform, apex rounded 23. *V. epipsiloides*
 24b. Rhizome slightly stout; leaves large, cordate, apex acuminate 25. *V. diamantiaca*
- 22b. Plant without underground stolon.
 25a. Plant with aerial stolons.
 26a. Spur 5–7 mm 29. *V. formosana*
 26b. Spur less than 2 mm.
 27a. Leaves on stolons usually rosette; stipules mostly free; lower petal the shortest, apex acute.
 28a. Leaves basally conspicuously decurrent to petioles 26. *V. diffusa*
 28b. Leaves nearly wingless.
 29a. Bracteoles linear 28. *V. lucens*
 29b. Bracteoles lanceolate, 5–7 mm, minutely ciliate 31. *V. nagasawae*
- 27b. Stolons elongated, with scattered leaves; stipules nearly free; lower petal usually equaling others, apex rounded.
 30a. Stipules usually entire; sepals broad ovate, ca. 5 × 3 mm 27. *V. grandisepala*
 30b. Stipules fimbriate; sepals lanceolate, much narrower.
 31a. Leaf blade distinctly spinose on margin.
 32a. Leaf blade margin conspicuously spinose at apices of teeth 37. *V. mucronulifera*
 32b. Leaf blade margin shortly spinose in between teeth 33. *V. kwangtungensis*
- 31b. Leaf blade without spines on margin.
 33a. Leaf blade orbicular or nearly orbicular, apex rounded, margin crenate.
 34a. Rhizome usually long, nodes elongated; lateral petals bearded 30. *V. davidii*
 34b. Rhizome densely noded; lateral petals glabrous.
 35a. Leaf blade adaxially scabrous, sparsely puberulous 34. *V. duclouxii*
 35b. Leaf blade adaxially shining, glabrous 32. *V. sikkimensis*
- 33b. Leaf blade cordate, apex acuminate or acute, margin crenate-serrate.
 36a. Rhizome short, densely noded; petioles usually longer than leaf blade 36. *V. fargesii*
 36b. Rhizome long and thick, nodes elongated.
 37a. Leaves, petioles, and pedicels densely hirsute; sepals puberulous; petiole usually shorter than leaf blade, leaf blade oblong or oblong-ovate, apex acute or acuminate; lateral petals beardless 35. *V. yunnanensis*
 37b. Leaf blade glabrous or sparsely puberulous; petioles, pedicels, and sepals glabrous, or sometimes petioles ± puberulous.
 38a. Leaf blade glabrous; sepals ovate, 2–2.5 mm wide 40. *V. nuda*
 38b. Leaf blade ± puberulous; sepals lanceolate, 1.2–1.8 mm wide.
 39a. Leaves not glandular; bracteoles 10–13 mm; flowers violet, purplish, or white; lateral petals bearded 38. *V. thomsonii*
 39b. Leaves and capsules dotlike brown glandular; bracteoles 3–8 mm; flowers purple to light purple; lateral petals glabrous 39. *V. sumatrana*
- 25b. Plant without aerial stolons (except in *V. moupinensis*).
 40a. Stipules free; rhizome distinctly thick, densely noded, with numerous brown rootlets at nodes.
 41a. Leaves all basal, puberulous; stipules small, 5–8 mm 41. *V. rossii*
 41b. Aerial stems usually present, with leaves and fruits at apex; leaves usually glabrous; stipules large, 1–1.8 cm 42. *V. moupinensis*
- 40b. Stipules ± adnate to petioles.
 42a. Leaf blade multi-lobed, dissected, or incised.
 43a. Leaf blade palmately 5-lobed 43. *V. dactyloides*
 43b. Leaf blade dissected, divided, or incised.
 44a. Sepals smaller, auricles less than 2 mm; stipules smaller.
 45a. Petals pinkish or pinkish white, lower petal apex acute; leaf usually deeply divided 44. *V. dissecta*
 45b. Petals blue violet or white, lower petal apex obtuse; leaf blade margin incised or slightly divided 47. *V. forrestiana*
- 44b. Sepals 10–14 mm, auricles 4–6 mm, apex dentate; stipules larger.
 46a. Stipules ca. 1/2 adnate to petioles 46. *V. albida*
 46b. Stipules over 1/2 adnate to petioles.
 47a. Leaf blade usually pinnatifid; stipules ca. 1/2 adnate to petioles, the free part ca. 8 mm; petals white, creamy-white or light purplish 45. *V. chaerophylloides*

- 47b. Leaf blade usually undivided, margin distinctly coarsely serrate; stipules mostly adnate to petioles, the free part 2–5 mm; petals light pink or bluish purple 55. *V. magnifica*
- 42b. Leaves simple, margin crenate or serrate.
- 48a. Roots dark brown or black; leaf base usually decurrent to petiole.
- 49a. Leaf blade not decurrent to petioles 68. *V. lactiflora*
- 49b. Leaf blade distinctly decurrent to petioles.
- 50a. Roots black; petioles not obvious or very short when young 48. *V. gmeliniana*
- 50b. Roots dark brown; petioles usually much longer than blades.
- 51a. Spur 5–10 mm; flowers violet, rarely white 49. *V. mandshurica*
- 51b. Spur shorter than 3 mm; flowers white 50. *V. patrinii*
- 48b. Roots yellowish to grayish white; leaf base usually not decurrent to petiole.
- 52a. Spur more than 4 mm.
- 53a. Rhizome short, thick, leaves in summer prominently larger than those in spring.
- 54a. Leaf blade lanceolate, margin shallowly crenate, base distinctly decurrent to petiole 63. *V. philippica*
- 54b. Leaf blade ovate, margin serrate or deeply crenate, base not decurrent to petiole.
- 55a. Stipules densely sericeous 69. *V. hirtipes*
- 55b. Stipules glabrous or shortly pubescent.
- 56a. Lateral petals glabrous or sparsely bearded.
- 57a. Leaf blade base usually truncate or slightly cordate; lateral petals usually glabrous 76. *V. prionantha*
- 57b. Leaf blade usually distinctly cordate.
- 58a. Leaf apex usually acuminate; stipules ca. 1/2 adnate to petioles; petals white or light violet; spur 4–5 mm 66. *V. belophylla*
- 58b. Leaf apex usually obtusely acute; stipules ca. 2/3 adnate to petioles; petals light purplish or whitish violet; spur 5–9 mm 77. *V. japonica*
- 56b. Lateral petals distinctly bearded.
- 59a. Petals usually violet or red-purple.
- 60a. Ovary pubescent 70. *V. phalacrocarpa*
- 60b. Ovary glabrous.
- 61a. Leaves and pedicels usually glabrous 74. *V. macroceras*
- 61b. Leaves and pedicels usually pubescent 61. *V. tienschiensis*
- 59b. Petals usually white, rarely pinkish white.
- 62a. Rhizome usually dark brown and very thick 64. *V. mongolica*
- 62b. Rhizome yellowish white, slender.
- 63a. Bracteoles ciliate 56. *V. sphaerocarpa*
- 63b. Bracteoles glabrous.
- 64a. Sepal and stipules and fruit (ca. 6 mm) smaller; leaf abaxially glabrous 67. *V. pekinensis*
- 64b. Sepal and stipules and fruit (ca. 10 mm) larger; leaf abaxially pubescent 65. *V. hancockii*
- 53b. Rhizome short, thin, leaves in summer nearly the same size as those in spring.
- 65a. Leaf blade apex rounded.
- 66a. Leaf blade orbicular to reniform, adaxially distinctly white variegated along veins, abaxially red-purple 52. *V. variegata*
- 66b. Leaf blade orbicular to ovate, adaxially green or variegated along veins, abaxially green 53. *V. tenuicornis*
- 65b. Leaf blade apex acute.
- 67a. Plants without underground stolons; leaves usually glabrous, lateral petals usually glabrous 73. *V. violacea*
- 67b. Plants usually with underground stolons; leaves pubescent.
- 68a. Lateral petals glabrous; leaf blade orbicular-ovate to ovate 71. *V. selkirkii*
- 68b. Lateral petals sparsely pubescent; leaf blade triangular-ovate to narrowly ovate 72. *V. tokubuchiana*
- 52b. Spur less than 3 mm.
- 69a. Leaf blade orbicular or suborbicular; rhizome very densely noded.
- 70a. Lateral petals bearded; spur narrow 51. *V. striatella*
- 70b. Lateral petals usually glabrous; spur broad 24. *V. brachyceras*
- 69b. Leaf blade ovate, oblong, elliptic, triangular or cordate; rhizome relatively sparsely noded.
- 71a. Leaf blade ovate or cordate.
- 72a. Lateral petals bearded 75. *V. yunnanfuensis*
- 72b. Lateral petals glabrous 62. *V. senzanensis*
- 71b. Leaf blade elliptic, oblong or triangular.
- 73a. Leaf blade base truncate or cordate; stipules brownish.

- 74a. Leaves triangular-lanceolate, base truncate, usually distinctly decurrent to petiole; spur short 59. *V. betonicifolia*
- 74b. Leaves triangular-ovate, base cordate or truncate, slightly or not decurrent to petiole; sepal auricles usually distinct, spur slender 57. *V. inconspicua*
- 73b. Leaf blade base rounded or cuneate; stipules whitish.
- 75a. Lateral petals glabrous.
- 76a. Leaves glabrous, margin entire or sparsely and shallowly crenate 54. *V. kunawarensis*
- 76b. Leaves pubescent, margin crenate 78. *V. perpusilla*
- 75b. Lateral petals distinctly bearded.
- 77a. Upper petals bearded 60. *V. trichopetala*
- 77b. Upper petals glabrous 58. *V. cuspidifolia*

1. *Viola mirabilis* Linnaeus, Sp. Pl. 2: 936. 1753.

奇异堇菜 qí yì jīn cài

Viola brachysepala Maximowicz; *V. mirabilis* var. *brachysepala* (Maximowicz) Regel; *V. mirabilis* var. *brevicalcarata* Nakai; *V. mirabilis* var. *glaberrima* W. Becker; *V. mirabilis* f. *latisepala* W. Becker; *V. mirabilis* var. *platysepala* Kitagawa; *V. mirabilis* var. *subglabra* Ledebour.

Herbs perennial, acaulescent before anthesis, later gradually caulescent, 6–23 cm tall. Rhizome erect or oblique, to 4 cm, 3–7 mm in diam., conspicuously noded, much branched in upper part, with dense brown or red-brown remains of scalelike stipules; roots numerous, brown, harder when dry. Stem erect, puberulous or glabrous, with only 1 leaf at middle, densely leaved in upper part. Stipules large; basal ones red-brown, scalelike, ovate, ca. 1 × 0.5 cm, apex obtuse or acuminate; upper ones brownish, broadly lanceolate, 0.8–1.7 × 0.3–0.5 cm, glabrous, margin entire; those of cauline leaves lanceolate, margin usually ciliate; petioles of basal leaves longer, 5–15 cm, puberulous or glabrous, narrowly winged; those of cauline leaves unequal in length, middle ones ca. 8 cm, upper ones very short or nearly absent; leaf blade broadly cordate or reniform, 3–5 × 4–6 cm, abaxially puberulous along veins, adaxially puberulous, base broadly cordate, margin shallowly crenate, often involute at anthesis, apex rounded or mucronate. Flowers purplish or violet, large; those in basal leaf axils usually not fruiting, pedicels to 10 cm, with 2 linear bracteoles in upper part; those in cauline leaf axils fruiting, pedicels short, with bracteoles at or below middle. Sepals oblong-lanceolate, ovate-lanceolate, or lanceolate, 7–16 × 2–4 mm, apex acute, basal auricles ca. 2 mm, 3-veined, margin ciliate or subglabrous, apex obtuse, outer 3 usually conspicuously longer and broader than inner 2. Petals obovate, lateral ones distinctly bearded, anterior one to 2 cm (spur included), spur robust, ca. 5 mm, usually curved upward, rarely straight, apex obtuse. Ovary glabrous; styles suberect at base or slightly curved forward, slightly thickened in upper part, slightly curved and shortly beaked at apex, not papillose; stigma hole narrow. Capsule ellipsoid, 1–1.4 cm, glabrous. Fl. May, fr. May–Aug. $2n = 20$.

Broad-leaved forests, needle-leaved and broad-leaved mixed forests, forest margins, thickets, grassy slopes; below 2000 m. Gansu, N Hebei, Heilongjiang, Jilin, Liaoning, Nei Mongol, Ningxia, Shanxi [Japan, Korea, Mongolia, Russia].

2. *Viola arcuata* Blume, Bijdr. 58. 1825.

如意草 rú yì cǎo

Viola alata Burgersdijk; *V. alata* subsp. *verecunda* (A. Gray) W. Becker; *V. amurica* W. Becker; *V. arcuata* f. *radicans* (Makino) Nakai; *V. arcuata* var. *verecunda* (A. Gray) Nakai; *V. distans* Wallich; *V. excisa* Hance; *V. hupeiana* W. Becker; *V. verecunda* A. Gray; *V. verecunda* f. *hensoaensis* Kudo & Sasaki; *V. verecunda* f. *radicans* Makino; *V. verecunda* var. *semilunaris* Maximowicz.

Herbs perennial. Rhizome procumbent, brown, ca. 2 mm in diam., with numerous fibrous roots, producing several stems or stolons. Stems usually several fasciculate, greenish, to 35 cm tall; internodes long. Stolons flexible, to 40 cm, producing adventitious roots at nodes; internodes long. Stipules green, linear, lanceolate, ovate or spatulate, 5–25 × 1–8 mm, glabrous, margin usually entire, or remotely denticulate or ciliate, apex acuminate or acute; basal leaves long petiolate, petioles 5–20 cm, narrowly winged; petioles of leaves on stem and stolon shorter; blades of basal leaves deep green, triangular-cordate or ovate-cordate, 1.5–3 × 2–5.5 cm, both surfaces usually glabrous or sparsely puberulous along veins abaxially, base usually broadly cordate, rarely deeply cordate, sinus lunate, lobes large and spreading, margin sparsely and shallowly serrate, apex acute, rarely acuminate; blades of leaves on stem and stolon similar to those of basal leaves. Flowers light purplish or white, all produced from axils of leaves on stem and stolon; pedicels long, 2-bracteolate above middle; bracteoles linear. Sepals ovate-lanceolate, ca. 4 mm, apex acute, basal auricles very short, suborbicular, margin narrowly membranous. Petals narrowly obovate, ca. 7.5 mm, lateral ones dark purple striate, inside sparsely bearded or glabrous, anterior one shorter, conspicuously dark purple striate, apex rounded; spur short, ca. 2 mm; spur of 2 anterior stamens short and stout, subequaling anthers, apex rounded. Ovary glabrous; styles clavate, base slightly geniculate, gradually thickened upward; stigmas 2-lobed, lobes thick, erect, raised in central part, shortly beaked at base in between lobes in front, beak turning upward, with a rounded stigma hole at tip. Capsule oblong, 6–8 mm, ca. 3 mm in diam., glabrous, apex acute. Seeds yellowish, ovoid, ca. 1.5 mm, ca. 1 mm in diam., with a membranous wing on one side at base. Fl. Mar–Jun. $2n = 24^*$.

Moist and marshy places, grasslands, grassy places on mountain slopes, thickets, forest margins, fields, alongside houses; usually at lower elevation, below 3000 m. Anhui, Chongqing, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, Shaanxi, Shandong, Sichuan, Taiwan, Yunnan, Zhejiang [Bhutan, India, Indonesia, Japan, Korea, Malaysia, Mongolia, Myanmar, Papua New Guinea, Nepal, Russia, Thailand, Vietnam].

In FRPS (51: 105. 1991), the name *Viola hamiltoniana* D. Don was misapplied to this species.

3. *Viola henryi* H. Boissieu, Bull. Herb. Boissier, sér. 2, 1: 1075. 1901.

巫山堇菜 wu shan jin cai

Herbs perennial, to 30–40 cm tall. Rhizome obliquely ascending or erect, to 7 cm, 2–4 mm in diam., with numerous long, slender rootlets. Stems solitary or several, erect, smooth, glabrous, leafless at base, few leaved at middle and lower parts, densely leaved at apex. Stipules green, ovate, 5–7 mm, margin fimbriate-dentate, apex acuminate; petioles 1–8 cm, those of leaves at middle and lower parts longer, usually slightly longer than or subequaling blades, those of leaves at apex conspicuously shorter than blades; blades adaxially green, ovate or ovate-lanceolate, 3.5–8 × 2–4 cm, both surfaces sparsely puberulous or subglabrous, base shallowly cordate or rounded, slightly decurrent, margin obtusely serrate, apex long acuminate. Flowers in leaf axils at apex, purplish violet; pedicels much shorter than leaves, slender, 2-bracteolate at upper part; bracteoles opposite, subulate. Sepals narrowly linear, ca. 4 × 0.7 mm, margin narrowly membranous, apex acuminate, basal auricles very short, apex truncate. Petals oblong-obovate, upper ones 1–1.2 cm × ca. 4 mm, lateral ones ca. 1.1 cm × 3 mm, glabrous, anterior one ca. 9 mm (spur included); spur shallowly saccate, 2–3 mm, ca. 2.5 mm in diam. Anthers ca. 2 mm, appendage of connectives ca. 2 mm, spur of 2 anterior stamens shortly angular, ca. 2 mm, ca. 2 mm in diam. Ovary ovoid-globose, glabrous; styles clavate, slightly geniculate forward at base; stigmas margined on lateral sides and abaxially, shortly beaked in front, beak nearly erect, with a rounded stigma hole at tip. Fl. May, fr. Jul.

• Shaded and moist places in forest understories of mountain valleys; 1200–1800 m. W Hubei, NW Hunan, E Sichuan.

4. *Viola raddeana* Regel, Bull. Soc. Imp. Naturalistes Moscou 34(2): 463. 1861.

立堇菜 li jin cai

Viola deltoidea Yatabe.

Herbs perennial, glabrous. Rhizome short, densely noded, with long, slender roots. Stems usually several fasciculate, rarely solitary, erect or obliquely ascending, ca. 30 cm tall at anthesis, elongated after anthesis, to 100 cm tall, slender, glabrous, usually simple or sometimes branched. Basal leaves withered early; stipules of cauline leaves free, leaflike, narrowly lanceolate, large, 1.5–4 cm, subequaling or exceeding petioles, glabrous, margin subentire or usually irregularly 1–3-lobed in lower part, apex slightly obtuse or acute; petioles short, 1–3 cm, narrowly winged in upper part; blades of cauline leaves oblong-triangular, 1.5–7 × 1–2 cm, both surfaces glabrous, base nearly hastate, shallowly cordate, or subtruncate, margin remotely and shallowly crenate or subentire, apex ± acute or obtuse. Flowers bluish purple, small, long pedicellate; pedicels produced from cauline leaf axils, usually not exceeding leaves, 2-bracteolate at upper part; bracteoles linear, small. Sepals lanceolate or subulate, 4–4.5 mm, apex slightly acuminate, basal auricles very short, apex truncate and remotely crenate. Petals oblong-obo-

vate, 7–8 mm, with brown glandular dots, margin slightly repand, lateral ones glabrous, anterior one shorter, ca. 7.5 mm (spur included), deep blue-purple striate; spur very short, ca. 2 mm, apex rounded, slightly exceeding basal auricles of sepals. Anthers ca. 1.8 mm, appendage of connectives ca. 1.2 mm, spur of 2 anterior stamens subtriangular, very short, only ca. 1 mm, apex obtuse. Ovary glabrous, with glandular dots; styles slightly slender at base, conspicuously geniculate forward, thicker in upper part; stigmas 2-lobed, lobes erect, thick, shortly beaked at base in between 2 lobes, with a conspicuous stigma hole at tip of beak. Capsule oblong, ca. 1 cm. Fl. Jul, fr. Aug–Sep. $2n = 24$.

Thickets and forests along riversides, moist grasslands; below 1200 m. Heilongjiang, Jilin, Nei Mongol [Japan, Korea, Russia].

This species is very rare and possibly endangered.

5. *Viola triangulifolia* W. Becker, Bull. Misc. Inform. Kew 1929: 202. 1929.

三角叶堇菜 san jiao ye jin cai

Herbs perennial, caulescent, 13–35 cm tall. Rhizome usually obliquely ascending, deep brown, short, stout, densely noded, with numerous stout rootlets. Stems solitary or several fasciculate, erect, slender, glabrous. Basal leaves 2–5, usually withered early; petioles 3–6.5 cm; blades broadly ovate or ovate, 1–2 × 1.5–2.8 cm, base cordate, apex acute. Cauline leaves long petiolate; stipules free, lanceolate or linear-lanceolate, 0.5–1 cm, herbaceous, margin entire or remotely denticulate, often ciliate; blades ovate-triangular to narrowly triangular, 2–5 × 2–3.5 cm at base, both surfaces glabrous, base cordate or truncate, margin shallowly serrate, apex acute. Flowers solitary in axils of cauline leaves, white, purple striate, small; pedicels usually subequaling leaves, sometimes exceeding leaves, slender, 2-bracteolate at upper part; bracteoles opposite, linear. Sepals ovate-lanceolate or lanceolate, ca. 3 × 0.8–1.2 mm, apex acuminate, basal auricles ca. 0.5 mm, margin narrowly membranous. Upper petals narrowly obovate, 5–7.5 × ca. 2.5 mm, lateral ones oblong, 5–8 × ca. 2 mm, bearded, anterior one shorter, spatulate, ca. 6 mm (spur included); spur shallowly saccate, 1–1.5 mm, ca. 2 mm in diam. Anthers ca. 2 mm, appendage of connectives ca. 1.5 mm, spur of 2 anterior stamens shorter, square, subtriangular, ca. 1.1 × 0.8 mm. Ovary ovoid-globose, ca. 1.5 mm, glabrous; styles clavate, ca. 1.3 mm, base slightly geniculate forward, conspicuously thickened upward; stigmas conspicuously thickened on lateral and abaxial sides, margin obliquely spreading, flat in central part, shortly beaked in front, with a larger stigma hole at tip of beak. Capsule ellipsoid, small, 5–6 mm, glabrous. Fl. Apr–May, fr. May–Sep.

• Streamsides in mountain valleys, forest margins, roadsides; 200–1800 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangxi, Zhejiang.

6. *Viola montana* Linnaeus, Sp. Pl. 2: 935. 1753.

高堇菜 gao jin cai

Viola elatior Fries; *V. montana* var. *elatior* (Fries) Regel.

Herbs perennial. Stem erect, to 50 cm tall, robust, puberulous. Stipules leaflike, lanceolate or ovate-lanceolate, large,

lower and middle ones subequaling or shorter than petioles, upper ones exceeding petioles, 2–5.5 cm, base often 2- or 3-lobed, margin usually entire in upper half, irregularly dentate in lower half, apex acute; petiole 1.5–4 cm, narrowly winged in upper half; leaf blade lanceolate or ovate-lanceolate, 2–7 × 1.5–2.5 cm, both surfaces minutely puberulous, with dense brown glandular dots, base truncate or shallowly cordate, slightly decurrent to petiole, margin obtusely dentate or ciliate, apex acute. Flowers purplish violet, whitish at throat, large; pedicels exceeding or subequaling leaves, with 2 linear bracteoles above middle. Sepals lanceolate, 1–1.4 cm, apex acuminate, basal auricles short, apex shallowly dentate. Petals obovate, lateral ones ca. 1.8 cm, distinctly bearded, anterior one shorter, apex emarginate, ca. 2 cm (spur included); spur greenish, longer than basal auricles of sepals; spur of 2 anterior stamens 3–4 mm, base thicker, apex thinner. Styles slightly geniculate at base, thickened upward and clavate, densely papillose in upper part, curved forward and uncinately beaked at apex, tip of beak slightly thickened along margin, with a larger stigma hole at middle of beak. Capsule glabrous, conspicuously angled, apex mucronate, oblong. Fl. May, fr. Jun–Aug. $2n = 40$.

Forest margins, forests, grasslands on mountain slopes; 1100–1200 m. Xinjiang [Kazakhstan, Kyrgyzstan, Russia, Tajikistan, Uzbekistan; Europe].

7. *Viola websteri* Hemsley, J. Linn. Soc., Bot. 23: 56. 1886.

蓼叶堇菜 *liao ye jin cai*

Herbs perennial. Rhizome robust, with dense white rootlets. Stem erect, usually simple, 30–40 cm tall, puberulous, without leaves in lower part but stipulate. Lower stipules elliptic-lanceolate, membranous, base amplexicaul, margin usually remotely serrulate; upper ones lanceolate, margin usually pinnatifid, apex acute, adnate to petioles at base; petiole short; blade lanceolate or broadly lanceolate, 5–12 × 1.2–5 cm, abaxially subglabrous or puberulous along veins, veins reaching margin, adaxially and along margin sparsely puberulous, base cuneate, decurrent to petiole, margin remotely serrate, apex acute. Flowers solitary in leaf axils, purple, small; pedicels shorter than leaves, with 2 bracteoles at or above middle. Sepals narrowly lanceolate, apex acuminate, basal auricles short, apex truncate. Petals subequal, obovate-spatulate, apex rounded, lateral ones bearded, anterior one ca. 1.3 cm (spur included); spur straight, short, ca. 2 mm, apex obtuse. Ovary glabrous; styles clavate, slightly curved forward at base, apex uncinately and papillose. Capsule oblong, 1.2–1.5 cm, smooth, glabrous, apex acute. Seeds yellow, narrowly ovoid. Fl. May, fr. Jun–Aug.

Sparse mountain forests; 500–900 m. E Jilin [Korea].

8. *Viola acuminata* Ledebour, Fl. Ross. 1: 252. 1842.

鸡腿堇菜 *ji tui jin cai*

Herbs perennial, usually without basal leaves. Rhizome erect or oblique, robust, with numerous brownish roots. Stem usually 2–4 fasciculate, erect, 10–40 cm tall, glabrous or white puberulous in upper part. Stipules leaflike, 1–3.5 cm × 2–8 mm, herbaceous, usually pinnatifid and fimbriate, or shallowly divided, ciliate along margin, both surfaces dotlike brown glandular, sparsely puberulous along veins; lower petioles to 6 cm, upper ones shorter, 1.5–2.5 cm, glabrous or sparsely puberulous;

blade cordate, ovate-cordate, or ovate, 1.5–5.5 × 1.5–4.5 cm, densely dotlike brown glandular on both sides, sparsely puberulous along veins, base usually cordate, rarely truncate, margin obtusely serrate and shortly ciliate, apex acute or acuminate. Flowers whitish violet or white, long pedicellate; pedicels usually exceeding leaves, slender, puberulous, with 2 linear bracteoles above middle or near flower. Sepals linear-lanceolate, 7–12 × 1.5–2.5 mm, outer 3 longer and broader, apex acuminate, basal auricles 2–3 mm, apex truncate or sometimes 1- or 2-dentate, puberulous adaxially and along margin, 3-veined. Petals dotlike brown glandular, upper petals subequaling lateral ones, curved upward, usually glabrous, rarely bearded, lateral ones distinctly bearded, anterior one often purple veined, 0.9–1.6 cm (spur included); spur usually straight, 1.5–5 mm, saccate, apex obtuse; spur of 2 anterior stamens short and obtuse, ca. 1.5 mm. Ovary conic, glabrous; styles slightly curved forward at base, gradually thickened, with several series of papillose protuberances at apex, shortly beaked at apex, tip of beak slightly curved upward, with a larger stigma hole. Capsule ellipsoid, ca. 1 cm, glabrous, usually dotlike yellow-brown glandular, apex acuminate. Fl. May–Jun, fr. Jun–Sep.

Mixed forests, forest margins, thickets, grasslands on mountain slopes, moist places and shaded and moist grasslands in stream valleys; 400–2500 m. Anhui, Gansu, Hebei, Heilongjiang, Henan, Hubei, Jilin, Liaoning, Nei Mongol, Ningxia, Shaanxi, Shandong, Shanxi, Sichuan, Zhejiang [Japan, Korea, Mongolia, Russia].

1a. Spur 1.5–3.5 mm; upper petals beardless

..... 8a. var. *acuminata*

1b. Spur 4.5–5 mm; upper petals bearded 8b. var. *pilifera*

8a. *Viola acuminata* var. *acuminata*

鸡腿堇菜(原变种) *ji tui jin cai (yuan bian zhong)*

Viola acuminata subsp. *austroussuriensis* W. Becker; *V. acuminata* var. *austroussuriensis* (W. Becker) Kitagawa; *V. acuminata* var. *brevistipulata* (W. Becker) Kitagawa; *V. acuminata* var. *intermedia* Nakai; *V. austroussuriensis* (W. Becker) Komarov; *V. canina* Linnaeus var. *acuminata* (Ledebour) Regel; *V. micrantha* Turczaninow (1832), not Presl (1822); *V. micrantha* lus. *austroussuriensis* (W. Becker) W. Becker; *V. micrantha* prol. *brevistipulata* W. Becker; *V. micrantha* lus. *kiautschauensis* W. Becker; *V. turczaninowii* Juzepczuk.

Stipules leaflike, 1–3.5 cm × 2–8 mm, herbaceous, oblong, lanceolate or oblong, usually pinnatifid and fimbriate or shallowly divided, ciliate along margin, both surfaces dotlike brown glandular, sparsely puberulous along veins. Upper petals glabrous, spur usually straight, 1.5–3.5 mm, saccate; spur of 2 anterior stamens short and obtuse, ca. 1.5 mm. Fl. May–Jun, fr. Jun–Sep. $2n = 20$.

Mixed forests, forest margins, grasslands on mountain slopes, moist places in stream valleys; 400–2500 m. Gansu, Hebei, Heilongjiang, Henan, Hubei, Jilin, Liaoning, Nei Mongol, Ningxia, Shaanxi, Shandong, Shanxi, Sichuan [Japan, Korea, Mongolia, Russia].

8b. *Viola acuminata* var. *pilifera* C. J. Wang, Acta Bot. Yunnan. 13: 257. 1991.

毛花鸡腿堇菜 *mao hua ji tui jin cai*

Stipules lanceolate, remotely denticulate, puberulous.

Flowers larger, spur long and thick, 4.5–5 × 2–3 mm. Upper petals inside bearded, spur of 2 anterior stamens long angular, 4–4.5 mm. Fl. and fr. May–Sep.

• Forest margins, thickets, shaded and moist grasslands in stream valleys; 1600–1800 m. Gansu.

9. *Viola stewardiana* W. Becker, Repert. Spec. Nov. Regni Veg. 21: 237. 1925.

庐山堇菜 lu shan jin cai

Herbs perennial; tap roots long. Rhizome robust, densely noded. Underground part of stem procumbent, strongly lignified, very hard, often producing new plants; stems usually several fasciculate, obliquely ascending, 10–15 cm tall, longitudinally angled, glabrous. Basal leaves rosulate; petiole to 5.5 cm; blade triangular-ovate, 1.5–3 × 1.5–2.5 cm, both surfaces with minute brown glandular dots, veins conspicuously raised abaxially, base broadly cuneate or truncate, decurrent to petiole, margin crenate, glandular at apices of teeth, apex mucronate. Stipules of cauline leaves brown, lanceolate or linear-lanceolate, basal ones 1–1.2 cm, upper ones only ca. 0.5 cm, margin long fimbriate, apex long acuminate; lower petioles subequaling blades, upper ones shorter than blades, narrowly winged; blades narrowly ovate, rhombic, or triangular-ovate, ca. 4.5 × 2–3 cm, base cuneate, apex mucronate or acuminate. Flowers in upper leaf axils, light violet, long pedicellate; pedicels subequaling or slightly exceeding leaves, with 2 linear bracteoles slightly above middle. Sepals narrowly ovate or oblong-lanceolate, 3–3.5 mm, apex mucronate, basal auricles short, glabrous, margin entire, apex rounded. Petals conspicuously emarginate at apex, upper ones spatulate, ca. 8 mm, lateral ones oblong, glabrous, anterior one narrowly obovate, ca. 1.4 cm (spur included); spur ca. 6 mm, curved downward, apex obtuse; 2 anterior stamens spurless. Ovary ovoid-globose, glabrous; styles slightly geniculate forward at base, gradually thickened upward, without appendages at top, shortly beaked, beaks slightly curved upward, with a larger stigma hole at tip. Capsule subglobose, with scattered brown glands, ca. 6 mm, apex mucronate. Fl. Apr–May, fr. May–Sep. $2n = 20^*$.

• Streamsides in mountain valleys, rock crevices; 400–1500 m. Anhui, Fujian, SE Gansu, Guangdong, Guizhou, Hubei, Hunan, Jiangsu, Jiangxi, S Shaanxi, Sichuan, Zhejiang.

10. *Viola rupestris* F. W. Schmidt, Neuere Abh. Königl. Böhm. Ges. Wiss. 1: 60. 1791.

石生堇菜 shi sheng jin cai

Herbs perennial, caulescent, 5–10 cm tall, puberulous throughout, rarely sparsely puberulous or glabrous. Rhizome erect, deep brown, short, robust, with nodes and scales; tap root robust, long; roots brown, much branched in lower part; rootlets long, slender. Stems many, fasciculate, obliquely ascending or erect, longitudinally angled. Basal leaves rosulate, long petiole; cauline leaves similar to basal ones; stipules of basal leaves usually sparsely arranged, lanceolate, fimbriate-dentate, those of cauline leaves free, ovate to lanceolate, 3–7 × 0.8–2.5 mm, margin fimbriate-serrate or sparsely emarginate-serrate, teeth with brown glandular dots at apices, apex acuminate; petiole slender, weak, narrowly winged only in upper part, middle

ones much longer than blades, upper ones ca. as long as blades; blade orbicular or ovate-orbicular, 0.8–1.7 × 0.7–1.8 cm, both surfaces puberulous, with brown glandular dots when dry, base shallowly cordate, margin regularly crenate, apex obtuse. Flowers solitary in upper leaf axils purple or purplish; pedicels much exceeding leaves, 2.5–6 cm, slender, sparsely puberulous, 2-bracteolate above middle; bracteoles subulate or linear, 4–6 mm, fimbriate-dentate at middle and lower parts. Sepals broadly lanceolate or lanceolate, 4–7.5 × 1–2.5 mm, 3-veined, with dense brown glandular dots, apex acute, basal auricles square, shorter, 0.5–1.5 mm, with 2 or 3 obtuse teeth at apex. Petals narrowly oblong-ovate, veins deeply colored, lateral petals 0.8–1 × ca. 4 mm, distinctly bearded, upper ones subequaling lateral ones, anterior one shorter, 1.3–1.4 cm (spur included), with dense brown glandular dots; spur cylindrical, 3–4 mm, ca. 2 mm in diam., apex rounded, horizontally straight or slightly curved upward. Anthers ca. 1.3 mm, connective appendages ca. 0.7 mm; 2 anterior stamens ca. 3 mm, spur broadly triangular, ca. 2.5 × 0.8 mm. Ovary deep brown, ovoid, styles clavate, evenly thick, slightly narrower only at base, slightly geniculate forward at base, curved forward at tip and beaked, conspicuously papillose abaxially and on lateral sides of beak; beak horizontal, mouth slightly curved upward, with a larger stigma hole. Capsule oblong, 5–7 mm, 3–4 mm in diam., with remains of styles at apex, puberulous or glabrous.

Forests, grassy slopes, meadows in river valleys, sandy grasslands; 1000–2500(–4000) m. SE Gansu, S Shaanxi, S Shanxi, Xinjiang [Kashmir, Kazakhstan, Kyrgyzstan, Mongolia, N Pakistan, Russia, Tajikistan; SW Asia (Caucasus), Europe].

- 1a. Plants smaller; stipules usually ovate or broadly lanceolate, 3–5 × 1.5–2.5 mm, margin fimbriate-serrate or sparsely emarginate-serrate 10a. subsp. *rupestris*
 1b. Plants larger; stipules usually narrowly long, linear or subulate, 5–7 × 0.8–1.3 mm 10b. subsp. *licentii*

10a. *Viola rupestris* subsp. *rupestris*

石生堇菜(原亚种) shi sheng jin cai (yuan ya zhong)

Viola canina Linnaeus var. *rupestris* (F. W. Schmidt) Regel.

Plants 5–10 cm tall; blade orbicular or ovate-orbicular, 0.8–1.7 × 0.7–1.8 cm, both surfaces puberulous, with brown glandular dots when dry, base shallowly cordate, margin regularly crenate, apex obtuse; stipules of basal leaves usually sparsely arranged, lanceolate, fimbriate-dentate, those of cauline leaves free, ovate or broadly lanceolate, 3–5 × 1.5–2.5 mm, margin fimbriate-serrate or sparsely emarginate-serrate, teeth with brown glandular dots at apices, apex acuminate. Fl. May–Jun, fr. Jul–Aug. $2n = 20$.

Mountain forests, grassy slopes, meadows in river valleys; 1300–2500(–4000) m. Xinjiang [Kashmir, Kazakhstan, Kyrgyzstan, Mongolia, N Pakistan, Russia, Tajikistan; SW Asia (Caucasus), Europe].

10b. *Viola rupestris* subsp. *licentii* W. Becker, Bull. Misc. Inform. Kew 1928: 248. 1928.

长托叶石生堇菜 chang tuo ye shi sheng jin cai

Plant 10–20 cm tall; blades usually wider, subreniform, 0.8–1.4 × 1.2–1.8 cm; stipules narrowly long, linear or subulate, 5–7 × 0.8–1.3 mm, margin fimbriate-serrate. Fl. Apr–May, fr. Jul.

• Sandy grasslands, forests; 1000–2200 m. SE Gansu, S Shaanxi, S Shanxi.

11. *Viola sacchalinesis* H. Boissieu, Bull. Soc. Bot. France 57: 188. 1910.

库叶堇菜 *ku ye jin cai*

Herbs perennial, acaulescent at first, 2–5 cm tall, later gradually caulescent, to more than 20 cm tall, glabrous. Rhizome slender, with brown remains of scalelike stipules. Stipules ovate-lanceolate or narrowly ovate, 0.8–1 cm × 2–4 mm, apex acuminate, adnate to petioles at base inside, margin densely fimbriate-denticulate; petiole slender, lower ones ca. 4.5 cm, upper ones shorter; blade cordate, ovate-cordate, or reniform, 1–2.5 × 1–2.5 cm, both surfaces with brown glandular dots, glabrous or subglabrous, base cordate or broadly cordate, margin obtusely serrate, apex obtuse. Flowers bluish violet, long pedicellate; pedicels exceeding leaves, to 5.5 cm, with 2 opposite bracteoles near flower. Sepals lanceolate, ca. 5 mm, apex acuminate, basal auricles 2–3 mm, glabrous, margin entire, apex slightly dentate. Upper and lateral petals obovate, throat white, lateral ones distinctly bearded, anterior one oblong, 1.3–1.6 cm (spur included), distinctly veined in throat; spur shorter, ca. 3 mm, horizontally straight or slightly curved upward. Ovary glabrous, often with glandular dots; styles slightly geniculate forward at base, gradually thickened upward, clavate, papillose; beak hooked, with a larger stigma hole curved upward. Capsule ellipsoid, glabrous, apex acute. Fl. Apr–Jul, fr. Jun–Sep.

Forests, sparse deciduous forests, forest margins, alpine grasslands; 400–2400 m. Heilongjiang, Jilin, Nei Mongol [Japan, Korea, Mongolia, Russia].

- 1a. Petals oblong-ovate, lateral ones distinctly bearded, stigma papillose 11a. var. *sacchalinesis*
 1b. Petals broadly oblong-obovate, lateral ones glabrous, stigma not papillose 11b. var. *alpicola*

11a. *Viola sacchalinesis* var. *sacchalinesis*

库叶堇菜(原变种) *ku ye jin cai (yuan bian zhong)*

Viola komarovii W. Becker; *V. mariae* W. Becker; *V. miranda* W. Becker.

Rhizome usually not covered by dead leaf stipules. Stem usually longer, to 20 cm tall. Stipules ovate-lanceolate or narrowly ovate, margin densely fimbriate-denticulate. Petals bluish violet, oblong-ovate, apex obtuse; lateral petals distinctly bearded; spur 2.5–3 cm. Stigma papillose. Fl. Apr–Jun, fr. Jun–Sep. $2n = 20$.

Forests, forest margins; 400–2000 m. Heilongjiang, Jilin, Nei Mongol [Japan, Korea, Mongolia, Russia].

In FRPS (51: 24. 1991), the name *Viola mauritii* Teplouchow was misapplied to this taxon.

11b. *Viola sacchalinesis* var. *alpicola* P. Y. Fu & Y. C. Teng, Fl. Pl. Herb. Chin. Bor.-Orient. 6: 291. 1977.

长白山堇菜 *chang bai shan jin cai*

Viola koraiensis Nakai, Bot. Mag. (Tokyo) 30: 281. 1916.

Rhizome densely covered with dead black-brown leaf stipules and petioles. Stem usually short, glabrous. Stipules green, lanceolate, margin serrate or mostly fimbriate-serrate. Petals light violet or deep violet, broadly oblong-obovate, apex obtuse; lateral petals glabrous; spur 2–2.5 mm. Stigma glabrous. Fl. May–Jul, fr. Jul–Sep.

Alpine grasslands, sparse deciduous forests; 1100–2400 m. S Jilin (Changbai Shan) [N Korea].

12. *Viola grypoceras* A. Gray in Perry, Narr. Exped. China Japan 2: Append. 308. 1856.

紫花堇菜 *zi hua jin cai*

Viola grayi Franchet & Savatier var. *candida* H. Boissieu; *V. grypoceras* var. *barbata* W. Becker; *V. grypoceras* var. *pubescens* Nakai; *V. leveillei* H. Boissieu; *V. sylvestris* Lamarck var. *candida* (H. Boissieu) H. Léveillé; *V. sylvestris* var. *grypoceras* (A. Gray) Maximowicz.

Herbs perennial, with developed tap root. Rhizome erect, brown, short, robust, densely noded. Stems several, erect, obliquely ascending, or nearly procumbent or creeping, 5–20 cm tall at anthesis, to 30 cm tall at fruiting, glabrous or puberulous. Stipules brown, narrowly lanceolate, 1–1.5 cm × 1–2 mm, margin fimbriate-dentate, teeth 2–5 mm, apex acuminate; petioles of basal leaves to 8 cm, those of cauline leaves shorter, puberulous; blades of basal leaves cordate or broadly cordate, 1–4 × 1–3.5 cm, both surfaces glabrous or subglabrous, rarely puberulous abaxially, with dense brown glandular dots, base narrowly sinuate, margin obtusely serrate, apex obtuse or ± acute; blades of cauline leaves triangular-cordate or narrowly ovate-cordate, 1–6 cm, base shallowly sinuate or broadly triangular. Flowers purplish to white, fragrant; pedicels produced from base of stem or cauline leaf axils, 6–11 cm, much exceeding leaves, with 2 linear bracteoles above middle. Sepals lanceolate, ca. 7 mm, with brown glandular dots, apex acute, basal auricles ca. 2 mm, apex truncate, shallowly dentate. Petals obovate-oblong, with brown glandular dots, margin repand, lateral petals glabrous, anterior one 1.5–2 cm (spur included); spur 6–8 mm, ca. 2 mm in diam., usually curved downward, rarely straight; 2 anterior stamens long spurred, spur suberect. Ovary glabrous; styles slightly geniculate at base, gradually thickened toward top and clavate; stigmas not papillose, curved forward, forming a short beak, with a broad stigma hole at tip of beak. Capsule ellipsoid, ca. 1 cm, with dense brown glandular dots, apex acuminate. Fl. Mar–May, fr. May–Aug. $2n = 20^*$.

Grassy slopes, thickets; below 2400 m. Anhui, Fujian, SE Gansu, Guangdong, Guangxi, Guizhou, Henan, Hubei, Hunan, Jiangsu, Jiangxi, S Shaanxi, E Sichuan, Taiwan, Yunnan, Zhejiang [Japan, Korea].

In FRPS (51: 31. 1991), the name *Viola faurieana* W. Becker was misapplied to this species.

One of us (Ohba) prefers to treat plants with stems nearly procumbent or creeping as *Viola grypoceras* var. *exilis* (Miquel) Nakai.

13. *Viola kosanensis* Hayata, Icon. Pl. Formosan. 3: 28. 1913.

福建堇菜 fu jian jin cai

Viola fukienensis W. Becker; *V. kiangsiensis* W. Becker; *V. nagamiana* T. Hashimoto; *V. shinchikuensis* Yamamoto.

Herbs perennial, caulescent or acaulescent, 5–15 cm tall. Rhizome erect, yellow-brown, very long, to 12 cm, stout, 4–7 mm in diam., densely noded, with dense brown remains of stipules, often branched at apex, with numerous long, slender fibrous roots. Basal leaves numerous, fasciculate, rosulate; stipules free, brown, linear-lanceolate, margin fimbriate-serrate; petiole 1.5–4 cm, very narrowly winged in upper part; blade ovate or triangular-ovate, 1.3–3.5 × 1–3 cm, both surfaces glabrous to subglabrous or appressed puberulous, with dense brown glandular dots, veins conspicuously raised abaxially, base shallowly cordate or cuneate, margin serrulate, apex ± acute. Flowers deep purple to light purple or white, small, ca. 1 cm; pedicels linear, 2–7 cm, slender, soft, glabrous or puberulous, 2-bracteolate above middle; bracteoles linear-subulate, 3–3.5 mm, margin fimbriate at base. Sepals linear-lanceolate, 5–6 mm, 3-veined, margin entire, apex ± acute, basal auricles ca. 1.5 mm, apex rounded or inconspicuously crenate. Petals oblong-obovate, lateral ones bearded, anterior one shorter; spur 2–3 mm. Ovary glabrous; styles slightly geniculate at base; stigmas raised, shortly beaked in front, slightly margined abaxially and adaxially. Capsule oblong, 6–7 mm, glabrous, with brown dots. Seeds brown when mature, ovoid-globose, ca. 2 mm, ca. 1 mm in diam. Fl. Mar–Apr, fr. Aug–Oct.

• Forest margins on mountains, shaded and moist places along riversides; 200–2700 m. Anhui, Fujian, Guangdong, Guangxi, NE Guizhou, Hubei, Hunan, Jiangxi, S Shaanxi, Sichuan, Taiwan, NW Yunnan.

14. *Viola pendulicarpa* W. Becker, Beih. Bot. Centralbl., Abt. 2, 36: 55. 1918.

悬果堇菜 xuan guo jin cai

Viola kansuensis W. Becker; *V. kansuensis* var. *oblonga* W. Becker; *V. polymorpha* C. C. Chang; *V. pseudoarculata* C. C. Chang; *V. weixiensis* C. J. Wang.

Herbs perennial, caulescent or sometimes nearly acaulescent, ca. 15 cm tall, glabrous throughout. Rhizome erect, very long, to 12 cm, stout, 4–7 mm thick, internodes shortened, nodes dense and with remains of brown stipules, often branched at top and with numerous long, slender, fibrous roots. Leaves numerous, mostly basal, rosulate; stipules free, brown when dry, linear-lanceolate or subulate, 1.2–2 cm, margin densely long fimbriate, with inconspicuous glandular dots on both sides; petiole long, to 12 cm, slender, glabrous; leaf blade triangular-ovate, ovate, or ovate-cordate, 2–3.5 × 1.6–3 cm, both surfaces glabrous but with dense brown glandular dots, base truncate or shallowly cordate, margin serrate, apex abruptly acute or slightly acuminate. Flowers white or purplish, ca. 1 cm; pedicels filiform, long, 4–7 cm, not or slightly exceeding leaves, slender, 2-bracteolate above middle; bracteoles alternate, linear. Sepals linear-lanceolate, ca. 6 mm, conspicuously 3-veined, margin narrowly membranous, apex acuminate; basal auricles of lower sepals ca. 1.5 mm, apex rounded; lateral sepals narrower, apex

slightly abruptly acute. Petals obovate-oblong; lateral ones bearded; anterior one distinctly purplish striate in throat; spur saccate, ca. 2.5 mm, apex rounded. Anthers ca. 2 mm. Ovary glabrous, with brown glandular dots; styles clavate, ca. 1.5 mm, slightly slender at base and slightly geniculate; stigmas flat at top, slightly thick and elevated behind, with few papillose protuberances, shortly beaked in front, with larger stigmatic hole at tip of beak, hole spatulate, opening upward. Capsule nearly oblong, 4–9 mm, with sparse brown glandular dots. Seeds dark brown, ovoid-globose, ca. 2 mm, ca. 1 mm in diam. Fl. Mar–May, fr. May–Sep.

• Mountain forests, forest margins, riversides; 300–2400(–3500) m. W Hubei, S Shaanxi, Sichuan, NW Yunnan.

15. *Viola serrula* W. Becker, Bull. Misc. Inform. Kew 1928: 247. 1928.

小齿堇菜 xiao chi jin cai

Herbs perennial. Stem procumbent or obliquely ascending, 5–15 cm tall. Rhizome erect, hard, densely covered with dense remains of stipules and petioles. Stipules free, brown, narrowly lanceolate, margin fimbriate; petiole 2–4 cm; leaf blade cordate or broadly ovate, 1.5–2 × ca. 1 cm, abaxially glabrous, adaxially pubescent, base widely cordate, margin shallowly crenulate, apex abruptly acute. Flowers violet or whitish, small; pedicels long, much exceeding leaves, slender, glabrous, with 2 opposite bracteoles in upper part. Sepals ovate-lanceolate, apex abruptly acute, basal auricles narrower, with brown glandular dots. Lateral petals papillose-hairy at base inside; anterior petal thickly spurred; spur 2–2.5 mm, horizontally straight. Styles slender, not geniculate at base, papillose-hairy at apex, with a slightly curved short beak in front. Capsule ca. 4 mm, glabrous, with brown glandular dots. Fl. Mar–Apr, fr. Jun–Jul.

• Rock crevices in sparse forests; 300–2000 m. Chongqing, Guizhou, NE Yunnan.

16. *Viola obtusa* (Makino) Makino var. *tsuifengensis* T. Hashimoto, Acta Tsukuba Bot. Gard. 6: 3. 1987

翠峰堇菜 cui feng jin cai

Herbs perennial, puberulous or rarely glabrescent. Rhizome erect or subhorizontal, rather stout with dry brown scales, 0.5–2 cm, with lateral roots. Stems erect or ascending, 2–12 cm at anthesis, usually with 1 or 2 stipulelike scales in between base and first cauline leaf. Basal leaves few or ephemeral at anthesis; stipules brownish, ovate, 8–10 mm, margin fimbriate-laciniate; petiole 1.7–6 cm; leaf blade cordate-ovate or rarely cordate-reniform, 17–30 × 1.6–2.4 cm, margin crenate, apex acute or rarely obtuse. Cauline leaves usually tufted above 1/3 of plant; leaf blade mostly triangular-ovate, longer than wide, base cordate, apex acute or rarely obtuse. Pedicels slender, usually arising from axils of cauline leaves, 2–8 cm, with opposite bracteoles near apex; bracteoles linear-triangular. Sepals green with purple tints, lanceolate, 5–7 × 1–1.5 mm, margin membranous, apex acuminate; appendages of lateral sepals obtriangular, ca. 1.5 mm, margin irregularly dentate. Petals obovate, to 12 × ca. 5 mm, margin undulate, lateral ones glabrous, anterior petal not recurved; spur 2.5–3 mm. Ovary glabrous; style geniculate at base, beaked in front, with a stigma hole at tip of

hole, ca. 3 mm, glabrous. Seeds ovoid, ca. 1.2 mm. Fl. Mar–Apr, fr. May–Sep.

- Taiwan (Nantou).

Viola obtusa var. *obtusata* occurs in Japan.

17. *Viola odorata* Linnaeus, Sp. Pl. 2: 934. 1753.

香堇菜 xiang jin cai

Herbs perennial, acaulescent, stoloniferous, 3–15 cm tall. Rhizome erect or oblique, brownish, robust, densely noded, with numerous roots and slender, long stolons produced from nodes. Leaves basal; leaf blade orbicular or reniform to broadly ovate-cordate, smaller at anthesis, 1.5–2.5 × 1.5–2.5 cm, gradually accrescent, to 4.5 × 4.5 cm, both surfaces sparsely puberulous or subglabrous, base deeply cordate, margin crenate, apex rounded or ± acute. Flowers deep purple, large, fragrant; pedicels long, slender, puberulous or subglabrous, 2-bracteolate at or above middle. Sepals oblong or oblong-ovate, base obtuse or shallowly dentate, apex obtuse, basal auricles 2–3 mm. Petals crenate, upper ones obovate, lateral ones inside shortly bearded, anterior one broadly obovate, 1.5–2 cm (spur included); spur 2–4 mm, straight or slightly curved; spurs of 2 anterior stamens robust, ca. 4 mm. Ovary puberulous; styles slender and straight at base, thickened upward and slightly compressed, apically curved and with a hooked beak about as long as diameter of styles, with a smaller stigma hole at tip of beak. Capsule globose, densely puberulous. Fl. Apr–May, fr. Jun–Sep. $2n = 20$, 60.

Cultivated in large cities including Beijing, Guangzhou, Shanghai, and Tianjin. Guangdong, Hebei, Shaanxi, Zhejiang [native to N Africa, C and SW Asia, and Europe].

18. *Viola pilosa* Blume, Catalogus, 57. 1823.

匍匐堇菜 pu fu jin cai

Viola pogonantha W. W. Smith; *V. serpens* Wallich ex Gingins; *V. serpens* subsp. *guruhwalensis* W. Becker; *V. serpens* var. *pseudoscotophylla* H. Boissieu.

Herbs perennial, acaulescent or with very short stem. Rhizome erect or obliquely ascending, 3–5 cm × 1.5–4 mm; internodes conspicuous. Stolon elongated, slender, glabrous, with evenly scattered leaves. Leaves nearly basal; stipules mostly free, brown or green, lanceolate, margin long or shortly fimbriate-dentate, apex long acuminate; petioles nearly as long as blades or lower ones much longer than blades, densely appressed hirsute, more densely hairy in upper part; leaf blade greenish on both surfaces, ovate or narrowly ovate, 2–6 × 1–3 cm, sparsely white stiffly hairy, more densely so along veins abaxially, base narrowly and deeply sinuate, lateral auricles conspicuous, margin densely and shallowly obtusely dentate, apex caudate-acuminate or acute. Flowers purplish or white, medium-sized; pedicels usually exceeding leaves, sparsely puberulous or subglabrous, 2-bracteolate above middle; bracteoles linear. Sepals lanceolate, 6–7.5 × ca. 2.5 mm, apex acute, basal auricles 2–2.5 mm, outside usually sparsely white puberulous, margin ciliate, apex remotely and shallowly dentate. Petals oblong-obovate, base narrower, lateral ones bearded, anterior one shorter,

inside deep-colored veined; spur saccate, 2–2.5 mm, usually sparsely puberulous; spur of 2 anterior stamens ca. 1.5 mm, angular. Ovary usually puberulous; styles clavate, base slightly geniculate, gradually thickened upward; stigmas ± flat, not margined, very inconspicuously short beaked in front, with smaller stigma hole at tip of beak. Capsule subglobose, 5–10 mm, puberulous or glabrous. Seeds with dotted protuberances on surface, conspicuously appendaged on lower lateral side. Fl. Feb–Apr, fr. May–Sep. $2n = 20$.

Mountain forests, grasslands, roadsides; 800–3000 m. W Guangxi, Guizhou, Sichuan, SE Xizang, Yunnan [Afghanistan, Bhutan, India, Indonesia, Kashmir, Malaysia, Myanmar, Nepal, Sri Lanka, Thailand].

In FRPS (51: 90. 1991), the name *Viola canescens* Wallich was misapplied to this species.

19. *Viola hondoensis* W. Becker & H. Boissieu, Bull. Herb. Boissier, sér. 2, 8: 739. 1908.

日本球果堇菜 ri ben qiu guo jin cai

Viola hirta Linnaeus var. *japonica* Maximowicz.

Plants 3–8 cm tall at anthesis, pubescent. Rhizome thick, creeping, nodes closely spaced. Stolons creeping, producing new individuals. Radical leaves in summer larger than those in spring, usually present in winter; leaf blade to 6–7 × 6–7 cm. Petiole 2–8 cm, pubescent. Stipules broadly lanceolate, margins fimbriate; leaf blade orbicular-cordate to reniform, 1.5–4 × 1.5–4 cm, both surfaces pubescent, base cordate, margin crenate, apex rounded. Pedicel radical or cauline, 3–8 cm. Flowers light violet or white, 1–1.5 cm in diam. Sepals ovate, pubescent, apex obtuse, basal auricles ca. 1 mm. Petals 1–1.3 cm; lateral ones sparsely shortly bearded or glabrous, slightly purple striate; lowest petal purple-striate; spur 3–4.5 mm, 2–3 mm longer than base auricles. Ovary pilose; style hooked at apex. Pedicel curved in fruit. Capsule globose, 5–6 mm in diam., densely pubescent. Fl. Mar–May, fr. Jul–Sep. $2n = 20$.

Mixed forests near streams; 900–1300 m. Chongqing, Hubei, Hunan, Jiangxi, S Shaanxi, Zhejiang [Japan, Korea].

20. *Viola collina* Besser, Cat. Hort. Cremeneer. 151. 1816.

球果堇菜 qiu guo jin cai

Herbs perennial, 4–9 cm tall at anthesis, to 20 cm at fruiting. Rhizome erect or oblique, yellow-brown, 2–6 cm, robust, thick, densely noded, apex often branched; roots numerous, brownish. Leaves basal, rosulate; stipules lanceolate, 1–1.5 cm, membranous, base adnate to petioles, margin remotely fimbriate-denticulate, apex acuminate; petiole narrowly winged, 2–5 cm at anthesis, to 19 cm at fruiting, appressed puberulous or rarely glabrescent; leaf blade broadly ovate or suborbicular, 1–3.5 × 1–3 cm, conspicuously accrescent at fruiting, to 8 × ca. 6 cm, both surfaces sparsely puberulous or rarely glabrescent, base shallowly or deeply and narrowly sinuate, later cordate, margin shallowly and obtusely serrate, apex obtuse or acute, rarely acuminate. Flowers purplish, ca. 1.4 cm, long pedicellate; pedicels with 2 bracteoles ca. 6 mm at or below middle, puberulous or rarely glabrescent. Sepals oblong-lanceolate or lanceolate, 5–6 mm, ciliate and glandular, basal auricles short and obtuse. Petals whitish at base, upper and lateral ones obtuse at

apex, lateral ones bearded or subglabrous, spur of anterior one white, shorter, ca. 3.5 mm, slightly curved upward, apex obtuse. Ovary puberulous; styles geniculate at base, gradually thickened upward, often sparsely papillose, apically curved downward forming a hooked beak, with a smaller stigma hole at tip of beak. Capsule globose, densely white puberulous or rarely glabrescent; fruit stalk usually curved downward when mature.

Forests, forest margins, thickets, grasslands, grassy slopes, mountain valleys, shaded and moist places; below 2800 m. Anhui, Chongqing, Gansu, Guizhou, Hebei, Heilongjiang, Henan, Hubei, Jiangsu, Jilin, Liaoning, Nei Mongol, Ningxia, Shaanxi, Shandong, Shanxi, Sichuan, NW Yunnan, Zhejiang [Japan, Korea, Mongolia, Russia, Tajikistan; Europe].

- 1a. Both leaves and capsules puberulous 20a. var. *collina*
 1b. Either leaves or capsules glabrous.
 2a. Petioles and leaf blades glabrous;
 capsules puberulous 20b. var. *intramongolica*
 2b. Petioles and leaf blades
 puberulous; capsules glabrous
 20c. var. *glabricarpa*

20a. *Viola collina* var. *collina*

球果堇菜(原变种) qiu guo jin cai (yuan bian zhong)

Viola hirta Linnaeus var. *collina* (Besser) Regel; *V. microdonta* Chang.

Petioles, leaf blades, pedicels, and capsules puberulous. Fl. Mar–May, fr. Jun–Aug. $2n = 20$.

Forests, forest margins, thickets, grassy slopes, mountain valleys, moist places along roadsides; below 2800 m. Anhui, Chongqing, Gansu, Guizhou, Hebei, Heilongjiang, Henan, Hubei, Jiangsu, Jilin, Liaoning, Nei Mongol, Ningxia, Shaanxi, Shandong, Shanxi, Sichuan, NW Yunnan, Zhejiang [Japan, Korea, Mongolia, Russia, Tajikistan; Europe].

20b. *Viola collina* var. *intramongolica* C. J. Wang, Acta Bot. Yunnan. 13: 257. 1991.

光叶球果堇菜 guang ye qiu guo jin cai

Petioles and leaf blades glabrous. Sepals oblong, both surfaces glabrous, with yellow-brown, small glands only along margin proximally, basal auricles sparsely ciliate. Capsules puberulous. Fr. Aug.

- *Larix* forests, grasslands; 1100–1200 m. Nei Mongol.

20c. *Viola collina* var. *glabricarpa* K. Sun, Bull. Bot. Res., Harbin 14: 236. 1994.

光果球果堇菜 guang guo qiu guo jin cai

Petioles and leaf blades puberulous. Capsules glabrous.

- Forests, shaded and moist places; below 1400 m. Shandong (Tai'an).

21. *Viola hirta* Linnaeus, Sp. Pl. 2: 934. 1753.

硬毛堇菜 ying mao jin cai

Herbs perennial, acaulescent, 5–15 cm tall. Rhizome brownish, robust, densely noded, often branched in upper part, sometimes with shortened, suberect flagellate branches. Leaves basal; stipules lanceolate, 1–2 cm, apex long acuminate, margin

shortly fimbriate and glandular; petiole 3–7 cm, densely puberulous; leaf blade smaller at anthesis, ovate or ovate-cordate, 1.5–2.5 × 1–2 cm, both surfaces puberulous, base shallowly cordate to deeply cordate, margin obtusely serrate, apex rounded or ± acute. Petiole after anthesis to 10 cm; leaf blade accrescent after anthesis, oblong-ovate or suborbicular, to 6 cm, base deeply cordate. Flowers deep purple, large, not fragrant; pedicels usually longer than blades, puberulous, with 2 linear bracteoles below middle. Sepals oblong, apex obtuse, basal auricles short, base rounded, margin sparsely fimbriate and glandular. Petals oblong-obovate, lateral ones bearded, anterior one emarginate at apex, 1.5–1.7 cm (spur included); spur red-purple, ca. 5 mm, apex obtuse, usually curved upward; spurs of 2 anterior stamens ca. 4 mm, slender. Ovary globose, puberulous; styles slender and slightly curved forward at base, thickened upward, apically curved and with a hooked beak, with a smaller stigma hole at tip of beak. Capsule globose, puberulous. Fl. Apr–May. $2n = 20$.

Forest margins, grasslands, thickets; 1100–1700 m. Xinjiang [Russia; Europe].

22. *Viola bulbosa* Maximowicz, Mélanges Biol. Bull. Phys.-Math. Acad. Imp. Sci. Saint-Petersbourg 9: 748. 1876.

鳞茎堇菜 lin jing jin cai

Viola bulbosa var. *franchetii* H. Boissieu; *V. bulbosa* subsp. *tuberifera* (Franchet) W. Becker; *V. filifera* Komarov; *V. hookeri* Franchet (1886), not Thomson & W. Becker (1916); *V. multistolonifera* C. J. Wang; *V. tuberifera* Franchet; *V. tuberifera* var. *brevipedicellata* S. Y. Chen; *V. tuberifera* var. *pseudopalustris* H. Lévillé.

Herbs perennial, dwarf, shortly caulescent, 2.5–4.5 cm tall. Rhizome erect, long, slender, with numerous underground stolons and a small bulb in lower part; bulb 5–6 mm in diam., consisting of 4–6, white, fleshy boat-shaped scales, with numerous fibrous roots in lower part. Leaves clustered at apex of stem; stipules 1–1.4 cm, only 1/3 adnate to petioles, free part linear-lanceolate, ciliate or glabrous, apex acute; petiole narrowly winged, usually shorter than or subequaling blade, puberulous; leaf blade oblong-ovate, suborbicular or reniform, 1–2.5 cm × 5–14 mm, glabrous, or white puberulous abaxially particularly on young leaves, base cuneate or narrowly cordate, margin serrate or crenate, apex rounded or sometimes acute. Flowers white, small; pedicels produced from leaf axils of stem, usually slightly exceeding or subequaling leaves, 2-bracteolate above middle; bracteoles linear. Sepals ovate or oblong, 3–4 × 1.2–1.5 mm, apex acute, basal auricles orbicular, short, glabrous or ciliate. Petals obovate, lateral ones 8–10 mm, glabrous or bearded, anterior one 7–8 mm, purple-violet striate, apex emarginate; spur saccate, short, 1.2–1.7 mm, stout, ca. 2 mm in diam., apex obtuse; anthers ca. 2.5 mm (appendage of connectives included); spur of 2 anterior stamens short, stout, apex obtuse and slightly curved. Ovary glabrous; styles slightly geniculate at base, slightly thickened upward; stigmas triangular, slightly thickened and narrowly margined on lateral sides and abaxially, apex conspicuously beaked, beak short, nearly erect, stigma hole nearly as large as beak. Capsule ovoid. Fl. May–Jun, fr. Jun–Sep. $2n = 24$.

Mountain valleys, grasslands on mountain slopes, forest margins, thickets, fields; 1900–4200 m. Gansu, Qinghai, Shaanxi, Sichuan, Xizang, Yunnan [Bhutan, N India, Nepal].

23. *Viola epipsiloides* A. Löve & D. Löve, Bot. Not. 128: 516. 1976 [“1975”].

溪堇菜 xi jin cai

Viola repens Turczaninow ex Trautvetter & C. A. Meyer in Middendorff, Reise Sibir. 1(2,3) [Fl. Ochot.]: 18. 1856, not Schweinitz (1822).

Herbs perennial, acaulescent, 5–20 cm tall. Rhizome creeping, long and white, with remains of brown stipules. Leaves basal, usually 2, sometimes 3; stipules free, white, ovate-lanceolate, ca. 8 mm, membranous, margin entire or sometimes 2- or 3-denticulate, apex acuminate; petiole 2–5 cm at anthesis, to 10 cm in fruit, very narrowly winged or wingless; leaf blade broadly ovate, orbicular, or reniform, 1.5–2.5 × 2–3 cm, abaxially ± puberulous, later glabrescent or sparsely puberulous only along veins, adaxially glabrous, base deeply cordate, margin shallowly crenate, apex acute or slightly obtuse. Flowers purple or purplish; pedicels not or slightly exceeding leaves, robust, with 2 linear bracteoles in upper part. Sepals ovate-lanceolate, ca. 4 mm, margin narrowly membranous, basal auricles short, apex truncate. Petals oblong-obovate, lateral ones sparsely bearded, anterior one purple-striate, 1.5–1.8 cm (spur included); spur short, ca. 3 mm, robust, horizontally straight or slightly curved upward; spur of 2 anterior stamens shorter than anthers, ca. 3 mm. Ovary glabrous; styles slightly geniculate at base, gradually thickened upward; stigmas thickly margined on lateral sides and at apex, very shortly beaked in front, with a broad stigma hole at tip of beak. Capsule 5–10 mm, ellipsoid, glabrous, apex acuminate. Fl. May, fr. Jun. $2n = 24$.

Needle-leaved forests, in moist and boggy places, usually along streams. 400–1300 m. Heilongjiang, Jilin, Nei Mongol, N Xinjiang [Japan, Korea, Russia; Europe, North America].

In FRPS (51: 38. 1991), the name *Viola epipsila* Ledebour was misapplied to this species.

24. *Viola brachyceras* Turczaninow, Cat. Pl. Baical-Dahur. 191. 1839; Bull. Soc. Imp. Naturalistes Moscou 15: 301. 1842.

兴安圆叶堇菜 xing an yuan ye jin cai

Herbs perennial, acaulescent, 6–10 cm high. Rhizome 2–3 cm, oblique or vertical, rather sturdy, at top with remnants of leaves and covered with rootlets. Leaves basal, few, 1–2 cm at anthesis; petiole ca. 2 × as long as blade, slightly winged; leaf blade orbicular-cordate, both surfaces glabrous, margin obscurely crenate, apex obtuse or rarely acute; leaves of fruiting plant 3–5 × 3–5 cm, deeply cordate; stipules small, green but subsequently turning brown, ca. 1/2 adnate to petiole, margin sparsely fimbriate. Flowers white or light violet, ca. 8 mm; pedicel slightly exceeding leaves at anthesis. Sepals ovate-lanceolate, 3–4 mm, sparsely denticulate; sepal appendages short, apex rounded. Petals oblong-obovate; lateral petals bearded, lower one shorter than others, lilac-striate; spur short, slightly exceeding sepal appendages. Style geniculate at base, flattened on top. Capsule with dark brown dots, 6–10 mm. Fl. May–Jun, fr. Jul–Sep. $2n = 20$.

Larix forests, river banks; 500–900 m. Heilongjiang, Jilin, Nei Mongol [Mongolia, Russia].

25. *Viola diamantiaca* Nakai, Bot. Mag. (Tokyo) 33: 205. 1919.

大叶堇菜 da ye jin cai

Viola diamantiaca f. *glabrior* (Kitagawa) Kitagawa; *V. diamantiaca* var. *glabrior* Kitagawa.

Herbs perennial, acaulescent, with long, slender stolons. Rhizome obliquely ascending or horizontal, slightly robust, densely noded, with numerous long, slender, brown roots. Basal leaves 1, rarely 2 or 3, produced from top of rhizome; stipules free, greenish, lanceolate or narrowly ovate-lanceolate, ca. 1 cm, submembranous when dry, margin remotely denticulate, apex acuminate; petiole to 20 cm, slender, winged, usually puberulous in upper part, glabrous in lower part; leaf blade abaxially glaucous-green, adaxially green, cordate or ovate-cordate, 7–9 × 5–7 cm, thin, adaxially glabrous, puberulous along veins, base shallowly or deeply cordate, margin obtusely dentate, apex caudate-acuminate. Flowers purplish violet or glaucous, large, long pedicellate; pedicels solitary, slender, 2-bracteolate slightly above middle; bracteoles lanceolate, small. Sepals ovate-lanceolate, glabrous, basal auricles short. Lateral petals 1.5–1.7 cm, glabrous, anterior one 1.8–2 cm (spur included); spur short, ca. 4 mm, stout, apex obtuse. Capsule purple-red punctate, ca. 1.3 cm. Fl. Apr–May, fr. Jun–Aug.

Broad-leaved forests on mountains, forest margins, moist rocks; 600–1500 m. E Jilin, E Liaoning [Korea].

26. *Viola diffusa* Gingins in Candolle, Prodr. 1: 298. 1824.

七星莲 qi xing lian

Viola diffusa var. *brevibarbata* C. J. Wang; *V. diffusa* var. *brevisepala* W. Becker; *V. diffusa* var. *glabella* H. Boissieu; *V. diffusa* var. *glaberrima* W. Becker; *V. diffusa* subsp. *tenuis* (Benth.) W. Becker; *V. diffusa* var. *tomentosa* W. Becker; *V. diffusoides* C. J. Wang; *V. tenuis* Benth.; *V. wilsonii* W. Becker.

Herbs annual, stiffly hairy or white puberulous throughout, or subglabrous, rarely glabrous, producing stolon at anthesis. Stolon with rosulate leaves at top, usually producing adventitious roots. Rhizome short, with numerous white rootlets and fibrous roots. Basal leaves numerous, fasciculate and rosulate, or alternate on stolon; stipules adnate to petioles at base, 2/3 free, linear-lanceolate, 4–12 mm, margin remotely denticulate or fimbriate-dentate, apex acuminate; petiole 2–4.5 cm, conspicuously winged, usually puberulous; leaf blade ovate or ovate-oblong, 1.5–3.5 × 1–2 cm, both surfaces densely white puberulous on young leaves, later gradually sparsely so, but still densely puberulous along veins and margin, or glabrous, base broadly cuneate or truncate, rarely shallowly cordate, conspicuously decurrent to petiole, margin obtusely dentate and ciliate, apex obtuse or ± acute. Flowers purplish or yellowish, small, long pedicellate, in basal leaf axils and leaf axils of stolon; pedicels 1.5–8.5 cm, slender, glabrous or sparsely puberulous, 2-bracteolate at middle; bracteoles linear. Sepals lanceolate, 4–5.5 mm, apex acute, basal auricles short, margin sparsely cili-

ate, apex rounded or remotely denticulate. Lateral petals obovate or oblong-obovate, 6–8 mm, glabrous or shortly bearded, anterior one ca. 6 mm (spur included), conspicuously shorter than other petals, apex acute; spur very short, only ca. 1.5 mm, slightly exerted out of basal auricles of sepals; spur of 2 anterior stamens triangular, short, broad. Ovary glabrous; styles clavate, slightly geniculate, gradually thickened in upper part; stigmas thickly margined on lateral sides and abaxially, slightly raised in central part, shortly beaked in front. Capsule oblong, 6–7 mm, ca. 3 mm in diam., glabrous, often with persistent styles. Seeds ca. 1 mm. Fl. Mar–May, fr. May–Oct. $2n = 26^*$, 74^* .

Mountain forests, forest margins, grassy slopes, stream valleys, rock crevices; below 2000 m. Anhui, Chongqing, Fujian, SE Gansu, Guangdong, Guangxi, Guizhou, Hainan, Henan, Hubei, Hunan, Jiangsu, Jiangxi, S Shaanxi, Sichuan, Taiwan, Xizang, Yunnan, Zhejiang [Bhutan, Japan, India, Indonesia, Malaysia, Myanmar, Nepal, Papua New Guinea, Philippines, Thailand, Vietnam].

27. *Viola grandisepala* W. Becker, Bull. Misc. Inform. Kew 1928: 250. 1928.

阔萼堇菜 kuo e jin cai

Viola binchuanensis S. H. Huang; *V. brunneostipulosa* Handel-Mazzetti.

Herbs perennial, dwarf, nearly acaulescent, 7–10 cm tall. Rhizome ca. 2 cm (shortened stem included), ca. 2 mm in diam., with dense nodes and leaves, sometimes with stolons. Leaves nearly basal; stipules adnate to petioles only at base, deep brown, upper ones ovate, inner ones broadly lanceolate, ca. 1.2 cm, margin entire, apex acuminate; petiole 2–5 cm, soft, glabrous; leaf blade broadly ovate or suborbicular, 1–3 × 1.5–3 cm, both surfaces glabrous, densely brown punctate, adaxially sparsely white puberulous near margin, base deeply cordate, margin densely and shallowly crenulate, apex obtuse or orbicular. Flowers white, medium-sized; pedicels exceeding leaves, glabrous, 2-bracteolate above middle; bracteoles brown, linear. Sepals broadly ovate to ovate, ca. 5 × 3 mm, 3-veined, apex acute, basal auricles very short, abaxially brown punctate, margin densely ciliate. Petals oblong-obovate, lateral ones glabrous, anterior one ca. 1 cm (spur included); spur short, slightly longer than basal auricles of sepals, 1.5–2 mm. Anthers of anterior stamens ca. 2 mm, appendage of connectives ca. 1 mm; spur short, only ca. 1.5 mm, broad. Ovary broadly ovoid; styles nearly erect at base, slightly thickened in upper part; stigmas curved forward and thickly beaked in front, with a large stigma hole at tip of beak. Fl. Apr and Sep, fr. May–Oct.

• Mountain slopes, shaded and moist places along roadsides; 1900–3000 m. Sichuan, Yunnan.

28. *Viola lucens* W. Becker, Bull. Misc. Inform. Kew 1928: 250. 1928.

亮毛堇菜 liang mao jin cai

Herbs perennial, small, 5–7 cm tall, white villous throughout, acaulescent, stoloniferous. Rhizome erect, ca. 2 mm in diam., densely noded, with numerous rootlets. Stolon slender, often producing new plant at top. Leaves basal, rosulate; stipules brown, lanceolate, margin fimbriate-dentate; petioles unequal in length, 0.2–2.5 cm, slender, densely villous; leaf

blade oblong-ovate or oblong, 1–2(–3) × 0.5–1.3 cm, both surfaces densely white villous, base cordate or rounded, margin crenate, apex obtuse. Flowers light bluish violet; pedicels much exceeding leaves, 3–4 cm, slender, sparsely puberulous, 2-bracteolate above middle-bracteolate at middle; bracteoles opposite, linear. Sepals narrowly lanceolate, 2.5–3 × ca. 1 mm, margin narrowly membranous, basal auricles short, only ca. 0.5 mm. Upper and lateral petals obovate, 1–1.1 cm, lateral ones glabrous, anterior one boat-shaped, ca. 9 mm (spur included), apex acute; spur ca. 1.5 mm. Ovary globose, glabrous; styles clavate, base geniculate, thickened at apex; stigmas narrowly margined on lateral sides, apex shortly beaked. Capsule ovoid-orbicular, ca. 0.5 cm, glabrous. Fl. Feb–Apr and Aug–Sep.

• Grassy places, forest margins, crevices; sea level to 1800 m. Anhui, Fujian, Guangdong, Guizhou, Hubei, Hunan, Jiangxi.

29. *Viola formosana* Hayata, J. Coll. Sci. Imp. Univ. Tokyo 22: 28. 1906.

台湾堇菜 tai wan jin cai

Herbs acaulescent. Rhizome erect, short, stout, usually with long stolons; stolons rooting at ends and producing dense rosettes of leaves and flowers. Leaves basal; stipules adnate to petioles only at base, free part lanceolate, margin fimbriate or erose; petioles slender, 1–15 cm, glabrous or sparsely puberulous; leaf blade abaxially greenish purple or glaucous, broadly triangular-cordate or cordate to orbicular, 1–4 × 1–4 cm, both surfaces glabrous or sparsely puberulous, sometimes puberulous along teeth, base deeply cordate, margin crenate, apex acute to rounded or obtuse. Flowers violet to white with darker veins, 1.5–2 cm in diam.; pedicels longer, sometimes to 15 cm, glabrous or puberulous, 2-bracteolate above middle; bracteoles subulate. Sepals narrowly lanceolate, 3–5 × 0.5–1.5 mm, apex acuminate, basal auricles shorter, 0.5–1 mm, glabrous. Upper petals subequaling lateral ones, ovate, ca. 1.2 cm, lateral ones glabrous, base cuneate, apex emarginate, anterior one larger, ca. 1.5 cm, apex deeply emarginate or shallowly 2-lobed; spur 5–7 mm, slightly curved. Styles nearly erect; stigmas narrowly margined on lateral sides and abaxially, shortly beaked in front. Capsule globose to ellipsoid, 4–6 mm, glabrous. Seeds ovoid, ca. 1 mm.

• Mountain forests, mountains, grassy slopes; 1200–2500 m. Taiwan.

- 1a. Leaf blade 1–3 × 1–3 cm, broadly cordate to orbicular, apex acute to rounded or obtuse, petiole 1–10 cm ... 29a. var. *formosana*
- 1b. Leaf blade 1.5–4 × 1–4 cm, triangular-cordate, apex acute, petiole to 15 cm 29b. var. *kawakamii*

29a. *Viola formosana* var. *formosana*

台湾堇菜(原变种) tai wan jin cai (yuan bian zhong)

Viola arisanensis W. Becker; *V. formosana* var. *tozanensis* (Hayata) C. F. Hsieh; *V. taiwanensis* W. Becker; *V. tozanensis* Hayata.

Petiole 1–10 cm; leaf blade 1–3 × 1–3 cm, broadly cordate to orbicular, apex acute to rounded or obtuse. Fl. Mar, fr. May–Jun. $2n = 22^*$.

- Mountains; 1400–2500 m. Taiwan.

29b. *Viola formosana* var. *kawakamii* (Hayata) Y. S. Chen & Q. E. Yang, **comb. nov.**

川上氏堇菜 *chuan shang shi jin cai*

Basionym: *Viola kawakamii* Hayata, J. Coll. Sci. Imp. Univ. Tokyo 25(19): 52. 1908; *V. formosana* var. *stenopetala* (Hayata) J. C. Wang et al.; *V. hypoleuca* Hayata; *V. kawakamii* var. *stenopetala* Hayata; *V. matsudae* Hayata; *V. takasagoensis* Koidzumi.

Petiole to 15 cm; leaf blade triangular-cordate, 1.5–4 × 1–4 cm, apex acute. $2n = 22^*$.

- Mountain forests, grassy slopes; 1200–2400 m. Taiwan.

“*Viola formosana* var. *kawakamii* (Hayata) J. C. Wang” (Taxonomic Study *Viola* Taiwan, 167. 1988) appeared in a Ph.D. dissertation, which is not effectively published under Art. 30.5 of the *Vienna Code*.

30. *Viola davidii* Franchet, Nouv. Arch. Mus. Hist. Nat., sér. 2, 8: 203. 1886.

深圆齿堇菜 *shen yuan chi jin cai*

Viola davidii var. *paucicrenata* W. Becker; *V. schneideri* W. Becker; *V. smithiana* W. Becker.

Herbs perennial, nearly acaulescent, 7–10 cm tall, glabrous. Rhizome obliquely ascending, shortly noded, with dense rootlets. Stolon developed, 10–15 cm, with scattered leaves and flowers, producing adventitious roots at nodes, top usually developing into a new plant. Leaves nearly basal; stipules mostly free, brown, broadly lanceolate, 1–1.5 cm, adaxially brown striate, margin remotely fimbriate-dentate, apex long acuminate; petioles unequal in length, longest to 5 cm; leaf blade abaxially often glaucous, adaxially greenish, ovate or ovate-orbicular, 2–7 × 1.5–3.5 cm, both surfaces glabrous, with brown glandular dots when dry, base deeply cordate, margin shallowly 6–8-crenate on each side, apex rounded or acute. Flowers white or purplish; pedicels exceeding or subequaling leaves, 2-bracteolate above middle; bracteoles linear. Sepals lanceolate or ovate-lanceolate, 5–6 × 1.5–2 mm, apex acute, basal auricles short, margin narrowly membranous, apex truncate. Petals oblong-obovate, 7–8 mm, lateral ones bearded, anterior one shorter; spur saccate, short, 1.5–2 mm, ca. 2 mm in diam.; spur of anterior stamens oblong, short, subequaling anthers, ca. 2 mm. Ovary oblong, glabrous; styles clavate, base nearly erect, gradually thickened upward; stigmas conspicuously and broadly margined on lateral sides, beaked in front, beak upward and straight, short, stout, with large stigma hole at tip. Capsule oblong, 5–7 mm, glabrous. Fl. Mar–May and Sep, fr. May–Oct.

- Mountain forests, forest margins, grassy slopes, stream valleys, roadsides; 1200–2800 m. Chongqing, Fujian, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangxi, Sichuan, SE Xizang, Yunnan, Zhejiang.

31. *Viola nagasawae* Makino & Hayata, J. Coll. Sci. Imp. Univ. Tokyo 22: 30. 1906 [“*nagasawai*”].

台北堇菜 *tai bei jin cai*

Herbs perennial, acaulescent, with slender stolon. Rhizome

erect, brownish, slender. Stolon with clustered leaves at top. Leaves basal, rosulate; stipules subulate, ca. 7 mm, margin erose, long fimbriate; petiole ca. 3 cm, slender, sparsely spreading puberulous; leaf blade ovate, elliptic, triangular-ovate to lanceolate, 1–1.5 × 0.8–1 cm, abaxially glabrous or hairy, adaxially with sparse white stiff hairs, base shallowly cordate, margin 8–10-crenate and ciliate, apex obtuse. Flowers purplish, small; pedicels produced from axils of basal leaves and those of leaves on stolon, much exceeding leaves, 8–10 cm, slender, 2-bracteolate at middle; bracteoles subopposite, linear, 5–7 mm, minutely ciliate. Sepals linear-lanceolate, 4–5 mm, margin sparsely fimbriate-ciliate or glabrous, basal auricles short. Petals obovate, upper ones subequaling lateral ones, 9–11 × ca. 4.5 mm, lateral petals glabrous or bearded, anterior petal oblong, ca. 7.5 mm (spur included), apex acuminate; spur short, ca. 1.5 mm; spur of 2 anterior stamens oblong, ca. 1.5 mm, nearly as broad as anthers. Ovary ovoid, glabrous; styles nearly erect, slender at base; stigmas slightly 2-lobed, lobes narrow and slightly thick, slightly raised in central part, shortly beaked in front. Capsule ca. 5 mm.

- Grassy slopes; below 1100 m. Taiwan.

- 1a. Leaf blade ovate or elliptic, apex obtuse, abaxially glabrous; sepals sparsely fimbriate-ciliate along margin; lateral petals beardless 31a. var. *nagasawae*
- 1b. Leaf blades triangular-ovate to lanceolate, apex acute, both surfaces stiffly hairy; sepals sparsely ciliate or glabrous along margin; lateral petals bearded 31b. var. *pricei*

31a. *Viola nagasawae* var. *nagasawae*

台北堇菜(原变种) *tai bei jin cai* (yuan bian zhong)

Viola acutilabella Hayata; *V. nagasawae* var. *acutilabella* (Hayata) Nakai.

Leaf blade ovate or elliptic, apex obtuse, abaxially glabrous; sepals sparsely fimbriate-ciliate along margin; lateral petals beardless. Fl. Mar–Nov, fr. May–Nov. $2n = 48^*$.

- Moist places on grassy slopes; 200–1100 m. Taiwan.

31b. *Viola nagasawae* var. *pricei* (W. Becker) J. C. Wang & T. C. Huang, *Taiwania* 35: 47. 1990.

锐叶台北堇菜 *rui ye tai bei jin cai*

Viola pricei W. Becker, Bull. Misc. Inform. Kew 1928: 252. 1928.

Leaf blade triangular-ovate to lanceolate, both surfaces stiffly hairy, apex acute. Sepals sparsely ciliate or glabrous along margin. Lateral petals bearded. $2n = 48^*$.

- Grassy slopes; below 500 m. Taiwan.

32. *Viola sikkimensis* W. Becker, *Beih. Bot. Centralbl.*, Abt. 2, 34: 260. 1916.

锡金堇菜 *xi jin jin cai*

Viola hookeri Thomson & W. Becker (1916), not Franchet (1886).

Herbs perennial, acaulescent. Rhizome short, 2–2.5 cm, stout, 4–7 mm in diam., densely noded, often with brown remains of stipules. Stolon to more than 10 cm; internodes longer, producing rootlets at nodes. Leaves basal; stipules brown, lanceolate, 1–1.3 cm, margin long fimbriate-dentate; petiole 3–10 cm, glabrous; leaf blade abaxially gray-green, adaxially deep green and nitid, broadly ovate or suborbicular, 1.5–5 × 1.5–4 cm, both surfaces glabrous or sparsely puberulous, base deeply cordate, margin densely and shallowly crenate, apex obtuse. Flowers white or purplish; pedicels exceeding leaves, glabrous, 2-bracteolate above middle; bracteoles subopposite, linear, margin remotely denticulate. Sepals narrowly lanceolate, 5–6 mm, glabrous, 3-veined, basal auricles rounded or remotely dentate at apex. Petals oblong-obovate, 1–1.2 cm × 4–4.5 mm, lateral ones glabrous, anterior one purple veined, shorter, 1–1.2 cm (spur included); spur ca. 2 mm, ca. 2.5 mm in diam., slightly enlarged; spur of 2 anterior stamens angular, slightly longer than anthers, apex obtuse. Ovary conic, glabrous; styles clavate, gradually thickened upward; stigmas flat at apices, broadly margined on lateral sides and abaxially, shortly beaked at apex, beak straight. Capsule ovoid-orbicular. Fl. Apr–May, fr. May–Jun.

Mountain forests, forest margins, streamsides, riversides; 1500–2500 m. SE Xizang, Yunnan [?Bhutan, India, Myanmar, Nepal].

33. *Viola kwangtungensis* Melchior, Sunyatsenia 1: 124. 1933.

广东堇菜 *guang dong jin cai*

Viola sikkimensis W. Becker var. *debilis* W. Becker.

Herbs perennial, small, acaulescent or nearly so, 4–9 cm tall, glabrous, sometimes stoloniferous. Rhizome nearly erect, slender, densely noded. Leaves basal; stipules free or adnate to petioles only at base, brown, lanceolate, ca. 0.5 mm, margin fimbriate, apex acuminate; petioles unequal in length, 2–5 cm, glabrous; leaf blade abaxially purple, adaxially deep green, orbicular or sometimes reniform, 1–3 × 1–3 cm, both surfaces glabrous, base shallowly cordate or truncate, margin deeply crenate, shortly spinose in between teeth, apex obtuse. Flowers light violet, sometimes white; pedicels 4–9 mm, slender, 2-bracteolate at upper part; bracteoles linear. Sepals lanceolate, usually pubescent, 3–5 × 1.5–2 mm, apex ± acute, basal auricles absent, margin membranous, apex truncate. Petals obovate-oblong, upper ones 1–1.2 cm × ca. 4 mm, lateral ones subequaling upper ones, glabrous, anterior one shorter, ca. 9 mm (spur included), purple veined; spur saccate, shorter, ca. 2 mm. Anthers ca. 1.5 mm. Ovary globose, with brown glandular dots; styles clavate, base geniculate; stigmas narrowly margined on lateral sides and abaxially, shortly beaked in front. Capsule ellipsoid, ca. 7 mm, glabrous, often with brown glandular dots. Fl. Apr–May, fr. May–Aug.

• Forests, forest margins, grasslands on mountain slopes, stream valleys, shaded places on rocks; 600–2000 m. Fujian, N Guangdong, Hunan, Jiangxi, Sichuan.

34. *Viola duclouxii* W. Becker, Bull. Misc. Inform. Kew 1928: 249. 1928.

紫点堇菜 *zi dian jin cai*

Herbs perennial, acaulescent, with stolons. Rhizome short, 2–4 cm, stout, 2–3 mm in diam., densely noded, often with brown remains of stipules. Stolon to 20 cm, internodes longer, producing rootlets at nodes. Leaves basal; stipules brown, lanceolate, 8–10 mm, margin long or sparsely fimbriate; petiole 1.5–12 cm, glabrous; leaf blade abaxially gray-green, adaxially deep green, broadly ovate or suborbicular, 1.5–4 × 1.3–3.5 cm, dotlike brown glandular, abaxially glabrous, adaxially sparsely puberulous and scabrous, base deeply cordate, margin densely and shallowly rounded-serrate, apex obtuse; leaves in stolons smaller. Flowers white; pedicels 2–2.5 cm, glabrous, 2-bracteolate at middle; bracteoles subopposite, linear, margin entire. Sepals linear-lanceolate, ca. 3 × 1.2 mm, puberulous or nearly glabrous when mature, basal auricles ca. 1 mm, apex acute. Upper petals spatulate, ca. 7 × 4 mm, lateral ones spatulate, ca. 8 × 3 mm, glabrous, anterior one oblong, ca. 9 × 3 mm; spur ca. 1 mm, ca. 5 mm in diam. Capsules ovoid, 5–6 mm. Seeds globose, ca. 1.2 mm in diam. Fl. Mar–Apr, fr. Aug–Sep.

• Forests; 1600–2700 m. Yunnan.

35. *Viola yunnanensis* W. Becker & H. Boissieu, Bull. Herb. Boissier, sér. 2, 8: 740. 1908.

云南堇菜 *yun nan jin cai*

Herbs perennial. Rhizome elongate, obliquely ascending or procumbent and stemlike, with adventitious roots at nodes. Stem absent or shorter, less than 2 cm. Stolon to 37 cm, slender, usually densely white puberulous, with clustered leaves at top and often producing a new plant. Leaves nearly basal or alternate on stolon; stipules mostly free, glaucous, lanceolate, 1–1.3 cm, membranous, margin fimbriate-dentate, apex narrowly long acuminate; petioles unequal in length, 3–8 cm, densely spreading white puberulous; leaf blade abaxially gray-green, adaxially deep or dark green, oblong or oblong-ovate, 3–8 × 2–4 cm, broadest near middle, both surfaces densely gray-white puberulous, more densely so on young leaves, base shallowly and narrowly cordate, margin large crenate, apex acute or acuminate. Flowers white, 1.5–1.7 cm, ca. 1.5 cm in diam.; pedicels of cleistogamous flowers produced from basal leaf axils much shorter than leaves, those on stolon much longer than leaves; pedicels densely puberulous, 2-bracteolate above middle; bracteoles opposite, linear, 8–10 mm. Sepals linear-lanceolate or lanceolate, 5–7 mm, basal auricles short, sparsely white puberulous along veins, 3-veined, margin densely ciliate. Upper petals oblong, 1.3–1.5 cm × 5–6.5 mm, lateral ones ca. 1 cm, usually shortly bearded, anterior one shorter, deeply veined, 8–9 mm (spur included), apex acute; spur saccate, very short, ca. 1.5 mm, slightly curved downward; spur of 2 anterior stamens very shortly angular. Ovary ovoid-globose, glabrous; styles clavate, base nearly erect, gradually thickened upward; stigmas narrowly margined, shortly beaked in front, beak straight, with a smaller stigma hole at tip. Capsule green, oblong or subglobose, small, 5–7 mm. Seeds globose. Fl. Feb–Jun, fr. May–Dec.

Mountain forests, grasslands along forest margins, moist places on rocks along streamsides and roadsides; 1300–2400 m. Hainan, S Yunnan [Indonesia, Malaysia, Myanmar, Vietnam].

36. *Viola fargesii* H. Boissieu, Bull. Herb. Boissier, sér. 2, 2: 333. 1902.

柔毛堇菜 rou mao jin cai

Viola adenothrix Hayata; *V. adenothrix* var. *tsugitakaensis* (Masamune) J. C. Wang & T. C. Huang; *V. arisanensis* W. Becker; *V. brachycentra* Hayata; *V. canescens* Wallich f. *glabrescens* W. Becker; *V. canescens* subsp. *lanuginosa* W. Becker; *V. principis* H. Boissieu; *V. principis* var. *acutifolia* C. J. Wang; *V. pulla* W. Becker; *V. thrichopoda* Hayata; *V. tsugitakaensis* Masamune.

Herbs perennial, spreading white puberulous throughout. Rhizome robust, 2–4 cm, 3–7 mm in diam. Stolon longer, elongated, puberulous, sometimes stemlike. Leaves nearly basal or alternate on stolon; stipules mostly free, brown or greenish, dark striate, broadly lanceolate, 1.2–1.8 cm × 3–4 mm, margin long fimbriate-dentate, apex acuminate; petiole 5–13 cm, densely villous, wingless; leaf blade ovate or broadly ovate, sometimes suborbicular, 2–6 × 2–4.5 cm, abaxially puberulous, more densely so along veins, base broadly cordate or narrowly cordate, margin densely and shallowly obtusely dentate, apex rounded, rarely acuminate. Flowers white; pedicels usually exceeding leaves, densely spreading white puberulous, 2-bracteolate above middle; bracteoles opposite, linear. Sepals narrowly ovate-lanceolate or lanceolate, 7–9 mm, apex acuminate, basal auricles short, ca. 2 mm, 3-veined, margin puberulous outside, apex obtuse. Petals oblong-obovate, 1–1.5 cm, apex ± acute, lateral ones slightly bearded, anterior one shorter, ca. 7 mm (spur included), apex acute; spur saccate, short, 2–2.5 mm, stout, ca. 2 mm in diam.; spur of 2 anterior stamens angular, slightly longer than anthers, apex acute. Ovary conic, glabrous; styles clavate, base slightly geniculate, thickened upward, slightly flat at apex, conspicuously margined on lateral sides, shortly beaked in front, with a stigma hole open upward at tip of beak. Capsule narrowly orbicular, ca. 8 mm, glabrous. Fl. Mar–Jun, fr. Jun–Sep. $2n = 24^*$.

• Mountain forests, forest margins, grasslands, stream valleys, roadsides; 600–3800 m. S Anhui, Fujian, N Guangdong, N Guangxi, Guizhou, Hubei, Hunan, Jiangsu, Jiangxi, Sichuan, Taiwan, Yunnan, Zhejiang.

37. *Viola mucronulifera* Handel-Mazzetti, Sinensia 2: 4. 1931.

小尖堇菜 xiao jian jin cai

Herbs perennial, nearly acaulescent, or stem short, only ca. 1 cm. Rhizome long, slender; internodes remote. Stolon to 15 cm, slender, glabrous, producing numerous adventitious roots at nodes, top developing into a new plant. Leaves nearly basal or clustered on shortened stem; stipules adnate to petioles only at base, free part lanceolate, brown striate, margin long fimbriate-dentate; petioles subequaling blades, to 7 cm, glabrous; leaf blade abaxially gray-green, adaxially deep green, ovate-cordate or elliptic-cordate, 2–5 × 1.5–3 cm, both surfaces glabrous, abaxially often sparsely spinose along raised midvein, base narrowly cordate, margin serrate, 6–10-toothed on each side, teeth suborbicular, conspicuously spinose at apices, spines spreading or bending forward and often reddish glandular at apices, apex acute. Flowers white or purplish; pedicels subequaling or

slightly shorter than leaves, 2-bracteolate above middle; bracteoles linear. Sepals lanceolate, ca. 5 × 1–1.2 mm, glabrous, margin narrowly membranous, basal auricles short, less than 1 mm, apex truncate, sparsely shallowly dentate. Petals obovate, upper ones subequaling lateral ones, ca. 1.3 × 0.5 cm, lateral ones glabrous, anterior one shorter, ca. 1.1 cm × ca. 3 mm (spur included); spur saccate, short, 2–2.5 mm, stout, 2–2.5 mm in diam.; spur of 2 anterior stamens acutangular, ca. 2 mm, subequaling anthers. Ovary oblong-globose, glabrous; styles clavate, base slightly geniculate, gradually thickened upward; stigmas slightly raised at apex, thickened and narrowly margined on lateral sides, inconspicuously beaked at apex, with a small stigma hole open upward at tip of beak. Capsule ellipsoid, ca. 6 mm, glabrous. Fl. Mar–Apr, fr. May–Jun.

• Mountain forests, forest margins, grasslands; 1300–1900 m. Guangxi, Guizhou, Sichuan, Yunnan.

38. *Viola thomsonii* Oudemans in Miquel, Ann. Mus. Bot. Lugduno-Batavi 3: 74. 1867.

毛堇菜 mao jin cai

Herbs perennial, acaulescent. Rhizome long, longest to 10 cm, stout, 4–6 mm in diam.; internodes 2–4 cm. Stolon long, to 15 cm, slender, flagellate, with alternate small leaves, often producing new plant at top. Leaves basal; stipules deep brown, lanceolate or broadly lanceolate, 1–1.5 cm, dry membranous, margin fimbriate-dentate, glabrous; petioles unequal in length, 6–11 cm, very narrowly winged in upper part, glabrous; lower leaves cordate, smaller, upper ones larger, ovate-cordate, 6–8 × 4–4.5 cm, both surfaces sparsely white puberulous or glabrous adaxially, base deeply cordate, margin densely and shallowly crenate, apex acuminate. Flowers white or light violet; pedicels usually not exceeding leaves, glabrous, 2-bracteolate tightly near flower; bracteoles brown, linear, 1–1.3 cm, dry membranous. Sepals lanceolate, 4.5–5.5 × 1.2–1.8 mm, apex acute, basal auricles longer, ca. 2 mm, apex shallowly 2- or 3-dentate, sparsely ciliate, 3-veined. Petals oblong-obovate, ca. 1.5 cm, lateral ones shortly bearded, anterior one shorter, inside purple striate, shortly spurred; spur saccate, shorter than basal auricles of sepals, ca. 2 mm in diam.; spur of 2 anterior stamens shortly angular, subequaling anthers. Ovary ovoid-globose, glabrous; styles clavate; stigmas narrowly margined on lateral sides, shortly beaked in front, beak erect, with smaller stigma hole at tip. Capsule ellipsoid. Seeds dark brown, globose, 7–10 mm. Fl. Apr–Jun, fr. Jul–Aug.

Mountain forests, forest margins, stream valleys, shaded and moist places along roadsides; 800–2400 m. SE Xizang, NW and S Yunnan [Bhutan, E India, Myanmar, Nepal].

39. *Viola sumatrana* Miquel, Fl. Ned. Ind., Eerste Bijv. 389. 1861.

光叶堇菜 guang ye jin cai

Viola hossei W. Becker.

Herbs perennial, acaulescent. Rhizome 1–20 cm, 1.5–2.5 mm in diam., with brown remains of stipules at nodes. Stolon 15–20 cm, longest to 40 cm, slender, glabrous, producing adventitious roots. Leaves basal or alternate on stolon; stipules

free, deep brown, linear-lanceolate, 7–15 mm, margin long fimbriate-dentate; petioles unequal in length, 2–9 cm, narrowly winged in upper part, puberulous or glabrescent; leaf blade abaxially greenish, adaxially deep green or dark green, triangular-ovate or oblong-ovate, 2–5 × 1.5–3 cm, usually broadest near base, both surfaces glabrous or sparsely white puberulous and dotlike brown glandular, base deeply cordate, margin shallowly serrate or shallowly crenate, glandular at apices of teeth, apex long acuminate. Flowers violet to light purple or white; pedicels usually not exceeding leaves, 2-bracteolate at or slightly above middle; bracteoles opposite, rarely alternate, 3–8 mm. Sepals linear-lanceolate, 5–6 mm, apex acute; appendages very short, only ca. 0.5 mm, 3-veined, dotlike rusty glandular, margin membranous, apex truncate. Petals oblong-ovate, 8–10 × ca. 3 mm, lateral ones glabrous, anterior one shorter, ca. 7 mm (spur included); spur saccate, short, ca. 1.5 mm, usually twice as long as calycine appendages; spur of 2 anterior stamens short, wide, shortly angular, usually subequaling anthers. Ovary ovoid-globose; styles clavate, base slightly geniculate, gradually thickened upward; stigmas thickened and conspicuously margined on lateral sides, margin spreading, shortly beaked in front, beak erect, with a smaller stigma hole at tip. Capsule ellipsoid, small, 5–7 mm, dotlike brown rusty glandular. Seeds globose, small, ca. 0.5 mm in diam. Fl. spring–summer, fr. summer–autumn. $2n = 46$.

Shaded forests, forest margins, streamsides, rock crevices along streamsides; below 2400 m. Guangxi, Guizhou, Hainan, S Yunnan [Indonesia, Malaysia, Myanmar, Thailand, Vietnam].

40. *Viola nuda* W. Becker, Repert. Spec. Nov. Regni Veg. 26: 26. 1929.

裸堇菜 *luo jin cai*

Herbs perennial, acaulescent, stoloniferous, or with very short stem, 7–13 cm tall. Rhizome erect, 1–3 cm, ca. 3 mm in diam., conspicuously noded; stolons 1 or several, 10–15 cm, with leaves at top. Stipules free, lanceolate, 1–2 cm, margin remotely fimbriate-dentate, apex acuminate; petiole 2.5–8 cm, wingless; leaf blade ovate, 2–5 × 2.5–4 cm, but smaller on stolons, both surfaces glabrous, base broadly cordate, margin shallowly serrate, apex ± acute. Flowers white, purplish striate and punctate at base; pedicels 2-bracteolate at upper part; bracteoles 6–8 mm. Sepals narrowly ovate, ca. 5 × 2–2.5 mm, basal auricles short, margin denticulate. Upper petals obovate, lateral ones obovate-oblong, ca. 1 cm, inside shortly bearded, anterior one shorter, ca. 8 mm, apex ± acute; spur of 2 anterior stamens acutely angular, ca. 1.5 mm. Anthers ca. 2 mm, appendage of connectives ca. 1.5 mm. Styles geniculate at base; stigmas flat at top, narrowly margined on lateral sides and abaxially, very shortly beaked in front. Capsules unknown. Fl. Apr.

• Mountain thickets, streamsides, riversides; ca. 2700 m. W Yunnan.

41. *Viola rossii* Hemsley, J. Linn. Soc., Bot. 23: 54. 1886.

辽宁堇菜 *liao ning jin cai*

Herbs perennial, acaulescent. Rhizome erect or obliquely ascending, deep brown, 2–4 cm, 3–4 mm in diam., sometimes branched in upper part, densely noded, with numerous brown

rootlets at nodes. Leaves basal; stipules free, greenish, lanceolate or narrowly ovate, 5–8 mm, submembranous when dry, margin entire or remotely denticulate, apex acuminate; petiole soft, very narrowly winged, to 14 cm after anthesis; leaf blade abaxially greenish, adaxially green, broadly ovate or subreniform, 2–6 × 2–5 cm, abaxially densely white puberulous, gradually less hairy on old leaves, adaxially sparsely white puberulous at base and along margin, base shallowly cordate, rarely deeply cordate, auricles often involute, margin densely serrulate, apex acuminate. Flowers purple, large, long pedicellate; pedicels subequaling leaves, glabrous, 2-bracteolate slightly above middle; bracteoles opposite, lanceolate. Sepals ovate or oblong-ovate, ca. 7 mm, glabrous, basal auricles short, apex obtuse or truncate, remotely dentate. Petals obovate, lateral ones sparsely bearded or glabrous, anterior one spatulate, 1.8–2 cm (spur included); spur saccate, 3–4 mm, ca. 4 mm in diam.; spur of 2 anterior stamens shorter, subequaling anthers, ca. 3 mm, ca. 1.5 mm in diam., apex slender. Ovary glabrous; styles slightly geniculate at base, slightly thickly margined on lateral sides, slightly flat in central part, shortly beaked in front. Capsule ellipsoid, large, ca. 1.2 cm, glabrous, apex mucronate. Seeds glaucous, ovoid-globose, ca. 2.8 mm, ca. 1.8 mm in diam., smooth. Fl. Apr–May, fr. Jun–Aug. $2n = 24$.

Mixed needle-leaved and broad-leaved forests, broad-leaved forests, forest margins, thickets, grasslands on mountain slopes; 100–1300 m. Anhui, Hunan, Jiangxi, Liaoning, Shandong, Zhejiang [Japan, Korea].

42. *Viola moupinensis* Franchet, Bull. Soc. Bot. France 33: 412. 1886.

萱 萱

Viola mairei H. Léveillé; *V. moupinensis* var. *lijiangensis* C. J. Wang; *V. palustris* var. *moupinensis* (Franchet) Franchet; *V. paravaginata* H. Hara; *V. rosthornii* E. Pritzel; *V. vaginata* Maximowicz subsp. *alata* W. Becker; *V. vaginata* var. *sutchuensis* Franchet ex H. Boissieu.

Herbs perennial, acaulescent, sometimes with ascending stolon to 30 cm, clustered with several leaves at top of stolon. Rhizome erect or sometimes obliquely ascending, to 15 cm, 6–10 mm in diam., densely noded, usually with brown remains of stipules and dense rootlets. Leaves basal; stipules free, brownish or light colored in upper half, ovate, 1–1.8 cm, margin remotely denticulate or entire, apex acuminate; petiole winged, 4–10 cm, to 25 cm after anthesis; leaf blade cordate or reniform-cordate, 2.5–5 × 3–4.5 cm, accrescent after anthesis and reniform, ca. 9 × 10 cm, both surfaces glabrous, sometimes slightly puberulous only along veins abaxially, base narrowly sinuate or broadly triangular, lateral auricles often involute at anthesis, margin glandular obtusely dentate, apex acute or acuminate. Flowers purplish or white, purple-striate, large; pedicels not exceeding leaves, 2-bracteolate at middle; bracteoles linear. Sepals lanceolate or narrowly ovate, apex ± acute, basal auricles short, apex truncate, remotely and shallowly dentate, margin narrowly membranous. Petals oblong, lateral ones bearded, anterior one ca. 1.5 cm (spur included); spur saccate, conspicuously longer than basal auricles of sepals, stout; spur of 2 anterior stamens ca. 1 mm, ca. 1.1 mm in diam., apex obtuse. Ovary glabrous; styles slightly geniculate forward at base,

thickened in upper part; stigmas truncate, thickly margined on lateral sides and abaxially, shortly beaked in front, beak horizontal. Capsule ellipsoid, ca. 1.5 cm, glabrous, brown glandular. Seeds large, obovoid, ca. 2.5 mm, ca. 2 mm in diam., base acute, apex rounded. Fl. Mar–May, fr. May–Jul.

Open places at forest margins, thickets, streamsides, grassy slopes; 600–3600 m. Anhui, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangsu, Jiangxi, Shaanxi, Sichuan, Xizang, Yunnan, Zhejiang [Bhutan, India (Sikkim), Nepal].

Wang (Bull. Bot. Res., Harbin 8(2): 20. 1988) described a yellow-flowered variety, *Viola moupinensis* var. *lijiangensis*, and stated that it differs from the typical variety in having yellow flowers. According to our examination of the type material and field work at the type locality, we consider that the flower color of the type specimens might have been wrongly recorded.

43. *Viola dactyloides* Roemer & Schultes, Syst. Veg. 5: 351. 1819.

掌叶堇菜 *zhang ye jin cai*

Viola dactyloides var. *multipartita* W. Becker.

Herbs perennial, acaulescent, 7–20 cm tall. Rhizome slightly obliquely ascending, short, 6–20 mm, with numerous red-brown roots. Leaves basal, long petiolate; stipules greenish, ovate-lanceolate, over 1/2 adnate to petioles, free part long acuminate at apex, margin entire or remotely fimbriate-denticulate, dry membranous; petiole to 15 cm, usually white puberulous in lower part, glabrescent; leaf blade 5-palmatisect, segments oblong, oblong-ovate, or broadly lanceolate, 3–4 × 0.5–1 cm (slightly accrescent at fruiting), abaxially more densely puberulous along veins and margin, adaxially glabrous or sparsely puberulous, base acuminate and shortly stipitate, stipes white puberulous or glabrous, margin remotely serrate or slightly repand, or shallowly emarginate-dentate, sometimes some segments shallowly or deeply 2- or 3-lobed, apex ± acute. Flowers purplish, large, fragrant, long pedicellate; pedicels deep green, usually not exceeding leaves, glabrous, 2-bracteolate below middle; bracteoles linear, small, 5–8 mm, margin entire or few denticulate. Sepals oblong or lanceolate, ca. 8 mm, apex slightly obtuse, basal auricles short, only 1–1.5 mm, 3-veined, margin narrowly membranous, apex truncate. Upper petals broadly obovate, ca. 1.6 × 0.85 cm, claw ca. 4.5 mm; lateral petals oblong-obovate, ca. 1.5 × 0.7 cm, conspicuously bearded; anterior petal obovate, 2–2.3 cm (spur included), spur long, 5–6 mm, stout, ca. 2.5 mm in diam., slightly curved upward, apex obtuse. Anthers ca. 2 mm, appendage of connectives ca. 2 mm, spur of 2 anterior stamens long, ca. 4 mm, slender, 0.2–0.6 mm in diam. Ovary ovoid-globose, ca. 2 mm, glabrous; styles slender at base and geniculate forward, conspicuously thickened in upper part; stigmas 2-lobed, slightly thickened and narrowly margined on lateral sides, margin erect, slightly concave in central part, shortly beaked in front, beak obliquely ascending and larger, with a small stigma hole at tip. Capsule purplish (immature), ellipsoid, ca. 7 mm, glabrous, apex acute. Seeds brown-red, ovoid-globose, ca. 2.5 mm, ca. 2 mm in diam. Fl. and fr. May–Aug. $2n = 24$.

Deciduous broad-leaved forests, mixed needle-leaved and broad-leaved forests, forest margins, thickets, shaded rock crevices; 500–700

m. N Hebei, Heilongjiang, Jilin, Liaoning, Nei Mongol [Mongolia, Russia].

44. *Viola dissecta* Ledebour, Fl. Altaic. 1: 255. 1829.

裂叶堇菜 *lie ye jin cai*

Herbs perennial, acaulescent, highly variable in height, 3–17 cm tall at anthesis, 4–34 cm tall at fruiting. Rhizome erect, short, 5–12 mm, 3–8 mm in diam., densely noded, often producing from lower part several thicker yellowish roots. Stipules of basal leaves glaucous to greenish, over 2/3 adnate to petioles, free part narrowly lanceolate, submembranous, margin remotely denticulate, apex acuminate; petioles highly variable in length and indumentum, 1.5–24 cm, those of young leaves often pubescent, glabrescent; blades of basal leaves orbicular, reniform, or broadly ovate, 1.2–9 × 1.5–10 cm, both surfaces white pubescent, later glabrescent or sparsely pubescent only adaxially, veins conspicuously raised and pubescent or glabrous abaxially, usually 3-, rarely 5-sect, segments linear, oblong, or narrowly ovate-lanceolate, 0.2–3 cm wide, margin entire or sparsely irregularly dentate, or subpinnatifid, terminal lobes usually minutely ciliate, blade not divided, margin incised. Flowers purplish or purple-violet, large; pedicels usually subequaling or slightly exceeding leaves, usually shorter than leaves at fruiting, hairy or glabrous, 2-bracteolate above middle; bracteoles linear. Sepals ovate, oblong-ovate, or lanceolate, 4–7 mm, 3-veined, margin narrowly membranous, apex ± acute, basal auricles short, 1–1.5 mm, apex truncate, entire or 1- or 2-denticulate. Upper petals narrowly obovate, 8–13 × 6–9 mm, slightly curved upward in upper part, lateral ones oblong-obovate, 7–10 mm × ca. 6 mm, sparsely bearded, anterior one (including spur) 1.4–2.2 cm; spur conspicuous, cylindrical, 4–8 mm, 2–3 mm in diam., apex obtuse and slightly enlarged. Anthers 1.5–2 mm, appendage of connectives 1.5–2 mm, spur of anterior 2 stamens long, 3–5 mm, slender, 0.5–0.7 mm in diam. Ovary ovoid-globose, ca. 1.8 mm, glabrous; styles clavate, 2–2.5 mm, slightly slender at base and slightly geniculate forward; stigmas slightly thickened and margined on lateral sides and abaxially, margins spreading, shortly beaked in front, with a conspicuous stigma hole at tip of beak. Capsule oblong or ellipsoid, 7–18 mm, apex acute, pericarp hard, glabrous. Fl. Apr–Sep, fr. May–Oct.

Grasslands in logged forest areas and on mountain slopes, mixed forest margins, thickets, field margins, roadsides; below 3000 m. Gansu, Hebei, Heilongjiang, Jilin, Liaoning, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi, N Sichuan [Korea, Mongolia, Russia].

1a. Leaf blade deeply divided 44a. var. *dissecta*

1b. Leaf blade margin incised 44b. var. *incisa*

44a. *Viola dissecta* var. *dissecta*

裂叶堇菜(原变种) *lie ye jin cai* (yuan bian zhong)

Viola dissecta f. *pubescens* (Regel) Kitagawa; *V. dissecta* var. *pubescens* (Regel) Kitagawa; *V. ×lii* Kitagawa; *V. pinnata* Linnaeus var. *dissecta* (Ledebour) Regel; *V. pinnata* subsp. *multifida* W. Becker.

Leaf blade cordate, glabrous or sparsely pubescent, deeply divided. Fl. Apr–Sep, fr. May–Oct. $2n = 24^*$.

Grasslands on mountain slopes, mixed forest margins, thickets, field margins, roadsides; below 3000 m. Gansu, Hebei, Heilongjiang, Jilin, Liaoning, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi, N Sichuan [Korea, Mongolia, Russia].

44b. *Viola dissecta* var. *incisa* (Turczaninow) Y. S. Chen, **comb. et stat. nov.**

总裂叶堇菜 zong lie ye jin cai

Basionym: *Viola incisa* Turczaninow, Bull. Soc. Imp. Naturalistes Moscou 15: 302. 1842; *V. fissifolia* Kitagawa; *V. ×jettmarii* Handel-Mazzetti.

Leaf blade ovate, 1.5–3 × 1–1.5 cm, accrescent at fruiting, to 5 cm, both surfaces densely white puberulous, base broadly cuneate, margin irregularly emarginate-lobed to emarginate-fid, lower lobes irregularly 2- or 3-dentate, apex ± acute. Fl. Apr–May, fr. Jun–Oct.

Forest margins on mountains, grasslands in logged forest areas, grasslands on mountain slopes; below 1300 m. Hebei, Jilin, Liaoning, Nei Mongol, Shaanxi, Shanxi [Mongolia, Russia].

One of us (Nikitin) prefers to treat *Viola incisa* as a distinct species, at least in Russia, and considers *V. fissifolia* also possibly to be a separate species.

45. *Viola chaerophylloides* (Regel) W. Becker, Bull. Herb. Boissier, sér. 2, 2: 856. 1902.

南山堇菜 nan shan jin cai

Herbs perennial, acaulescent, dwarf at anthesis, 4–20 cm tall, to more than 30 cm tall at fruiting. Rhizome erect, short, 3–10 mm, stout, surrounded by remains of stipules, with 3–6 robust yellowish or white roots. Basal leaves 2–6, long petiolate; stipules over 1/2 adnate to petioles, broadly lanceolate, membranous, margin sparsely denticulate and ciliate or entire, apex acuminate; petioles 3–9 cm at anthesis, usually green, sometimes purplish, glabrous, nitid, elongated at fruiting to more than 20 cm; leaf blade glabrous on both surfaces or pubescent along veins, 3-sect, segments shortly stipitate, lateral segments deeply 2-fid, central segment deeply 2- or 3-fid, terminal lobes highly variable in shape and size, ovate-lanceolate, lanceolate, oblong, or linear-lanceolate, margin irregularly dentate or shallowly divided, sometimes triparted to pinnatifid or 3-lobed, apex obtuse or acute. Flowers white, creamy-white, or purplish, large, 2–2.5 cm in diam., fragrant; pedicels usually purplish, nitid, subequaling or exceeding leaves at anthesis, glabrous, 2-bracteolate above middle; bracteoles linear or linear-lanceolate, margin very remotely and minutely denticulate. Sepals oblong-ovate or narrowly ovate, 1–1.4 cm, basal auricles developed, 4.5–6 mm, glabrous, 3-veined, margin membranous, apex irregularly emarginate or shallowly divided. Petals broadly obovate, upper petals 1.3–1.5 cm × ca. 9 mm, lateral ones ca. 1.5 × 0.7 cm, sparsely bearded, anterior one purple-striate, 1.6–2 cm (spur included); spur long, 5–7 mm, stout, straight or slightly curved downward. Anthers 2.5–3 mm, spur of anterior 2 stamens ca. 5 mm, slender, ca. 1.5 mm in diam. Ovary ca. 2 mm, glabrous; styles ca. 3 mm, base slightly geniculate; stigmas slightly thickly margined on lateral sides and abaxially, slightly raised in central part, shortly beaked in front, with a rounded

stigma hole at tip of beak. Capsule narrowly ellipsoid, large, 1–1.6 cm, glabrous, apex acute. Seeds numerous, ovoid, ca. 2.2 mm, ca. 1.5 mm in diam.

Mixed forests, forest margins, shaded and moist places in stream valleys, thickets on sunny slopes, grassy slopes; below 2000 m. Anhui, Chongqing, Hebei, Henan, Hubei, Jiangsu, Jiangxi, Liaoning, Shandong, Zhejiang [Japan, Korea, SE Russia].

- 1a. Terminal lobe of leaves irregularly dentate or shallowly divided 45a. var. *chaerophylloides*
- 1b. Terminal lobe of leaves triparted to pinnatifid or 3-lobed 45b. var. *sieboldiana*

45a. *Viola chaerophylloides* var. *chaerophylloides*

南山堇菜(原变种) nan shan jin cai (yuan bian zhong)

Viola pinnata Linnaeus var. *chaerophylloides* Regel, Pl. Radd. 1: 222. 1861; *V. albida* Palibin var. *chaerophylloides* (Regel) F. Maekawa; *V. dentariifolia* H. Boissieu; *V. dissecta* Ledebour var. *chaerophylloides* (Regel) Makino; *V. napellifolia* Nakai; *V. sieboldiana* var. *chaerophylloides* (Regel) Nakai.

Terminal lobes highly variable in shape and size, ovate-lanceolate, lanceolate, oblong, or linear-lanceolate, margin irregularly dentate or shallowly divided, apex obtuse or acute. Fl. Mar–May, fr. May–Sep. $2n = 24^*$.

Mixed forests, forest margins, shaded and moist places in stream valleys, thickets on sunny slopes, grassy slopes; below 2000 m. Anhui, Chongqing, Hebei, Henan, Hubei, Jiangsu, Jiangxi, Liaoning, Shandong, Zhejiang [Japan, Korea, SE Russia].

45b. *Viola chaerophylloides* var. *sieboldiana* (Maximowicz) Makino, Bot. Mag. (Tokyo) 19: 87. 1905.

细裂堇菜 xi lie jin cai

Viola pinnata Linnaeus var. *sieboldiana* Maximowicz, Bull. Acad. Imp. Sci. Saint-Petersbourg 23: 313. 1877; *V. albida* f. *sieboldiana* (Maximowicz) F. Maekawa; *V. chaerophylloides* f. *sieboldiana* (Maximowicz) F. Maekawa; *V. dissecta* f. *sieboldiana* (Maximowicz) Makino; *V. dissecta* var. *sieboldiana* (Maximowicz) Nakai; *V. napellifolia* Nakai var. *sieboldiana* (Maximowicz) Naka; *V. sieboldiana* (Maximowicz) Makino.

Terminal lobe of leaves triparted to pinnatifid or 3-lobed. Fl. Mar–May, fr. May–Sep.

Mixed forests, shaded and moist places in stream valleys, thickets on sunny slopes, grassy slopes; below 1700 m. Anhui, Hubei, Jiangxi, Zhejiang [Japan].

46. *Viola albida* Palibin, Trudy Imp. S.-Peterburgsk. Bot. Sada 17(1): 30. 1899.

朝鲜堇菜 chao xian jin cai

Herbs perennial, acaulescent, 5–20 cm tall, glabrous. Rhizome erect, short, ca. 1 cm, densely noded, ca. 6 mm in diam., with dense brown remains of stipules, with several yellowish rootlets. Roots light colored, to 10 cm. Leaves basal, usually 2–4; stipules greenish, 1/3–1/2 adnate to petioles, free part linear-lanceolate, margin remotely denticulate; petiole usually longer

than blades, sometimes shorter than blades at fruiting, slender, very narrowly winged in upper part, glabrous; leaf blade ovate or broadly ovate, entire or irregularly few lobed or 3–5-fid, 2–11 × 1.5–7 cm, both surfaces glabrous, base deeply or shallowly cordate, margin regularly obtusely serrate, teeth curved toward inside, apex acuminate or shortly acuminate. Flowers white or light violet, purple striate, large, 1.6–2 mm in diam.; pedicels 1–3, equaling or slightly exceeding leaves, slender, 2-bracteolate at or below middle; bracteoles linear, ca. 1.5 cm. Sepals oblong-lanceolate, ca. 1.6 cm (basal auricles included), apex acuminate, basal auricles conspicuous, 2.5–4.5 mm, margin narrowly membranous, apex irregularly 2- or 3-dentate. Petals obovate, ca. 1.6 cm, upper ones ca. 9 mm wide, lateral ones ca. 6 mm wide, sparsely bearded, anterior one ca. 2.2 cm (spur included), apex emarginate; spur long, ca. 6 mm, stout, 3–4 mm in diam., apex rounded. Anthers ca. 2 mm, appendage of connectives ca. 2 mm; spur of 2 anterior stamens long, ca. 4 mm, slender, ca. 0.8 mm in diam. Ovary ca. 3 mm, glabrous; styles clavate, ca. 2.5 mm, base slender and slightly geniculate forward, gradually thickened upward; stigmas slightly thickened and narrowly margined on lateral sides and abaxially, slightly raised in central part and elongated forward into a short beak, with a medium-sized stigma hole at tip of beak. Capsule ovoid-orbicular, ca. 9 mm.

Mixed forests, thickets; 300–800 m. Heilongjiang, Liaoning, Shandong [Japan, Korea].

- 1a. Leaf blade entire 46a. var. *albida*
 1b. Leaf blade divided 46b. var. *takahashii*

46a. *Viola albida* var. *albida*

朝鲜堇菜(原变种) chao xian jin cai (yuan bian zhong)

Viola prionantha Bunge var. *incisa* Kitagawa, Rep. Inst. Sci. Res. Manchoukuo 6(4): 123. 1942; *V. dissecta* Ledebour subvar. *albida* (Palibin) Makino; *V. dissecta* var. *albida* (Palibin) Nakai.

Leaf blade ovate or broadly ovate, 2–11 × 1.5–7 cm, both surfaces glabrous, base deeply or shallowly cordate, margin regularly obtusely serrate, teeth curved toward inside, apex acuminate or shortly acuminate; stipules ca. 1/3 adnate to petioles; flowers white, sometimes reddish inside. Fl. Apr–May, fr. Jun–Oct. $2n = 24$.

Mixed forests, thickets; 300–800 m. SE Liaoning [Japan, Korea].

46b. *Viola albida* var. *takahashii* (Nakai) Nakai, Bot. Mag. (Tokyo) 36: 84. 1922.

菊叶堇菜 ju ye jin cai

Viola dissecta var. *takahashii* Nakai, Icon. Pl. Koisik. 1(4): 94. 1912; *V. albida* f. *takahashii* (Nakai) Kitagawa; *V. savatieri* Makino f. *detonsa* (Kitagawa) Kitagawa; *V. savatieri* var. *detonsa* Kitagawa; *V. ×takahashii* (Nakai) Takenouchi.

Leaf blade abaxially greenish, adaxially deep green, ovate or oblong-ovate, 3–5 × 1.5–3 cm, glabrous, sometimes sparsely puberulous only along veins, base shallowly cordate, margin greatly varied in appearance, usually irregularly few lobed or 3–5-fid, lateral lobes shorter, middle lobe longer, terminal lobes

lanceolate, margin remotely and large toothed, apex acute. Stipules ca. 1/2 adnate to petioles. Flowers white or light violet. Fl. May, fr. Jun–Oct. $2n = 24$.

Mixed forests; 300–500 m. Heilongjiang, Liaoning, Shandong [Korea].

In FRPS (51: 79. 1991), the name *Viola savatieri* Makino was misapplied to this taxon.

47. *Viola forrestiana* W. Becker, Repert. Spec. Nov. Regni Veg. 19: 234. 1923.

羽裂堇菜 yu lie jin cai

Herbs perennial, acaulescent, 5–12 cm tall. Rhizome erect, short; roots blackish, long, slender, smooth. Leaves basal, numerous; stipules mostly adnate to petioles, slightly white, lanceolate, conspicuous, ca. 1.5 cm, membranous; petiole 2–7 cm, glabrous; leaf blade triangular-ovate or narrowly ovate, 3–5.5 × 2–3.5 cm, abaxially glabrous, adaxially puberulous, base shallowly cordate or sometimes subtruncate, margin irregularly emarginate-crenate or acutely lobed below middle, lobes oblong and crenate, apex acute. Flowers purple or purplish; pedicels usually exceeding or subequaling leaves, sparsely puberulous, 2-bracteolate near middle; bracteoles linear-lanceolate, 5–8 mm. Sepals lanceolate, ca. 5 mm, basal auricles ca. 2 mm, margin membranous, apex acute. Petals oblong-obovate, upper ones 1.2–1.4 cm, lateral ones subequaling upper ones, distinctly bearded, spur of anterior petal large, to 6 mm, stout, to 4 mm in diam., slightly curved, apex thickened. Ovary glabrous; styles clavate, slightly thickened upward; stigmas narrowly margined on lateral sides and abaxially, flat in central part, shortly beaked in front, beak subhorizontal. Capsule globose. Fl. Mar–May, fr. Jun–Sep.

• Grasslands on mountain slopes, streamsides, riversides; 2200–4000 m. Sichuan, SE Xizang.

48. *Viola gmeliniana* Roemer & Schultes, Syst. Veg. 5: 354. 1819.

兴安堇菜 xing an jin cai

Viola fusiformis Smith; *V. gmeliniana* var. *albiflora* W. Becker; *V. gmeliniana* var. *glabra* Ledebour; *V. gmeliniana* var. *hispidula* Ledebour.

Herbs perennial, dwarf, acaulescent, 4–10 cm tall. Rhizome erect, brown, thick, surrounded by remains of leaves of previous year in upper part. Roots usually blackish, smooth, rarely branched. Leaves numerous, basal, rosulate; stipules greenish or glaucous, 1/2–3/4 adnate to petioles, the free part lanceolate, apex acute, margin remotely denticulate or subentire; petiole inconspicuous or nearly absent on young leaves, to 4 cm at fruiting, narrowly winged in upper part, stiffly hairy or subglabrous; leaf blade spatulate, long elliptic or lanceolate, 2–5 × 0.5–1.2 cm, subleathery, both surfaces ciliate or glabrous or densely stiffly hairy, or stiffly hairy only along veins adaxially, base narrow and decurrent to petiole, margin obtusely crenate or subentire and slightly repand, apex obtuse or ± acute. Flowers purple-violet, small; pedicels often purplish, usually exceeding or subequaling leaves, glabrous, rarely sparsely puberulous, 2-bracteolate at middle; bracteoles linear, 4–6 mm.

Sepals ovate-lanceolate or lanceolate, 5–6 mm, margin narrowly membranous, apex acute, basal auricles subsquare, 1.5–2 mm, apex rounded or truncate, sometimes remotely dentate. Petals oblong-obovate, upper ones ca. 9 × 5 mm, lateral ones ca. 9 × 4.5 mm, distinctly bearded, anterior one 1–1.3 cm (spur included); spur 2–3.5 mm, ca. 1.5 mm in diam., apex rounded, slightly curved upward. Anthers ca. 2 mm, appendage of connectives ca. 1.5 mm; spur of 2 anterior stamens short, ca. 3 mm, stout, apex attenuate. Ovary ovoid-globose, ca. 1.8 mm, with granular appendages along abaxial ridge; styles ca. 2 mm, clavate, base conspicuously geniculate forward, gradually thickened upward; stigmas slightly thickened and margined on lateral sides and abaxially, slightly raised at top, conspicuously beaked in front, with a larger stigma hole at tip of beak. Capsule yellow-brown, narrowly ellipsoid, ca. 9 mm, glabrous. Fl. May–Jun, fr. Jun–Aug. $2n = 24$.

Thickets on mountain slopes, river shores, sandy places, grassy places on sand dunes; 300–1500 m. Heilongjiang, Nei Mongol [Mongolia, Russia].

49. *Viola mandshurica* W. Becker, Bot. Jahrb. Syst. 54, Beibl. 120: 179. 1917.

东北堇菜 dong bei jin cai

Viola alisoviana Kiss f. *intermedia* (Kitagawa) Takenouchi; *V. hsinganensis* Takenouchi; *V. mandshurica* f. *albiflora* P. Y. Fu & Y. C. Teng; *V. mandshurica* f. *ciliata* (Nakai) F. Maekawa; *V. mandshurica* var. *ciliata* Nakai; *V. mandshurica* f. *glabra* (Nakai) Hiyama ex Maekawa; *V. mandshurica* var. *glabra* Nakai; *V. mandshurica* f. *macrantha* (Maximowicz) Nakai & Kitagawa; *V. oblongosagittata* Nakai f. *ishizakii* Yamamoto; *V. patrinii* Candolle ex Gingins f. *glabra* (Nakai) F. Maekawa; *V. patrinii* var. *macrantha* Maximowicz; *V. philippica* Cavanilles f. *intermedia* (Kitagawa) Kitagawa; *V. rhodosepala* Kitagawa; *V. yedoensis* Makino f. *intermedia* Kitagawa.

Herbs perennial, acaulescent, 6–18 cm tall. Rhizome erect, dark brown, short, 5–12 mm, densely noded, often producing from a single point several robust brown long roots; roots obliquely descending or sometimes slightly horizontal, usually smooth. Leaves 3–5 or numerous, basal; stipules membranous, lower ones scalelike, brown, upper ones brownish, purplish, or glaucous, over 2/3 adnate to petiole, free part linear-lanceolate, apex acuminate, margin remotely denticulate or subentire; petiole 2.5–8 cm, narrowly winged in upper part, wing conspicuously broadened after anthesis, puberulous or glabrous; leaf blade oblong, ligulate, or ovate-lanceolate, lower ones usually smaller and narrowly ovate, 2–6 × 0.5–1.5 cm, accrescent after anthesis, narrowly triangular, elliptic-lanceolate, or slightly hastate, to 10 × 5 cm, broadest in lowest part, both surfaces glabrous or sparsely puberulous, midvein conspicuously raised abaxially, base truncate or broadly cuneate, decurrent to petiole, margin remotely and shallowly repand-crenate or sometimes subentire in lower part, apex obtuse or rounded. Flowers purple-violet or purplish, sometimes white, ca. 2 cm in diam.; pedicels long, usually exceeding leaves, slender, glabrous or puberulous, usually 2-bracteolate below or near middle; bracteoles linear. Sepals ovate-lanceolate or lanceolate, 5–7 mm, apex acuminate, basal auricles short, 1.5–2 mm,

broad, 3-veined, margin narrowly membranous, apex rounded or truncate, usually not dentate. Upper petals obovate, 1.1–1.3 cm × 5–8 mm, lateral ones oblong-obovate, 1.1–1.5 cm × 4–6 mm, distinctly or sparsely bearded, anterior one 1.5–2.3 cm (spur included); spur cylindrical, long, 5–10 mm, robust, apex rounded, curved upward or straight. Appendage of connectives ca. 1.5 mm; anthers ca. 2 mm; spur of 2 anterior stamens 4–6 mm. Ovary ovoid-globose, ca. 2.5 mm, glabrous; styles clavate, base slender and geniculate forward, thicker in upper part; stigmas slightly thickened on lateral sides and abaxially and with erect, thin margins, shortly beaked in front, beak obliquely ascending, with a larger stigma hole at tip. Capsule oblong, 1–1.5 cm, glabrous, apex acute. Seeds brownish red, numerous, ovoid-globose, ca. 1.5 mm, glabrous. Fl. Apr–May, fr. May–Sep. $2n = 24, 48^*$.

Grasslands, grassy slopes, thickets, forest margins, sparse forests, fields, sandy places along river banks; below 1000 m. Anhui, Fujian, Heilongjiang, Jilin, Liaoning, Nei Mongol, Shandong, Taiwan [Japan, Korea, Russia].

50. *Viola patrinii* Candolle ex Gingins in Candolle, Prodr. 1: 293. 1824.

白花地丁 bai hua di ding

Viola patrinii var. *brevicalcarata* Skvortsov; *V. primulifolia* var. *glabra* Nakai.

Herbs perennial, acaulescent, 7–20 cm tall. Rhizome erect, dark brown, short, 4–10 mm, stout. Roots usually straight descending or slightly horizontal, black-brown, long, robust, often produced from same place on rhizome. Leaves 3–5 or more, basal; stipules green, ca. 2/3 adnate to petioles, free part linear-lanceolate, margin remotely denticulate or entire, apex acuminate; petiole long, usually 2–3 × exceeding blades, 2–12 cm, slender, usually glabrous or sparsely puberulous, narrowly or slightly broadly winged in upper part; leaf blade oblong, elliptic, narrowly ovate, or oblong-lanceolate, 1.5–6 × 0.6–2 cm, thin, both surfaces glabrous or puberulous along veins, base truncate, slightly cordate, or broadly cuneate, decurrent to petiole, margin remotely and shallowly repand-crenate or sometimes subentire, apex obtuse. Flowers white, purplish veined, medium-sized; pedicels usually exceeding or subequaling leaves, slender, glabrous or sparsely puberulous, 2-bracteolate below middle; bracteoles linear. Sepals ovate-lanceolate or lanceolate, apex ± acute or slightly obtuse, basal auricles short, ca. 1 mm, obtuse. Upper petals obovate, ca. 1.2 cm, base narrow, lateral ones oblong-obovate, ca. 1.2 cm, bearded, anterior one ca. 1.3 cm (spur included); spur shallowly saccate, short, robust, ca. 3 mm or slightly shorter, ca. 3 mm in diam., apex rounded. Anthers ca. 2 mm, appendage of connectives ca. 1.5 mm; spur of 2 anterior stamens short, ca. 2 mm, robust, ca. 0.6 mm in diam. Ovary narrowly ovoid, glabrous; styles clavate, slender, base slightly geniculate, slightly thickened in upper part; stigmas flat at top and triangular, narrowly margined on lateral sides, shortly beaked in front, beak obliquely ascending, with a smaller stigma hole at tip. Capsule ca. 1 cm, glabrous. Seeds yellow-brown to dark brown, ovoid-globose. Fl. May–Jun, fr. Jun–Sep. $2n = 12, 24, 36$.

Marshy meadows, moist places along riversides, thickets, moist

and shaded places at forest margins; 200–1700 m. Heilongjiang, Jilin, Liaoning, Nei Mongol [Japan, Korea, Mongolia, Russia].

51. *Viola striatella* H. Boissieu, Bull. Herb. Boissier, sér. 2, 1: 1077. 1901.

圆叶堇菜 *yuan ye jin cai*

Viola bambusetorum Handel-Mazzetti; *V. emeiensis* C. J. Wang; *V. lianhuashanensis* C. J. Wang & K. Sun; *V. pseudo-bambusetorum* Chang; *V. schensiensis* W. Becker.

Herbs perennial, acaulescent, 5–7 cm tall. Rhizome nearly erect, slightly robust, shortly and conspicuously noded, with few brown remains of stipules. Leaves basal, usually 3–5; stipules brownish or dark brownish, adnate to petioles in lower part, free part ovate-lanceolate, margin entire or sparsely shortly fimbriate, apex acuminate; petiole long, 4–6 cm, slender; leaf blade subreniform, orbicular, or ovate, 1–1.5 × 1–1.5 cm, both surfaces glabrous, base narrowly cordate, margin obtusely serrate, apex mucronate or obtuse. Flowers pinkish, deep purple, purple-white, or white, small; pedicels slightly exceeding leaves, slender, 2-bracteolate near middle; bracteoles opposite, linear, ca. 5 mm, margin remotely denticulate. Sepals linear-lanceolate, ca. 3 mm, margin narrowly membranous, apex ± acute, basal auricles not conspicuous, ca. 0.5 mm, apex obtuse. Petals oblong-obovate, upper ones ca. 8 × 3 mm, base attenuate, apex obtuse, lateral ones ca. 7 × 3 mm, shortly bearded, anterior one ca. 8.5 mm (spur included); spur shortly saccate, 2–2.5 mm, ca. 2 mm in diam., apex obtuse. Anthers ca. 1.5 mm, appendage of connectives subequalling anthers; spur of 2 anterior stamens shortly angular, ca. 1.5 mm. Ovary ovoid-globose, ca. 1.5 mm; styles clavate, 1.7–3 mm, base slender and slightly geniculate forward; stigmas slightly flat at top, narrowly margined on lateral sides, shortly beaked in front, beak erect, with a smaller stigma hole at tip. Fl. May, fr. Jun–Sept. $2n = 24^*$.

• Grasslands on mountain slopes, moist places on rocks; 1200–3400 m. Anhui, Chongqing, Gansu, Henan, Hubei, Hunan, Jiangxi, Shaanxi, Sichuan, Yunnan.

52. *Viola variegata* Fischer ex Link, Enum. Hort. Berol. Alt. 1: 240. 1821.

斑叶堇菜 *ban ye jin cai*

Viola tenuicornis W. Becker subsp. *primorskajensis* W. Becker; *V. variegata* f. *viridis* (Kitagawa) P. Y. Fu & Y. C. Teng; *V. variegata* var. *viridis* Kitagawa.

Herbs perennial, acaulescent, 3–12 cm tall. Rhizome usually short, 4–15 mm, slender, densely noded, with several whitish or brownish long roots. Leaves basal, rosulate; stipules greenish or glaucous, submembranous, 2/3 adnate to petioles, free part lanceolate, margin remotely glandular fimbriate-dentate, apex acuminate; petioles unequal in length, 1–7 cm, narrowly winged or wingless in upper part, with short stiff hairs or glabrous; leaf blade abaxially usually purplish red, adaxially dark green or green, white variegated (punctate-striate) along veins, orbicular, 1.2–5 × 1–4.5 cm, both surfaces often covered with short stiff hairs, sometimes sparsely hairy or subglabrous, base conspicuously cordate, margin obtusely dentate, apex rounded or obtuse. Flowers red-purple or dark purple, usually

light colored in lower part, 1.2–2.2 cm; pedicels usually purplish red, unequal in length, exceeding or slightly shorter than leaves, shortly hairy or subglabrous, 2-bracteolate at middle; bracteoles linear. Sepals usually purplish, oblong-lanceolate or ovate-lanceolate, 5–6 mm, 3-veined, margin narrowly membranous or ciliate, apex acute, basal auricles shorter, 1–1.5 mm, with short stiff hairs or glabrous adaxially, apex truncate or remotely and shallowly dentate. Petals obovate, 7–14 mm, lateral ones sparsely bearded or glabrous, anterior one white and violet-striate at base, 1.2–2.2 cm (spur included); spur cylindrical, 3–8 mm, robust or slender, apex obtuse, straight or slightly curved upward. Anthers and appendages of connectives ca. 2 mm; spur of 2 anterior stamens long, to 4 mm, slender, ca. 0.3 mm in diam. Ovary subglobose, usually with short stiff hairs or subglabrous; styles clavate, base slightly geniculate, gradually thickened upward; stigmas conspicuously thickened on lateral sides and abaxially, shortly beaked in front, with a stigma hole open upward at tip of beak. Capsule ellipsoid, ca. 7 mm, glabrous or sparsely short hairy, globose and usually with short stiff hairs when young. Seeds brownish, small, ca. 1.5 mm, shortly appendaged. Fl. Apr–May, fr. Jun–Sep. $2n = 24$.

Grasslands on mountain slopes, forests, thickets, rock crevices in shaded places; 300–1700 m. Hebei, Heilongjiang, Jilin, Liaoning, Nei Mongol, Shanxi [Japan, Korea, Mongolia, Russia].

53. *Viola tenuicornis* W. Becker, Beih. Bot. Centralbl., Abt. 2, 34: 248. 1916.

细距堇菜 *xi ju jin cai*

Herbs perennial, acaulescent, 2–13 cm tall. Rhizome usually erect, short, 2–10 mm, slender or slightly thick, densely noded, with several yellowish rootlets. Leaves 2 to numerous, basal; outer stipules submembranous, inner ones greenish, 2/3 adnate to petioles, free part linear-lanceolate or lanceolate, margin remotely fimbriate-dentate; petiole 1.5–6 cm, slender, wingless or very narrowly winged in upper part, usually puberulous or subglabrous; leaf blade abaxially dark purple to green, adaxially green, ovate or broadly ovate, 1–3 × 1–2 cm, accrescent at fruiting, to 6 × ca. 4.5 cm, glabrous or puberulous along veins or margin, base slightly cordate or subrounded, margin shallowly crenate, apex obtuse. Flowers purple-violet; pedicels slightly or not exceeding leaves, slender, puberulous or subglabrous, 2-bracteolate at or slightly below middle; bracteoles linear. Sepals usually green or purplish red, lanceolate or ovate-lanceolate, 5–8 × 1.5–2 mm, glabrous or puberulous, 3-veined, margin narrowly membranous, apex acute, basal auricles short, 1–3 mm, apex truncate or rounded, rarely shallowly dentate. Petals obovate, upper ones 1–1.2 × ca. 6 mm, lateral ones 8–11 × 3–4.5 mm, slightly bearded or glabrous, anterior one 1.5–1.7(–2) cm (spur included); spur cylindrical, 5–7(–9) mm, robust or slender, 1.2–3 mm in diam., apex rounded and curved upward. Anthers 1.5–2 mm; spur of 2 anterior stamens long, ca. 5.5 mm, slender, ca. 0.3 mm in diam., apex rounded and slightly curved. Ovary glabrous or puberulous; styles clavate, base geniculate forward, conspicuously thickened in upper part; stigmas conspicuously thickened on lateral sides and abaxially, slightly raised in central part, shortly beaked in front, with a stigma hole open upward at tip of beak. Capsule ellipsoid, 4–6 mm, glabrous.

Forests, forest margins, thickets, mountain slopes, dry places in open fields; below 2300 m. Gansu, Hebei, Heilongjiang, Henan, Jiangsu, Jilin, Liaoning, Nei Mongol, Shaanxi, Shandong, Shanxi [Korea, Russia].

- 1a. Leaf blade glabrous or puberulous along veins or margin; sepals and ovary glabrous 53a. subsp. *tenuicornis*
 1b. Leaf blade puberulous and verrucose; sepals white puberulous along margin; ovary puberulous 53b. subsp. *trichosepala*

53a. *Viola tenuicornis* subsp. *tenuicornis*

细距堇菜(原亚种) xi ju jin cai (yuan ya zhong)

Viola × *interposita* Kitagawa; *V. tenuicornis* var. *brachytricha* W. Becker; *V. variegata* Fischer ex Link var. *chinensis* Bunge ex Regel; *V. variegata* var. *viridis* Kitagawa.

Leaf blade glabrous or puberulous along veins or margin. Sepals and ovary glabrous. Fl. Apr–May, fr. Jun–Sep. $2n = 24^*$.

Forests, forest margins, thickets, moist places in grasslands on mountain slopes; 200–2300 m. Gansu, Hebei, Heilongjiang, Henan, Jiangsu, Jilin, Liaoning, Nei Mongol, Shaanxi, Shandong, Shanxi [Korea, Russia].

53b. *Viola tenuicornis* subsp. *trichosepala* W. Becker, Beih. Bot. Centralbl., Abt. 2, 34: 249. 1916.

毛萼堇菜 mao e jin cai

Viola trichosepala (W. Becker) Juzepczuk.

Petiole appressed puberulous; leaf blade puberulous and verrucose. Sepals white puberulous along margin. Lateral petals distinctly bearded. Ovary puberulous.

Sunny mountain slopes, dry places in open fields; below 1900 m. Hebei, Jilin, Liaoning, Nei Mongol, Shanxi [Korea, Russia].

54. *Viola kunawarensis* Royle, Ill. Bot. Himal. Mts. 75. t. 18. 1839.

西藏堇菜 xi zang jin cai

Viola kunawarensis var. *angustifolia* W. Becker; *V. kunawarensis* f. *longifolia* C. J. Wang; *V. thianschanica* Maximowicz.

Herbs perennial, dwarf, acaulescent, 2.5–6 cm tall. Rhizome short, robust, densely noded; roots brownish or glaucous, conic, long, slender, usually simple. Leaves basal, rosulate; stipules whitish, 1/2–2/3 adnate to petioles, membranous, free part lanceolate, margin sparsely glandular fimbriate, apex acuminate; petiole slightly longer than or nearly as long as leaf blade; leaf blade ovate, elliptic, or oblong, 0.5–2 cm × 2–5 mm, thickly papery, both surfaces glabrous, midvein conspicuously raised, base cuneate or broadly cuneate, slightly decurrent, margin entire or remotely and shallowly crenate, apex obtuse. Flowers deep blue-purple, small; pedicels straight, slightly longer than or nearly as long as leaves, slender, 2-bracteolate slightly above middle; bracteoles nearly opposite, linear or narrowly lanceolate, sparsely glandular-fimbriate along lower margin, apex acuminate. Sepals oblong or ovate-lanceolate, 3–4 × 1–1.5 mm, apex obtuse, basal auricles very short, 3-veined, margin narrowly membranous, apex obtuse. Petals oblong-obovate, 7–10

mm, base narrow, apex obtuse, lateral ones glabrous, anterior one slightly shorter, white veined; spur saccate, very short, slightly longer than basal auricles of sepals or not. Anthers ca. 1.5 mm, connective appendages ca. 1 mm, spur of 2 anterior stamens very short, only ca. 0.4 mm. Ovary ovoid-globose, ca. 1.5 mm, smooth, glabrous; styles clavate, base conspicuously geniculate, apex obtuse, very shortly beaked in front, with a smaller stigma hole at tip of beak. Capsule ovoid-orbicular, 5–7 mm. Fl. May–Jul, fr. Jul–Aug. $2n = 20^*$.

Alpine or subalpine meadows, subalpine thickets; 2900–4800 m. Gansu, Qinghai, NW Sichuan, Xinjiang, Xizang [Afghanistan, N India, Kashmir, Kazakhstan, Kyrgyzstan, W Mongolia, Nepal, Russia, Tajikistan].

55. *Viola magnifica* C. J. Wang ex X. D. Wang, Acta Bot. Yunnan. 13: 263. 1991.

犁头叶堇菜 li tou ye jin cai

Herbs perennial, acaulescent, ca. 28 cm tall. Rhizome robust, 1–2.5 cm, to 5 mm in diam., producing numerous terete roots and fibrous rootlets. Leaves basal, usually 5–7; stipules large, 1/2–2/3 adnate to petioles, free part linear or narrowly lanceolate, ca. 1.2 cm, margin subentire or remotely denticulate; petiole to 20 cm, very narrowly winged in upper part, glabrous; leaf blade adaxially deep green, triangular, triangular-ovate or narrowly ovate, 7–15 × 4–8 cm, broadest at base, larger at fruiting, both surfaces glabrous, base broadly or deeply cordate, lateral lobes spreading and large, margin distinctly coarsely serrate, teeth obtuse and slightly incurved at apices, apex acuminate. Flowers large, light pink or bluish purple. Sepals narrowly ovate, 4–7 × 2–3.2 mm; basal auricles 3–5 mm, apex deeply dentate. Lateral petals slightly bearded, anterior petal oblong, ca. 1.9 cm (spur included); spur 4–5 mm, 3–3.5 mm in diam. Capsule ellipsoid, 1.2–2 cm, ca. 5 mm in diam., glabrous; fruit stalk 4–15 cm, glabrous, 2-bracteolate near or below middle; bracteoles linear or linear-lanceolate, 7–10 mm. Fl. Mar–Apr, fr. Jul–Oct.

• Forests on mountain slopes, shaded and moist places at forest margins or in valleys; 800–2000 m. Anhui, Chongqing, NW Guizhou, Henan, Hubei, Hunan, Jiangxi, Zhejiang.

56. *Viola sphaerocarpa* W. Becker, Beih. Bot. Centralbl., Abt. 2, 36: 54. 1918.

圆果堇菜 yuan guo jin cai

Viola keiskei Miquel f. *hirsutior* W. Becker.

Herbs perennial, acaulescent, 6–12 cm tall, sparsely puberulous. Rhizome erect, whitish, slender, 2–2.5 mm in diam. inconspicuously noded, with branched rootlets in lower part. Leaves basal, numerous; stipules ca. 1/3 adnate to petioles at base, the free part subulate-linear, 0.8–1.4 cm, margin remotely glandular fimbriate-dentate; petiole to 13 cm, sparsely pubescent, narrowly winged in the upper part; leaf blade gray-green, orbicular-cordate or ovate-orbicular, 2.5–6.5 × 2–4.5 cm, both surfaces sparsely puberulous, more densely puberulous along veins abaxially, base deeply or broadly cordate, margin obtuse-serrate, apex ± acute or acuminate. Pedicels 3–6 cm, glabrous, with 2 ciliate bracteoles about the middle. Sepals ovate-lanceolate, puberulous along veins abaxially, basal auricles 2–3 mm,

apex enlarged, dentate. Petals white, lateral petals bearded, anterior one 1.5–1.8 cm including spur, spur ca. 6 mm, ca. 2 mm in diam. Ovary glabrous. Capsule globose, 6–10 mm, glabrous. Seeds ca. 1.8 mm, ca. 1 mm in diam. Fl. Mar, fr. May–Oct.

• Mountain forests, forest margins, thickets; 1200–3000 m. Chongqing, S Shaanxi, Sichuan, NW Yunnan.

57. *Viola inconspicua* Blume, Bijdr. 58. 1825.

长萼堇菜 chang e jin cai

Viola betonicifolia Smith subsp. *novaguineensis* D. M. Moore; *V. betonicifolia* var. *oblongosagittata* (Nakai) F. Maekawa & T. Hashimoto; *V. chinensis* G. Don; *V. confusa* Champion ex Benth; *V. confusa* subsp. *nagasakiensis* (W. Becker) F. Maekawa & T. Hashimoto; *V. hunanensis* Handel-Mazzetti; *V. inconspicua* subsp. *nagasakiensis* (W. Becker) J. C. Wang & T. C. Huang; *V. mandshurica* subsp. *nagasakiensis* W. Becker; *V. minor* (Makino) Makino; *V. oblongosagittata* Nakai; *V. patrinii* var. *minor* Makino; *V. philippica* subsp. *malesica* W. Becker; *V. primulifolia* Loureiro (1790), not Linnaeus (1753); *V. pseudomonbeigii* Chang; *V. serpens* Wallich ex Gingins var. *confusa* (Benth) J. D. Hooker & Thomson.

Herbs perennial, acaulescent. Rhizome erect or obliquely ascending, 1–2 cm, robust, 2–8 mm in diam., densely noded, with white roots. Leaves basal, rosulate; stipules ca. 3/4 adnate to petiole, free part lanceolate, 3–7 mm, margin sparsely shortly fimbriate-dentate, rarely entire, usually brown rusty dotted, apex acute; petiole 2–7 cm, usually glabrous or rarely shortly pubescent; leaf blade triangular-ovate, 1.5–9 × 1–7 cm, 1–2.2 × as long as wide, broadest at base, usually glabrous, rarely puberulous, base cordate with usually prominent, rounded basal lobes, decurrent to 1/3 length of petiole and narrowly winged, apex acuminate or acute. Flowers purplish or white, with darker striations; pedicels usually subequaling or slightly exceeding leaves, slender, glabrous or puberulous in upper part, 2-bracteolate slightly above middle; bracteoles linear. Sepals ovate-lanceolate, 4–7 × 1–1.8 mm, apex acute, glabrous or ciliate; appendage elongated, (1.5–)2–3(–4.8) mm, shallowly incised. Petals oblong-obovate, 7–9 mm; lateral ones bearded or rarely glabrous; anterior one 1–1.2 cm (spur included); spur tubular, 1.8–3(–4) mm, straight, obtuse. Spur of anterior stamens angular, base broad, apex acute. Ovary globose, glabrous; styles clavate, base slightly geniculate; stigmas flat at top, with broader margin on lateral sides, shortly beaked in front, with a stigmatic hole opening upward at tip of beak. Capsule oblong, 8–10 mm, glabrous. Seeds deep green, ovoid-globose, 1–1.5 mm, ca. 0.8 mm in diam. Fl. Nov–Apr, fr. Jun–Nov. $2n = 24^*$, 48^* , 72 .

Grasslands, field sides, path margins, forest margins; below 1600(–2400) m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hainan, Henan, Hubei, Hunan, Jiangsu, Jiangxi, SE Shaanxi, Sichuan, Taiwan, Yunnan, Zhejiang [India, Indonesia, Japan, Malaysia, Myanmar, New Guinea, Philippines, Vietnam].

58. *Viola cuspidifolia* W. Becker, Bull. Misc. Inform. Kew 1929: 201. 1929.

鄂西堇菜 e xi jin cai

Herbs perennial, acaulescent, 8–10 cm tall, gray-green, glabrous. Rhizome erect, 7–8 cm, robust, 3–4 mm in diam., without rootlets. Leaves basal, gray-green; stipules narrowly lanceolate, ca. 1 cm, ca. 2/3 adnate to petiole, margin sparsely shortly fimbriate; petiole subequaling leaf blade, narrowly winged in upper part; leaf blade lanceolate, 3–4 × ca. 1 cm, both surfaces glabrous, veins raised abaxially, base narrowly cuneate, long decurrent to petiole, margin remotely and shallowly serrate, apex ± acute. Flowers purplish; pedicels usually exceeding leaves. Sepals ovate-lanceolate, ca. 5 mm, ca. 1 mm in diam., apex acuminate, basal auricles nearly square, narrower. Petals elliptic, lateral ones bearded, anterior one spatulate, shortly spurred; spur ca. 2 mm, slightly robust. Ovary glabrous; styles clavate, base slightly geniculate, gradually thickened in upper part; stigmas with erect margins on lateral sides and abaxially, shortly beaked in front, beak slightly erect. Capsule ellipsoid, 5–6 mm, glabrous. Fl. Apr and Sep, fr. May–Oct.

• Grasslands on mountain slopes; elevation unknown. W Hubei, Hunan.

59. *Viola betonicifolia* Smith in Rees, Cycl. 37: *Viola* no. 7. 1817.

戟叶堇菜 ji ye jin cai

Viola betonicifolia subsp. *dielsiana* W. Becker; *V. betonicifolia* subsp. *nepalensis* (Gingins) W. Becker; *V. caespitosa* D. Don; *V. inconspicua* Blume subsp. *dielsiana* W. Becker; *V. oblongosagittata* Nakai var. *violascens* Nakai; *V. patrinii* Gingins var. *caespitosa* (D. Don) Ridley; *V. patrinii* var. *laotiana* H. Boissieu; *V. patrinii* var. *nepaulensis* Gingins.

Herbs perennial, acaulescent. Rhizome obliquely ascending or erect, usually short, 5–10 mm, stout, with several robust, long, yellowish roots. Leaves numerous, basal, rosulate; stipules dark brownish, lanceolate, 3–5 × ca. 1 mm, ca. 3/4 adnate to petiole, free part linear-lanceolate or subulate, margin entire or sparsely denticulate, apex acuminate; petiole long, 1.5–13 cm, narrowly and conspicuously winged in upper part, usually glabrous, sometimes puberulous in lower part; leaf blade narrowly lanceolate, narrowly triangular-hastate, or triangular-ovate, 2–7.5 × 0.5–3 cm, base truncate or shallowly cordate, sometimes broadly cuneate, apex acute, sometimes slightly obtuse; leaves accrescent after anthesis, both surfaces glabrous or subglabrous, lateral lobes spreading and conspicuously dentate, margin remotely shallowly crenate, more deeply dentate near base. Flowers white, light or deep purplish, deep-colored striate, 1.4–1.7 cm; pedicels long, equaling or exceeding leaves, slender, usually glabrous, sometimes puberulous in lower part, 2-bracteolate near middle; bracteoles linear. Sepals ovate-lanceolate or lanceolate, 5–6 × 1–1.6 mm, apex acuminate or ± acute, basal auricles shorter, 0.5–1 mm, 3-veined, margin narrowly membranous, apex rounded, sometimes remotely obtusely dentate. Upper petals obovate, 1–1.2 cm, bearded; lateral ones oblong-obovate, bearded, 1–1.2 cm; anterior one usually shorter, 1.3–1.5 cm (spur included); spur tubular, short, 1–2.5 mm, stout, 2–3 mm in diam., apex rounded, straight or slightly curved upward; anthers and appendage of connectives ca. 2 mm; spur of 2 anterior stamens 1–3 mm. Ovary ovoid-globose,

ca. 2 mm, glabrous; styles clavate, slightly geniculate forward, gradually thickened in upper part; stigmas slightly thickened and narrowly margined on lateral sides and abaxially, shortly beaked in front, with a stigma hole at tip of beak. Capsule ellipsoid to oblong, 6–9 mm, glabrous. Seed ovoid, 1–1.2 mm. Fl. Feb–May, fr. May–Sep. $2n = 24^*$, 48, 72*.

Fields, roadsides, grasslands on mountain slopes, thickets, forest margins; below 1500(–2500) m. Anhui, Chongqing, Fujian, Guangdong, Guangxi, Guizhou, Hainan, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Shaanxi, Sichuan, Taiwan, SE Xizang, Yunnan, Zhejiang [Afghanistan, Bhutan, Japan, India, Indonesia, Kashmir, Malaysia, Myanmar, Nepal, Philippines, Sri Lanka, Thailand, Vietnam; N Australia].

60. *Viola trichopetala* C. C. Chang, Bull. Fan Mem. Inst. Biol., n.s., 1: 254. 1949.

毛瓣堇菜 mao ban jin cai

Viola betonicifolia Smith f. *pubescens* H. Hara; *V. philippica* Cavanilles var. *yunnanfuensis* W. Becker.

Herbs perennial, acaulescent, to 7 cm tall. Rhizome erect, brownish, 1.5–2.5 cm, slightly robust; roots straightly descending, long, robust. Leaves usually numerous, basal; stipules brown, 1/2–2/3 united with petioles, free part linear-lanceolate, margin entire or sparsely brown glandular denticulate, apically acuminate; petioles exceeding or shorter than blades, narrowly winged in upper part, with sparse spreading short stiff hairs or glabrous; blades in upper part lanceolate, those in lower part triangular-ovate or oblong-ovate, 3–4.5 × 2–3 cm, both surfaces pubescent or nearly glabrous, base broadly cordate or cuneate, decurrent to petiole, margin sparsely obtuse-crenate, apex obtuse. Flowers purplish violet or white with purple veins, ca. 1.5 cm in diam.; pedicels exceeding leaves at anthesis, 2-bracteolate below middle; bracteoles linear, 5–7 mm, margin entire. Sepals lanceolate, ca. 5 mm, ca. 1.5 mm wide at base, apex acute; basal auricles short, ca. 0.5 mm, glabrous, 3-veined, margin entire or sometimes repand-crenate, apex obtuse. Petals obovate, margin entire, lateral petals densely bearded, upper petals also few bearded, anterior petal ca. 1.5 cm (spur included); spur shallowly saccate, short, 1–2(–3) mm, stout, ca. 2 mm thick, apex rounded. Ovary glabrous, oblong; styles slender, clavate, geniculate at base, ca. 1.5 mm; stigmas with slightly thin and straightly spreading margin on 2 lateral sides and behind, slightly convex in central part, shortly beaked in front, with smaller stigma hole at tip of beak. Capsule oblong, 1–1.2 cm, glabrous, apex acute. Seeds red-brown, ovoid-globose, ca. 2 mm, ca. 1.5 mm thick. Fl. Feb–Jun, fr. Jun–Dec.

Grassy slopes, thickets; 1600–3400 m. SW Sichuan, Xizang, Yunnan [Bhutan].

61. *Viola tienschiensis* W. Becker, Repert. Spec. Nov. Regni Veg. 17: 314. 1921.

滇西堇菜 dian xi jin cai

Viola angustistipulata C. C. Chang; *V. betonicifolia* Smith subsp. *jaunsariensis* (W. Becker) H. Hara; *V. ganchoenensis* W. Becker; *V. flavida* Bureau & Franchet (1891), not Schur (1877); *V. oligocephala* Chang; *V. prionantha* subsp. *jaunsariensis* W. Becker.

Herbs perennial, acaulescent, to 12 cm tall. Rhizome erect

to ascending, rather stout, with white or yellowish roots. Stipules narrowly lanceolate, 1/3–1/2 adnate to petioles, margin entire or inconspicuously and remotely glandular serrate; petiole sparsely puberulous or glabrous, narrowly winged; leaf blade oblong-ovate, 3–8 × 1.5–5 cm, both surfaces appressed puberulous or glabrescent, base shallowly cordate or truncate and long decurrent to petiole, margin serrate to crenate-serrate, apex slightly acute. Pedicels longer than leaves, 7–9 cm, glabrous or very sparsely puberulous, 2-bracteolate near middle; bracteoles linear, ca. 5 mm. Sepals ovate or ovate-lanceolate, ca. 5 × 1.8–2 mm, appendages very narrowly square, 1–1.5 mm, apex obtuse or dentate. Petals rounded at apex, upper ones obovate, ca. 9 × 4.5 mm, lateral ones oblong, ca. 1 × 0.3 cm, bearded; anterior one triangular-obovate, ca. 9 mm; spur somewhat elongated, 4–6 mm, thin, somewhat curved upward. Style somewhat geniculate at base, clavate, apex flat, broadened on both sides and distinctly margined, somewhat erectly beaked in front. Capsule ellipsoid, 5–7 mm, glabrous. Fl. Mar–May, fr. May–Oct.

Grassy slopes, thickets or sparse forests; 300–3200 m. Guizhou, Sichuan, SE Xizang, Yunnan [India, Kashmir, Nepal].

62. *Viola senzanensis* Hayata, Icon. Pl. Formosan. 6: 3. 1916.

尖山堇菜 jian shan jin cai

Herbs perennial. Rhizome long creeping to ascending, slender, acaulescent. Stipules lanceolate, 5–10 × 1–2 mm, glabrous, membranous, ca. 2/3 adnate to petiole, margin slightly lacinate-serrate or entire, apex acute; petiole 2–11 cm, glabrous; leaf blade triangular-cordate, 1.2–2.8 × 2–3.8 cm, herbaceous to papery, glabrous or puberulous on both sides, base reniform-cordate, with basal lobes somewhat converging, margin shallowly serrate, wingless, apex acute to obtuse. Flowers nearly white, with dark violet veins, 1–1.5 cm in diam.; pedicels 4–10 cm, exceeding leaves, slender, glabrous or sparsely puberulous. Sepals ovate-lanceolate to lanceolate, 3.5–6 × 0.8–1.5 mm, glabrous, margin entire, apex acute; appendages ca. 1 mm, rounded. Petals obovate to oblong, lateral ones glabrous, anterior one equaling others, apex rounded; spurs cylindrical, 2–3 mm, slender, rounded. Styles 2–2.7 mm, base slightly geniculate, clavate distally, apex slightly lobed on both sides; stigmas beaked. Capsules oblong or ellipsoid, 6–9 mm, glabrous. Seeds ovoid, ca. 2 mm. $2n = 24^*$.

• High mountains; 3300–3600 m. Taiwan.

63. *Viola philippica* Cavanilles, Icon. 6: 19. 1801.

紫花地丁 zi hua di ding

Herbs perennial, acaulescent, 4–14 cm tall, to 20 cm tall at fruiting. Rhizome erect, brownish, short, 4–13 mm, 2–7 mm in diam., densely noded, with several yellowish or whitish rootlets. Leaves numerous, basal, rosulate; stipules glaucous or greenish, 1.5–2.5 cm, membranous, 2/3–4/5 adnate to petioles, free part linear-lanceolate, margin remotely glandular fimbriate-denticulate or subentire; petiole usually 1–2 × exceeding blades at anthesis, very narrowly winged in upper part, to 10 cm at fruiting, broadly winged in upper part, puberulous or glabrous; upper blades oblong-lanceolate or triangular-ovate, usually smaller than lower ones; lower ones oblong, narrowly ovate-lanceolate, or oblong-ovate, 1.5–4 × 0.5–1 cm, both surfaces glabrous or puberulous, sometimes only puberulous along veins

abaxially, base truncate or cuneate, rarely slightly cordate, margin shallowly crenate, apex obtuse; blades accrescent at fruiting, to 10 × 4 cm. Flowers purple-violet or purplish, rarely white, light colored and purple-striate at throat, medium-sized; pedicels usually numerous, equaling or exceeding leaves, slender, glabrous or puberulous, 2-bracteolate near middle; bracteoles linear. Sepals ovate to ovate-lanceolate, 3–7 × 0.7–1.8 mm, apex acuminate; appendages short, 1–1.5 mm, 1/2 to 1/6 as long as sepal, glabrous or sparsely pubescent, apex rounded or denticulate. Petals obovate or oblong-obovate, lateral ones 1–1.2 cm, inside glabrous or rarely lightly bearded, anterior one 1.3–2 cm (spur included), inside purple-veined; spur tubular, 3–8 mm, 2–5 × as long as calycine appendages; anthers ca. 2 mm, appendage of connectives ca. 1.5 mm; spur of 2 anterior stamens tubular, 3–6 mm, apex slender. Ovary ovoid, glabrous; styles clavate, slightly exceeding ovary, base slightly geniculate; stigmas triangular with slightly thickened and raised margins on lateral sides and abaxially, slightly flat at top, shortly beaked in front. Capsule ellipsoid, 5–12 mm, glabrous. Seeds yellowish, ovoid-globose, ca. 1.8 mm. Fl. Apr–May, fr. May–Sep. $2n = 24^*$, 48.

Fields, grassy places on mountain slopes, forest margins, thickets, roadsides; below 1700 m. Anhui, Chongqing, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hainan, Hebei, Heilongjiang, Henan, Hubei, Jiangsu, Jiangxi, Jilin, Liaoning, Nei Mongol, Ningxia, Shaanxi, Shandong, Shanxi, Sichuan, Taiwan, Yunnan, Zhejiang [Cambodia, India, Indonesia, Japan, Korea, Laos, Mongolia, Philippines, Vietnam].

- 1a. Leaves withered in winter, blade oblong-lanceolate to triangular-lanceolate, petioles slightly winged 63a. var. *philippica*
 1b. Leaves present in winter, blade triangular-lanceolate, petioles rather distinctly winged 63b. var. *pseudojaponica*

63a. *Viola philippica* var. *philippica*

紫花地丁(原变种) *zi hua di ding* (yuan bian zhong)

Viola alisoviana Kiss; *V. alisoviana* f. *candida* (Kitagawa) Takenouchi; *V. chinensis* G. Don f. *alboviolacea* Skvortsov; *V. chinensis* f. *anomala* Skvortsov; *V. chinensis* f. *communis* Skvortsov; *V. chinensis* f. *dissecta* Skvortsov; *V. chinensis* f. *glabra* Skvortsov; *V. philippica* f. *candida* (Kitagawa) Kitagawa; *V. philippica* subsp. *munda* W. Becker; *V. patrinii* Gingins var. *chinensis* Gingins; *V. yedoensis* Makino; *V. yedoensis* f. *candida* Kitagawa.

Plant glabrous or pubescent. Leaves withered in winter; petiole slightly winged; leaf blade oblong-lanceolate to triangular-lanceolate. Fl. Apr–May, fr. May–Sep. $2n = 24^*$, 48.

Fields, grassy places on mountain slopes, forest margins, thickets; below 1700 m. Anhui, Chongqing, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hainan, Hebei, Heilongjiang, Henan, Hubei, Jiangsu, Jiangxi, Jilin, Liaoning, Nei Mongol, Ningxia, Shaanxi, Shandong, Shanxi, Sichuan, Taiwan, Yunnan, Zhejiang [Cambodia, India, Indonesia, Japan, Korea, Laos, Mongolia, Philippines, Vietnam].

63b. *Viola philippica* var. *pseudojaponica* (Nakai) Y. S. Chen, comb. nov.

琉球堇菜 *liu qiu jin cai*

Basionym: *Viola pseudojaponica* Nakai, Bot. Mag. (Tokyo) 42: 560. 1928 [*"pseudo-japonica"*]; *V. longistipulata* Hayata; *V. nantouensis* S. S. Ying; *V. stenocentra* Hayata ex Nakai; *V. taiwaniana* Nakai; *V. yedoensis* var. *pseudojaponica* (Nakai) T. Hashimoto ex E. Hama & K. Nakai.

Leaves present in winter; petiole distinctly winged; leaf blade triangular-lanceolate, 3–7 × 3.5–5 cm, usually glabrous, rarely pubescent, base truncate or slightly cordate, apex acuminate. Fl. Nov–Apr, fr. May–Oct. $2n = 24^*$.

Roadsides. Taiwan [Japan (S Kyushu and Ryukyu Islands)].

64. *Viola mongolica* Franchet, Pl. David. 1: 42. 1884.

蒙古堇菜 *meng gu jin cai*

Viola hebeiensis J. W. Wang & T. G. Ma; *V. yamatsutae* Ishidoya ex Kitagawa; *V. yezoensis* Maximowicz var. *hebeiensis* (J. W. Wang & T. G. Ma) J. W. Wang & J. Yang [*"hopeiensis"*].

Herbs perennial, acaulescent, to 15 cm tall. Rhizome erect or obliquely ascending, 0.5–2 cm, robust, to 0.5 cm thick, with numerous brownish robust roots. Leaves basal; stipules greenish, 1/2 adnate to petioles, free part lanceolate, margin sparsely and shortly fimbriate-dentate, apex acute; petiole 3–4 cm, to 12 cm at fruiting, puberulous, narrowly winged; blade ovate or long ovate, 2–5 × 3–4 cm, to 8 × 4.5 cm at fruiting, both surfaces puberulous, base deeply cordate, sometimes shallowly cordate, margin shallowly serrate, apex acute or obtuse. Flowers white, throat yellowish green, long pedicellate; pedicels robust, usually exceeding leaves, 6–8 cm, puberulous, 2-bracteolate in or above middle; bracteoles linear, 1–1.5 cm, margin sparsely pilose. Sepals lanceolate, usually pilose, 1.1–1.3 cm (basal auricles included), 3–4 mm wide, apex acute; basal auricles conspicuous, 3–4 mm, apex deeply or shallowly emarginate. Upper petals obovate, ca. 1.2 × 0.8 cm, base narrowed and clawed, lateral ones oblong-obovate, ca. 1.3 × 0.6 cm, sparsely bearded and yellowish at throat, anterior one 1.8–2 cm (spur included), with 5–7 dark veins, apex obtuse; spur cylindric, robust, 5–7 mm, ca. 2.5 mm thick, apex obtuse, usually curved upward or straight. Anthers subequaling membranous apical appendages of connectives, ca. 2 mm; spur of anterior stamens narrowly linear, ca. 5 mm, usually curved near apex. Ovary glabrous; styles usually erect at base, thicker in upper part; stigmas narrowly margined on lateral sides and behind, shortly and thickly beaked in front, with a larger stigma hole at tip of beak. Capsule oblong, ca. 1 cm. Fl. Apr–May, fr. May–Oct.

• Broad-leaved forests, thickets on mountains, grasslands on mountain slopes; (200–)800–2800 m. Gansu, Hebei, Heilongjiang, Henan, Jilin, Liaoning, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi.

In FRPS (51: 44. 1991), the name *Viola yezoensis* Maximowicz was misapplied to this species.

65. *Viola hancockii* W. Becker, Bull. Misc. Inform. Kew 1928: 249. 1928.

西山堇菜 *xi shan jin cai*

Viola hancockii var. *fangshanensis* J. W. Wang.

Herbs perennial, acaulescent, 10–15 cm tall. Rhizome 1.5–2 cm, robust, 4–6 mm in diam., densely noded. Roots deep brown, long, robust, often branched, longest to 13 cm, with numerous rootlets. Leaves numerous, basal; outer stipules white, 1–1.3 cm × ca. 4 mm, membranous, inner ones ca. 3/4 adnate to petiole, free part broadly lanceolate or lanceolate, margin remotely shortly dentate; petiole slender, wingless, equaling or slightly exceeding blades, sparsely puberulous or glabrous; leaf blade abaxially pink to pinkish green, adaxially green or conspicuously white punctate-striate along veins, ovate-cordate, 2–6 × 2–4 cm, abaxially sparsely puberulous at base or subglabrous, veins conspicuously raised, adaxially sparsely puberulous, base deeply cordate, sinus narrow or slightly spreading, margin regularly obtusely serrate, apex acute, sometimes obtuse. Flowers whitish, large, to 2 cm; pedicels usually not or sometimes slightly exceeding leaves, 2-bracteolate at middle; bracteoles alternate, linear, 8–10 mm, margin remotely denticulate, apex acuminate. Sepals lanceolate or broadly lanceolate, 7–8 × ca. 3 mm, apex acute, basal auricles short, ca. 1.5 mm, remotely obtusely dentate, apex truncate. Petals oblong-obovate, upper ones ca. 1.2 × 0.8 cm, lateral ones bearded, ca. 1.2 × 1 cm, anterior one 1.8–2 cm (spur included); spur cylindrical, 6–8 mm, apex rounded, usually curved upward; spur of anterior stamens angular, 4–5 mm, slender. Ovary subglobose, glabrous; styles slightly geniculate at base; stigmas flat at apex, with slightly thick margin, shortly beaked in front, with a small stigma hole at tip. Capsule oblong, 0.7–1 cm, glabrous. Fl. Apr–May, fr. Jun–Sep. $2n = 24^*$.

• Broad-leaved forests, forest margins, streamsides; 200–1800 m. Gansu, Hebei, Henan, Jiangsu, Shaanxi, Shandong, Shanxi.

66. *Viola belophylla* H. Boissieu in Bull. Soc. Bot. France 55: 467. 1908.

枪叶堇菜 qiang ye jin cai

Viola monbeigii W. Becker.

Herbs perennial, acaulescent, 8–15 cm tall. Rhizome whitish to brown, ligneous, long, to 5.5 cm, 3–6 mm in diam., densely noded, with several, scattered, white roots. Leaves basal; stipules whitish or green, outer ones ovate-lanceolate, margin entire, inner ones ca. 1/2 adnate to petiole, free part narrowly lanceolate, margin remotely denticulate, apex acuminate; petiole 2.5–6(–20) cm, narrowly winged in upper part; leaf blade abaxially pale green, adaxially deep green, ovate or narrowly ovate, 2–20 × 1.5–7 cm, both surfaces subglabrous or young leaves puberulous abaxially, base deeply cordate, sometimes 2 lobes overlapping, margin obtusely serrate, apex acute or caudate-acuminate. Flowers white, 1.7–1.9 cm; pedicels purplish in lower part, usually exceeding or subequaling leaves at anthesis, much shorter than leaves at fruiting, sparsely pubescent, 2-bracteolate at or slightly below middle; bracteoles opposite, linear; ca. 1 cm. Sepals oblong or ovate-lanceolate, 5–7 × 3–4 mm, apex obtuse or acute, basal auricles subsquare, 1.8–2.5 mm, 3-veined, apex shallowly or deeply dentate. Petals obovate, lateral ones 1.2–1.3 cm × ca. 4.5 mm, slightly bearded, anterior one 1.6–1.9 cm (spur included); spur cylindrical, 5–7 mm, straight, apex rounded. Ovary glabrous; styles slender, ca. 2.5 mm, base slightly geniculate, conspicuously thickened in

upper part; stigmas conspicuously margined on lateral sides and abaxially, shortly beaked in front, with a larger stigma hole at tip of beak. Capsule ellipsoid, ca. 1 cm, glabrous. Fl. Apr–Jul, fr. Jul–Sep.

• Forest margins, grassy places on shaded mountain slopes, streamsides in mountain valleys; 1900–3200 m. Sichuan, SW Xizang, Yunnan.

67. *Viola pekinensis* (Regel) W. Becker, Beih. Bot. Centralbl., Abt. 2, 34: 251. 1916.

北京堇菜 bei jing jin cai

Viola dolichoceras C. J. Wang; *V. kamtschatica* Gingins var. *pekinensis* Regel; *V. liaosiensis* P. Y. Fu & Y. C. Teng; *V. mongolica* f. *longisepala* P. F. Fu & Y. C. Teng.

Herbs perennial, acaulescent, 5–9 cm tall, to 17 cm at fruiting, usually with persistent remains of leaves of last year at anthesis. Rhizome erect or obliquely ascending, 1–4 cm or longer, slightly robust, with numerous white rootlets. Leaves several, basal; stipules 1/2–2/3 adnate to petioles, free part narrowly lanceolate, margin remotely denticulate; petiole narrowly winged, 2–7 cm, glabrous; leaf blade ovate-cordate, cordate, or elliptic-cordate, 1.5–3 × 1–2 cm, larger at fruiting, 2.5–6 × 2–5 cm, both surfaces sparsely puberulous, abaxially sometimes subglabrous, base cordate, margin obtusely serrate, apex obtuse or acute. Flowers white or rarely light rose; pedicels usually exceeding leaves, slender, glabrous, 2-bracteolate near middle; bracteoles linear. Sepals elliptic-lanceolate or oblong-lanceolate, 7–9 mm, apex obtuse or acute; basal auricles 1.5–2.5 mm, apex truncate or shallowly dentate, ciliate. Lateral petals bearded, anterior one 1.5–2 cm (spur included), sometimes purple striate in middle and lower parts; spur slightly curved upward, cylindrical, 6–8 mm, apex obtuse. Ovary glabrous; styles slightly geniculate forward at base, gradually thickened upward; stigmas with wider margin on two lateral sides and behind, shortly beaked in front, with a slightly upward stigma hole at tip. Capsule ellipsoid or ovoid, 6–8 mm, glabrous. Fl. Apr–May, fr. Jun–Aug.

• Broad-leaved forests, needle-leaved forests, forest margins, stony places, crevices; 500–1900 m. Hebei, Heilongjiang, Henan, Jilin, Liaoning, Nei Mongol, Shandong, Shanxi.

In FRPS (51: 42. 1991), the name *Viola mongolica* was misapplied to this species.

68. *Viola lactiflora* Nakai, Bot. Mag. (Tokyo) 28: 329. 1914.

白花堇菜 bai hua jin cai

Viola limprichtiana W. Becker.

Herbs perennial, acaulescent, 10–18 cm tall. Rhizome erect or obliquely ascending, slightly robust, shortly and densely noded, with several, scattered, long, yellowish roots. Leaves numerous, basal; stipules conspicuous, greenish or brownish, submembranous, adnate to petiole above middle, free part linear-lanceolate, ca. 4 mm wide, margin remotely denticulate or entire; petiole 1–6 cm, wingless, those of lower leaves shorter, those of upper leaves longer; leaf blade narrowly triangular or oblong, those of lower leaves 2–3 × 1.5–2.5 cm, those of upper leaves 4–5 × 1.5–2.5 cm, both surfaces glabrous, veins conspicuously

uously raised abaxially, base shallowly cordate or truncate, sometimes slightly hastate, margin obtusely crenate, apex obtuse. Flowers white, medium-sized, 1.5–1.9 cm; pedicels not or slightly exceeding leaves, 2-bracteolate at or above middle; bracteoles linear. Sepals ovate-lanceolate or lanceolate, 5–7 mm, apex acuminate, basal auricles short and conspicuous, margin narrowly membranous, 3-veined, margin obtusely dentate or entire, apex truncate. Petals obovate, lateral ones distinctly bearded, anterior one broader, apex not emarginate; spur cylindrical, 4–5 mm, ca. 3 mm in diam., apex rounded. Anthers ca. 2 mm, subequaling appendage of connectives; spur of 2 anterior stamens shortly angular, ca. 2.5 mm, apex gradually smaller. Ovary glabrous; styles clavate, base slender, slightly geniculate forward, gradually thickened upward; stigmas slightly thickened on lateral sides and abaxially and narrowly margined, shortly beaked in front, with a smaller stigma hole at tip of beak. Capsule ellipsoid, 6–9 mm, glabrous, apex often with persistent styles. Seeds brownish, ovoid-globose, ca. 1.5 mm, glabrous. Fl. Mar–Apr. $2n = 48$.

Grassy slopes or wasteland; below 500 m. Jiangsu, Jiangxi, S Liaoning, Zhejiang [Japan (?naturalized), Korea].

69. *Viola hirtipes* S. Moore, J. Linn. Soc., Bot. 17: 379. 1879.

毛柄堇菜 mao bing jin cai

Herbs perennial, acaulescent and without stolon, 7–15 cm tall at anthesis, to 30 cm at fruiting. Rhizome erect, short, less than 1 cm, simple at top, often surrounded by remains of stipules; roots usually produced from same place on rhizome, oblique or slightly horizontal, white or brownish, 8–15 cm, robust, 1.5–3 mm in diam. Leaves 1–4 at anthesis; stipules greenish or glaucous, submembranous, over 1/2 adnate to petiole, free part linear-lanceolate, margin sparsely shortly glandular fimbriate-denticulate, apex acuminate; petiole equaling or slightly exceeding blade, elongated at fruiting, to 18 cm, densely sericeous; leaf blade oblong-ovate or ovate, 2–7 × 1–4 cm, both surfaces usually glabrous, or white puberulous only in lower part, particularly along veins abaxially, base slightly or deeply cordate, margin crenate, apex obtuse or ± acute; leaves increasing in number at fruiting; leaf blade enlarged to 15 cm × ca. 8 cm. Flowers purplish, large, 2–3 cm in diam.; pedicels long, slightly exceeding or equaling leaves, slender, densely or sparsely white puberulous, or sometimes subglabrous in upper part, 2-bracteolate at or below middle; bracteoles linear. Sepals oblong-lanceolate or narrowly lanceolate, 6–8.5 mm, margin narrowly membranous, 3- or 5-veined, apex acute, basal auricles 1.5–2 mm, ciliate or glabrous, apex obtuse or truncate. Petals obovate, ca. 1.6 cm × ca. 7.5 mm, lateral ones distinctly bearded, ca. 1.5 × 0.6 cm, anterior one whitish and purple striate at base, 2–2.5 mm (spur included); spur cylindrical, 7–9 mm, 1–2 mm in diam., straight or slightly curved upward, apex rounded. Stamens: appendages of connectives ca. 1.5 mm; anthers 2–2.5 mm; spur of 2 anterior stamens long, 4–5 mm, slender, ca. 0.8 mm in diam. Ovary narrowly ovoid, glabrous or puberulous; styles slightly geniculate at base, conspicuously thickened upward; stigmas 2-lobed, conspicuously margined on lateral sides and abaxially, shortly beaked in front, with a smaller and upward stigma hole at tip of beak. Capsule narrowly ellipsoid, glabrous. Fl. Apr–Jun, fr. May–Jul. $2n = 24$.

Broad-leaved forests, forest margins, thickets, grasslands on mountain slopes; 100–600 m. E Jilin, E Liaoning [Japan, Korea, Russia].

70. *Viola phalacrocarpa* Maximowicz, Mélanges Biol. Bull. Phys.-Math. Acad. Imp. Sci. Saint-Petersbourg 9: 726. 1876.

茜堇菜 qian jin cai

Herbs perennial, acaulescent, 6–17 cm tall, dwarf at anthesis, conspicuously taller at fruiting. Rhizome erect, short, 3–10 mm, stout, covered with white scales, with 2 to several roots; roots yellow-brown, long, to 18 cm, robust, simple. Leaves basal, rosulate; outer stipules glaucous, membranous, bladeless, inner ones greenish, over 1/2 adnate to petiole, free part lanceolate or narrowly lanceolate, apex long acuminate, margin remotely shortly fimbriate-denticulate; petiole long, 4–13 cm, slender, conspicuously winged in upper part, densely puberulous when young, later sparsely puberulous; leaf blades of lowest leaves often orbicular, those of others ovate or ovate-orbicular, 1.5–4.5 × 1.2–2.5 cm, to 6–7 × 5.5–6 cm at fruiting, both surfaces sparsely or densely (usually on young leaves at anthesis) white puberulous, sometimes purplish abaxially, base slightly cordate but deeply cordate at fruiting, margin crenate, apex obtuse or ± acute. Flowers purple-red, deep purple striate; pedicels usually exceeding or subequaling leaves, slender, puberulous, rarely glabrous, 2-bracteolate above middle; bracteoles linear. Sepals lanceolate or ovate-lanceolate, 6–7 mm (basal auricles included), margin narrowly membranous, apex acute, basal auricles 1–2 mm, densely or sparsely puberulous and ciliate, margin usually irregularly shallowly dentate, apex obtuse or truncate. Upper petals obovate, 1.1–1.3 cm × 6–7 mm, apex often repand-emarginate; lateral ones oblong-ovate, 1.1–1.3 cm × 5–6 mm, distinctly bearded, anterior one 1.7–2.2 mm (spur included), apex retuse; spur tubular, 6–9 mm, 1–1.8 mm in diam., straight or curved upward, sometimes sparsely puberulous, apex rounded. Stamens: appendages of connectives ca. 1.5 mm; anthers ca. 2 mm; spur of 2 anterior stamens long, 6–7 mm, slender, 0.3–0.4 mm in diam. Ovary ovoid-globose, densely puberulous; styles clavate, base geniculate, conspicuously thickened upward; stigmas conspicuously margined on lateral sides and abaxially, shortly beaked in front, with a large stigma hole at tip of beak. Capsule ellipsoid, 6–8 mm, with dense short stiff hairs when young, with sparse hairs when mature. Seeds red-brown, ovoid-globose, ca. 1.5 mm, ca. 1 mm in diam. Fl. Apr–May, fr. Jun–Sep. $2n = 24$.

Grasslands on sunny mountain slopes, thickets, forest margins; 100–600 m. SE Heilongjiang, E Jilin, Liaoning [Japan, Korea, Russia].

71. *Viola selkirkii* Pursh ex Goldie, Edinburgh Philos. J. 6: 324. 1822.

深山堇菜 shen shan jin cai

Viola selkirkii var. *albiflora* Nakai; *V. selkirkii* var. *angustistipulata* W. Becker; *V. selkirkii* var. *brevicalcarata* W. Becker; *V. selkirkii* var. *subbarbata* W. Becker; *V. selkirkii* var. *variegata* Nakai.

Herbs perennial, acaulescent and without stolon, 5–16 cm tall. Rhizome cordlike, occasionally separated, producing vegetative clones. Leaves basal, usually numerous, rosulate; stipules greenish, ca. 1/2 adnate to petiole, free part lanceolate, margin

remotely glandular denticulate, base narrowly and deeply cordate, margin obtusely dentate, apex \pm acute or obtuse; petiole 2–7 cm, to 13 cm in fruit, narrowly winged, sparsely white puberulous or glabrous; leaf blade ovate-cordate or slightly reniform, 1–5 \times 1–3.5 cm at anthesis, ca. 6 \times 4 cm at fruiting, thinly papery, strigose on the upper surface, glabrous or occasionally pubescent below; blades with narrow, deep sinus and lobes touching or slightly overlapping. Flowers long pedicellate, pedicels 4–7 cm, slightly or not exceeding leaves, glabrous, usually 2-bracteolate at middle; bracteoles linear, 5–7 mm, margin remotely denticulate. Sepals ovate-lanceolate, 6–7 mm, margin narrowly membranous, 3-veined, apex acute, basal auricles oblong, ca. 2 mm, apex irregularly emarginate and sparsely ciliate. Petals light blue, purple or white, obovate, all beardless, anterior one 1.5–2 cm (spur included); spur 5–7 mm, 2–3 mm in diam., apex rounded, straight or slightly curved upward. Ovary glabrous; styles clavate, base slightly geniculate forward, conspicuously thickened in upper part; stigmas flat at top, narrowly margined on lateral sides, shortly beaked in front, beak with an upward stigma hole at tip. Capsule ellipsoid, small, 6–8 mm, glabrous, apex obtuse. Seeds numerous, brownish, ovoid-globose, ca. 2 mm, ca. 1.1 mm in diam. Fl. Apr–May, fr. Jun–Sep. $2n = 12, 24$.

Mixed needle-leaved and broad-leaved forests, deciduous broad-leaved forests, thickets, stream valleys; 400–1500 m. Hebei, Heilongjiang, Jilin, Liaoning, Nei Mongol, N Shaanxi [Japan, Korea, Mongolia, Russia; Europe, North America].

72. *Viola tokubuchiana* Makino var. *takedana* (Makino) F. Maekawa in H. Hara, Enum. Spermatophytarum Japon. 3: 28. 1954.

凤凰堇菜 feng huang jin cai

Viola takedana Makino, Bot. Mag. (Tokyo) 21: 57. 1907; *V. funghuagensis* P. Y. Fu & Y. C. Teng.

Herbs perennial, acaulescent, 5–15 cm tall. Rhizome erect or obliquely ascending, short, 0.5–3 cm, slender, with numerous white rootlets, sometimes with underground stolons; roots elongating, producing new individuals. Leaves several, basal; stipules nearly 1/2 adnate to petioles, free part lanceolate, 5–10 mm, margin remotely denticulate; petiole narrowly winged, 5–11 cm, glabrous, usually purple in lower part, sometimes with sparse hairs; leaf blade triangular-ovate to narrowly ovate, 1.8–5 \times 1.2–3 cm, larger at fruiting, to 11 \times 6 cm, adaxially green to dark green, sometimes white variegated on veins, both surfaces slightly pubescent or glabrous, base deeply cordate, margin shallowly crenate-serrate, apex acuminate. Flowers white or red-purple; pedicels slender, usually exceeding leaves at anthesis, glabrous, 2-bracteolate near middle; bracteoles linear. Sepals ovate-lanceolate, 6–10 mm; appendages 2–3 mm, apex obtuse or shallowly dentate. Lateral petals bearded, anterior one 1.4–1.8 cm (spur included), purple striate in lower parts; spur cylindrical, 5–6 mm. Ovary glabrous; styles slightly geniculate forward at base, gradually thickened upward, stigmas with broader margin on two lateral sides and behind, shortly beaked in front, with a slightly upward stigma hole at tip. Capsule ellipsoid or ovoid, 7–11 mm, glabrous. Fl. Apr–May, fr. Jun–Aug.

Deciduous mountain forests; below 900 m. E Jilin, Liaoning [Japan, Korea].

In FRPS (51: 56. 1991), the name *Viola monbeigii* W. Becker was misapplied to this taxon. True *V. monbeigii* is a synonym of *V. be-lyphylla* (species no. 66).

Viola tokubuchiana var. *tokubuchiana* occurs in Japan.

73. *Viola violacea* Makino, Ill. Fl. Jap. 1(11): t. 67. 1891.

紫背堇菜 zi bei jin cai

Herbs perennial, acaulescent, 3–8 cm tall, usually glabrous. Rhizome short. Leaves caespitose, ascending, sometimes erect; stipules subulate-lanceolate or subulate-linear, base adnate to petioles, remotely glandulous-ciliate, membranous; petiole 2–8 cm; leaf blade abaxially usually purplish, adaxially deep green, sometimes white variegated on veins, narrowly triangular-ovate, 2–5 \times 1–3 cm, both surfaces glabrous or rarely pubescent, base cordate, margin shallowly serrate, apex acute. Pedicel 5–8 cm. Flowers red-purple, ca. 1.5 cm in diam. Sepals broadly lanceolate, 4–7.5 mm, appendages ca. 1 mm, apex truncate or rounded. Petals 8–12 mm; lateral ones glabrous or rarely sparsely bearded; spur usually slightly curved upward, 5–7 mm, slender. Ovary ovoid, glabrous. Fl. Mar–Apr, fr. May–Jul.

Forest understories in valleys; below 1000 m. Anhui, Fujian, Jiangxi, Zhejiang [Japan, S Korea].

74. *Viola macroceras* Bunge in Ledebour, Fl. Altaic. 1: 256. 1829.

大距堇菜 da ju jin cai

Herbs perennial, acaulescent, 5–14 cm tall, glabrous or sparsely puberulous. Rhizome obliquely ascending or erect, short, with few whitish fibrous roots. Leaves basal; stipules dense in upper part of rhizome, white, ovate-lanceolate, membranous, ca. 1/2 adnate to petiole, margin entire or sparsely long fimbriate, apex acute; petiole 1–8 cm, to 14 cm at fruiting; leaf blade cordate or ovate-cordate, 1.5–4.5 \times 1–3 cm, base shallowly or deeply cordate, usually cuneate and decurrent to petiole, margin shallowly crenate, apex acute, larger at fruiting, to 6 \times ca. 4 cm. Flowers purple-violet or blue-purple, fragrant; pedicels 4–9 cm, 2-bracteolate at middle; bracteoles 4–6 mm. Sepals narrowly elliptic or ovate-lanceolate, 5–6 \times 2–2.5 mm, apex obtuse, basal auricles short, apex obtuse, glabrous. Petals 1–1.2 cm, lateral ones bearded; spur 4–6 mm, stout, slightly curved upward or nearly straight. Ovary glabrous; styles clavate, base slightly geniculate, gradually thickened upward; stigmas flat at top, with obtuse margin on lateral sides and abaxially, shortly beaked in front, with an upward stigma hole at tip of beak. Capsule ellipsoid, 7–9 mm, glabrous, apex obtuse. Seeds brown or red-brown, large. Fl. Apr–Jun, fr. Aug–Sep.

Alpine meadows, stony slopes; below 1500 m. Xinjiang [Kashmir, Kazakhstan, Kyrgyzstan, Mongolia, Russia (W Siberia), Tajikistan, Uzbekistan].

75. *Viola yunnanfuensis* W. Becker, Bull. Misc. Inform. Kew 1928: 248. 1928.

心叶堇菜 xin ye jin cai

Viola bhutanica H. Hara; *V. concordifolia* C. J. Wang; *V.*

cordifolia W. Becker (1929), not Schweinitz (1822), nor Schur (1877).

Herbs perennial, acaulescent. Rhizome short, robust, 4–5 mm in diam., densely noded; roots numerous, whitish, elongated, robust. Leaves numerous, basal; stipules short, ca. 1 cm, 1/2–3/4 adnate to petioles, free part spreading; petiole usually subequaling blade at anthesis, conspicuously exceeding blade at fruiting, very narrowly winged in uppermost part, sparsely puberulous or glabrous; leaf blade ovate, broadly ovate, or triangular-ovate, rarely reniform, 2–8 × 2.5–7 cm, abaxially sparsely puberulous or glabrescent, sometimes purplish, adaxially spreading white puberulous or glabrescent, base deeply or broadly cordate, margin deeply crenate, apex acute or slightly obtuse. Flowers white or violet; pedicels not exceeding leaves, glabrous, 2-bracteolate near middle; bracteoles linear-lanceolate. Sepals broadly lanceolate, 5–7 × 1.5–2 mm, apex acuminate, appendages white puberulous or glabrous, ca. 1 mm, apex truncate or slightly dentate. Upper and lateral petals obovate, 1.2–1.4 cm × 5–6 mm, lateral ones conspicuously white bearded, anterior one narrowly obovate, ca. 1.5 cm (spur included), apex emarginate; spur cylindrical, 2–3 mm, ca. 2 mm in diam. Ovary conic, glabrous; styles clavate, base slightly geniculate, thickened in upper part; stigmas flat at top, conspicuously margined on lateral sides and abaxially, shortly beaked in front, with a broad stigma hole at tip of beak. Capsule ellipsoid, 7–10 mm, glabrous. Fl. Feb–Apr, fr. May–Oct.

Grasslands, thickets; below 3500 m. Guangxi, Guizhou, Sichuan, S Xizang, Yunnan [Bhutan].

76. *Viola prionantha* Bunge, Mém. Acad. Imp. Sci. St.-Pétersbourg Divers Savans 2: 82. 1835.

早开堇菜 zao kai jin cai

Viola prionantha var. *sylvatica* Kitagawa; *V. prionantha* var. *trichantha* C. J. Wang; *V. taishanensis* C. J. Wang.

Herbs perennial, acaulescent, 3–10 cm tall at anthesis, to 20 cm at fruiting. Rhizome erect, short, 4–20 cm, stout, to 9 mm in diam., often surrounded by remains of leaves of previous year in upper part; roots several, gray-white, long, robust, usually produced from lower part of rhizome, straight descending or sometimes subhorizontal. Leaves numerous, basal; stipules greenish or glaucous, membranous when dry, ca. 2/3 adnate to petioles, lower ones 7–9 mm wide, free part linear-lanceolate, 7–13 mm, margin remotely denticulate; petiole 1–5 cm at anthesis, to 13 cm at fruiting, robust, narrowly winged in upper part, glabrous or puberulous; leaf blade at anthesis oblong-ovate, ovate-lanceolate, or narrowly ovate, 1–4.5 cm × 6–20 mm, both surfaces glabrous or puberulous, sometimes hairy only along veins, base slightly cordate, truncate, or broadly cuneate, slightly decurrent, margin usually involute when young, densely crenulate, apex obtuse or ± acute; leaf blade conspicuously enlarged at fruiting, to 10 × 4 cm, triangular-ovate, broadest near middle, base usually broadly cordate. Flowers purple-violet or purplish, light colored and purple striate at throat, large, 1.2–2 cm in diam., not fragrant; pedicels angled, exceeding leaves, robust, 2-bracteolate near middle; bracteoles linear-

Sepals lanceolate or ovate-lanceolate, 6–8 mm, margin narrowly white membranous, apex acute, basal auricles 1–2 mm, apex irregularly dentate or subentire, ciliate or glabrous. Upper petals obovate, 8–11 mm, curved upward, lateral ones oblong-obovate, 8–12 mm, glabrous or rarely sparsely bearded, anterior one 1.4–2.5 cm (spur included); spur 5–9 mm, 1.5–2.5 mm in diam., apex obtuse and curved upward. Appendage of connectives ca. 1.5 mm; anthers 1.5–2 mm; spur of 2 anterior stamens ca. 4.5 mm, apex acute. Ovary narrowly ellipsoid, glabrous; styles clavate, base conspicuously geniculate, thickened in upper part; stigmas flat or slightly concave, very rounded or narrowly margined on lateral sides and abaxially, very shortly beaked in front, with a smaller stigma hole at tip of beak. Capsule narrowly ellipsoid, 5–12 mm, glabrous, apex obtuse, often with persistent styles. Seeds numerous, deep brown, ovoid-globose, ca. 2 mm, ca. 1.5 mm in diam., often brown-punctate. Fl. Mar–Apr and Oct, fr. May–Sep. $2n = 48^*$.

Grasslands on mountain slopes, streamsides, alongside houses; below 2800 m. Gansu, Hebei, Heilongjiang, Henan, Hubei, Jilin, Liaoning, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi, Sichuan [Korea, Russia].

77. *Viola japonica* Langsdorff ex Candolle, Prodr. 1: 295. 1824.

犁头草 li tou cao

Viola crassicalcarata Ching J. Wang; *V. concordifolia* C. J. Wang var. *hirtipedicellata* Ching J. Wang; *V. japonica* var. *stenopetala* Franchet ex H. Boissieu.

Herbs perennial, acaulescent, rosette-forming. Rhizome short, 5–7 mm, robust, ca. 5 mm in diam., densely noded; roots numerous, whitish, elongated, robust. Leaves numerous, basal; stipules narrowly ovate, 2–3 cm × 3–4 mm, ca. 2/3 adnate to petioles, margin remotely ciliate, apex acuminate; petiole usually subequaling blade at anthesis, conspicuously exceeding blade at fruiting, very narrowly winged in uppermost part, usually glabrous; leaf blade ovate, broadly ovate, or triangular-ovate, 3–8 × 3–5.5 cm, both surfaces sparsely puberulous or rarely glabrescent, base deeply or broadly cordate, margin densely crenate, apex acute or slightly obtuse. Flowers light purplish or whitish violet; pedicels not exceeding leaves, puberulous or glabrous, 2-bracteolate near middle; bracteoles linear-lanceolate, ca. 8 mm. Sepals broadly lanceolate, 5–7 × ca. 2 mm, apex acuminate, basal auricles 2–3 mm, apex truncate or 2-denticulate. Upper petals oblong-obovate, 1.3–1.5 cm × 5–6 mm, lateral ones oblong-obovate, 1.1–1.3 cm × 5–6 mm, sparsely bearded or glabrous, anterior one narrowly obovate, 1.7–2 cm (spur included), apex emarginate; spur cylindrical, 6–8 mm, 2.5–3.4 mm in diam.; spur of anterior 2 stamens long, 2–3 mm, slender. Ovary conic, glabrous; styles clavate, base slightly geniculate, thickened in upper part; stigmas flat at top, conspicuously margined on lateral sides and abaxially, shortly beaked in front, with a broad stigma hole at tip of beak. Capsule ellipsoid, ca. 1 cm. Fl. Mar and Oct, fr. May–Oct.

Sunny or half shaded places in lowlands; below 1100 m. Anhui, Chongqing, Fujian, Guizhou, Hubei, Hunan, Jiangsu, Jiangxi, Sichuan, Zhejiang [Japan, Korea].

78. *Viola perpusilla* H. Boissieu, Bull. Soc. Bot. France 55: 468. 1908.

极细堇菜 *ji xi jin cai*

Herbs perennial, dwarf, acaulescent, 1–5 cm tall. Rhizome erect, brown; roots fibrous, usually undivided. Leaves few, basal, rosulate; stipules whitish, membranous, 1/3–1/2 adnate to petioles, free part lanceolate, pubescent, apex linear-acuminate; petiole 0.4–1.5 cm; glabrous; leaf blade ovate or oblong, 0.4–2.2 cm × 3–8 mm, papery, abaxially glabrous or slightly pubescent, adaxially pubescent, base rounded or cuneate, slightly decurrent, margin shallowly crenate, apex obtuse. Flowers small; pedicels straight, 2–5 cm, longer than leaves, slender, slightly pubescent or nearly glabrous, 2-bracteolate slightly above mid-

dle; bracteoles nearly opposite, linear, 1–2 mm. Sepals 3–4 × ca. 1 mm, base acute, margin remotely denticulate-ciliate or glabrous, apex obtuse; basal auricles very short, ca. 0.4 mm, apex obtuse. Petals violet, oblong-obovate, 5–7 mm, base narrower, apex obtuse, lateral ones glabrous, anterior one slightly shorter; spur saccate, ca. 2 mm. Anthers ca. 1 mm. Ovary ovoid-globose, hairy; styles clavate, base conspicuously geniculate, stigma oblique, not margined. Fl. Jun.

• Grassy slopes. Yunnan (Dali).

This species is similar to *Viola kunawarensis*, but has leaf blades pubescent, margin crenate-dentate, pedicels usually pubescent and much longer than leaves, and ovary hairy.

2. *Viola* subg. *Dischidium* (Gingins) Petermann, Deutschl. Fl. 65. 1846.

二裂花柱亚属 *er lie hua zhu ya shu*

Viola sect. *Dischidium* Gingins, Mem. Fam. Viol. 1. 1823.

Plant with aerial stem. Stipules free, small. Flowers yellow. Anterior petal spurred. Style not beaked at apex; stigmas 2-lobed.

About 16 species: Asia, Europe, North America; 11 species (eight endemic) in China.

1a. Rhizome short, stout, erect or obliquely ascending.

2a. Cauline leaves lanceolate and verticillate 79. *V. dimorphophylla*

2b. Cauline leaves reniform, ovate or triangular, alternate.

3a. Leaf blade pedatipartite 80. *V. muliensis*

3b. Leaf blade not divided.

4a. Leaf blades reniform or broadly ovate; rhizome very stout, longer, densely noded.

5a. Cauline leaves scattered throughout stem; pedicel 3–4 cm 81. *V. szetschwanensis*

5b. Cauline leaves usually clustered at top of stem; pedicel 2–3.5 cm 82. *V. confertifolia*

4b. Leaf blades triangular or ovate; rhizome stouter and shorter.

6a. Leaf blade thickly papery, abaxially glaucous; stipules small, margin entire or remotely dentate 83. *V. delavayi*

6b. Leaf blade thinly herbaceous, abaxially green; stipules large, margin dentate or shallowly lobed 84. *V. urophylla*

1b. Rhizome procumbent, slender and long, yellow-brown to whitish, internodes longer, with scattered branched rootlets and nodes.

7a. Leaf blade broadly ovate, triangular-ovate, or ovate-lanceolate.

8a. Leaf blade broadly ovate or triangular 85. *V. cameleo*

8b. Leaf blade ovate-lanceolate or ovate 86. *V. hediniana*

7b. Leaf blade reniform or subcordate.

9a. Spur short, 1–2.5 mm 87. *V. biflora*

9b. Spur longer, 4–6 mm.

10a. Stem filiform; leaf blade basally deeply cordate 88. *V. tenuissima*

10b. Stem slender; leaf blade basally shallowly cordate 89. *V. wallichiana*

79. *Viola dimorphophylla* Y. S. Chen & Q. E. Yang, Bot. J. Linn. Soc. 149: 116. 2005.

轮叶堇菜 *lun ye jin cai*

Herbs perennial, to 30 cm tall, lacking stolons. Rootstock to 2.5 cm, ca. 5 mm in diam., vertical, densely articulate, with numerous dark brown fibrous roots. Stems 1–4, 0.2–1 mm in diam., glabrous, rarely 1-branched. Basal leaves 1 or 2(–4) or withered, long petiolate; petiole 2.5–13 cm, glabrous; leaf blade abaxially purplish, adaxially deep green, broadly cordate, usually broader than long, 1–4 × 1.5–5 cm, papery, abaxially glabrous, adaxially densely white hispid, base cordate, margin

crenate-serrate, apex obtuse. Cauline leaves (3–)5–7(–10), verticillate, sessile, linear, 8–44 × 1–6.5 mm, both surfaces glabrous, margin usually entire, sometimes remotely denticulate in upper part, very rarely bifid. Stipules 2, free, leaflike when mature, 4–10 mm, nearly indistinguishable from leaves. Flowers yellow, axillary, ca. 1.3 cm in diam., yellow; pedicels 1.2–3.5 cm, slender, glabrous, 2-bracteolate near apex; bracteoles linear, very small, ca. 1 mm. Sepals green, linear, 3–4 × 0.25–0.5 mm, glabrous, margin entire, apex acuminate; sepal appendages very short, glabrous. Petals glabrous, upper ones oblong-spatulate, 7–10 mm, 2.5–3.5 mm wide in upper part, apex rounded; lateral ones oblong-spatulate, 8–11 mm, 3.5–4 mm wide in upper part,

apex rounded, at throat with 2 black striae; lower petal broadly obovate-spatulate, 7–9 mm, 3–4 mm wide in upper part, apex obtuse, at throat with 6–9 black striae, shortly spurred; spur yellowish white, ca. 0.5 × 1.2 mm. Ovary ovoid, glabrous; style clavate, base geniculate, 1.6–3 mm; stigma capitate, thick, slightly 2-lobed, glabrous. Capsules ovoid or globose, 2–2.5 mm in diam., glabrous. Seeds ovoid, ca. 1.5 × 1 mm. Fl. Jul, fr. Sep.

• Thicket-covered or grassy slopes; 2400–2600 m. NW Yunnan (Zhongdian).

This is a very rare and endangered species.

80. *Viola muliensis* Y. S. Chen & Q. E. Yang, Bot. J. Linn. Soc. 149: 365. 2005.

木里堇菜 mu li jin cai

Herbs perennial, to 28 cm high, lacking stolons. Rootstock vertical, to 3 cm, densely articulate, with numerous dark brown fibrous roots. Stems 1–5, 0.5–1 mm in diam., glabrous, very rarely 1- or 2-branched. Leaves broadly ovate or triangular, very rarely orbicular, 1.5–4.5 × 2–8 cm, papery, both surfaces green and glabrous, base truncate to widely cuneate, rarely widely cordate, 3-pedately to 3–5 mm from base; middle partition rhombic or broadly linear, base cuneate or narrowly cuneate, apex acuminate, undivided, margin 2- or 3-dentate in upper part, sometimes 2- or 3-fid to 6–7 mm from base, lobes laxly 2- or 3-incised-lobulate; lateral partitions rarely undivided, margin 2- or 3-dentate, rarely entire, often unequally 2- or 3-fid, lobes 2- or 3-lobulate. Basal leaves 1–4, sometimes withered, long petiolate; petioles 2.5–14 cm, glabrous. Cauline leaves similar to basal ones but petioles shorter and blades smaller upward. Stipules 2, leaflike, subulate or linear, 4–22 × 0.5–3 mm, free, glabrous, margin entire, rarely base 1-denticulate. Flowers axillary, yellow, ca. 1.5 cm in diam.; pedicels 2–4.5 cm, slender, glabrous, near apex 2-bracteolate; bracteoles filiform, very small. Sepals green, narrowly linear, 3–5 × ca. 0.5 mm, glabrous, margin entire, apex acuminate; appendages very short, glabrous. Petals glabrous; upper ones oblong-spatulate, 8–10 mm, 3–4 mm wide in upper part, apex rounded; lateral ones oblong-spatulate, 10–12 mm, 2.5–3.5 mm wide in upper part, apex rounded, at throat with 2–4 black striae; lower petal broadly oblong-spatulate, 5–7 mm, 2.5–3 mm wide in upper part, apex obtuse or cuspidate, at throat densely black striate, shortly spurred; spur yellow, ca. 0.5 mm. Ovary ovoid, glabrous; style shortly clavate, base geniculate, 1–1.5 mm; stigma capitate, thick, slightly 2-lobed, glabrous. Capsule ovoid or globose, glabrous, ca. 4.5 mm, ca. 2.5 mm in diam. Seeds ovoid, ca. 0.8 × 1.5 mm. Fl. Jul, fr. Sep.

• Forest margins, moss-covered rock crevices; ca. 2500 m. SW Sichuan (Muli).

This is a very rare and critically endangered species.

81. *Viola szetschwanensis* W. Becker & H. Boissieu, Bull. Herb. Boissier, sér. 2, 8: 742. 1908 [*“sze-tschwanensis”*].

四川堇菜 si chuan jin cai

Viola biflora Linnaeus var. *acutifolia* H. Boissieu; *V. biflora* var. *ciliicalyx* H. Boissieu; *V. mainlingensis* S. Y. Chen;

V. manasensis F. Maekawa; *V. prattii* W. Becker; *V. szetschwanensis* var. *kangdienensis* Chang; *V. szetschwanensis* var. *nudicaulis* W. Becker.

Herbs perennial. Stems erect, ca. 25 cm tall, robust, 3- or 4-noded, usually leafless below middle. Stipules narrowly ovate to oblong-ovate, ca. 1.3 cm, both surfaces sparsely puberulous or subglabrous, margin remotely shallowly dentate, apex acuminate; basal leaves long petiolate; petiole 2–3.5 cm; leaf blade ovate-cordate or broadly ovate, 2–2.5 cm, base cordate, apex acuminate; cauline leaf petiole 0.5–1 cm, puberulous, cauline leaf blade broadly ovate, reniform, or suborbicular, 1.5–3 cm wide, abaxially sparsely puberulous, adaxially subglabrous or sparsely puberulous along veins, base shallowly cordate, margin shallowly crenate, apex mucronate or acuminate. Flowers solitary in leaf axils in upper part, yellow; pedicels erect, much longer than leaves, ca. 3 cm, to 4 cm at fruiting, slender, 2-bracteolate at upper part; bracteoles linear. Sepals linear, 4–6 × 0.8–1 mm, 3-veined, apex obtuse, basal auricles very short, glabrous or puberulous, apex truncate. Upper petals oblong, with slender claw, 1–1.2 cm × ca. 2.5 mm, lateral ones and anterior one shorter; spur 2–2.5 mm, apex obtuse. Anthers ca. 1.5 mm, appendage of connectives 1.5–2 mm; spur of anterior stamens short, ca. 1 mm. Ovary densely brown punctate; styles geniculate in lower part, thickened in upper part; stigmas 2-lobed, lobes auricular, thicker, spreading. Capsule oblong, 0.8–1 cm, ca. 4 mm in diam., densely brown dotted and sparsely puberulous. Seeds ovoid, ca. 2 × 1 mm. Fl. May–Sep, fr. Jul–Oct.

Mountain forests, forest margins, grassy slopes, thickets; 2400–4000 m. W Sichuan, Xizang, N Yunnan [Nepal].

82. *Viola confertifolia* Chang, Bull. Fan Mem. Inst. Biol., n.s., 1: 238. 1949.

密叶堇菜 mi ye jin cai

Viola biflora Linnaeus var. *platyphylla* Franchet.

Herbs perennial. Rhizome erect, ca. 3.5 cm, ca. 5 mm in diam., densely noded, with numerous fibrous roots. Stems 1–3, erect, to 11 cm tall, 2.5–3 mm in diam., glabrous, conspicuously striate, leafless in middle and lower parts. Basal leaves few or withered; stipules conspicuous, membranous, margin remotely dentate; petiole 5–7 cm, slender, very narrowly winged; leaf blade reniform, abaxially glabrous except along veins, adaxially sparsely puberulous. Upper leaves clustered at apex of stem; stipules ovate, 4–5 mm, herbaceous, margin remotely dentate or subentire; petiole ca. 1.5 cm; leaf blade reniform, ca. 1.5 × 2.5–4 cm, ± fleshy, both surfaces sparsely puberulous, margin obtusely serrate, apex usually obtuse, rarely mucronate. Flowers few, yellow, long pedicellate; pedicels linear, 2–3.5 cm, not bracteolate. Sepals linear, ca. 5 mm, 3-veined, margin subentire, basal auricles short. Petals obovate-oblong, glabrous, upper ones ca. 7.5 × 2.5 mm, lateral ones and anterior one ca. 8 × 4 mm; spur saccate, ca. 1.5 mm; spur of anterior stamens short. Ovary ovoid-globose, ca. 2 mm, glabrous; styles ca. 1 mm, base conspicuously geniculate, 2-lobed in upper part, lobes narrow and thick. Fl. Jul, fr. Sep.

• Moist places in mountain ravines; 2800–3200 m. NW Yunnan.

83. *Viola delavayi* Franchet, Bull. Soc. Bot. France 33: 413. 1886.

灰叶堇菜 hui ye jin cai

Viola boissieu H. Léveillé & Maire; *V. delavayi* f. *depau-perata* Diels; *V. delavayi* var. *villosa* W. Becker; *V. impatiens* H. Léveillé.

Herbs perennial. Rhizome short, stout, with numerous dark brown fibrous roots. Stems erect, 15–25 cm tall, slender, glabrous, usually simple, leafless in lower part. Basal leaf usually 1 or absent; petiole to 7 cm; leaf blade abaxially glaucous, adaxially green, ovate, 3–4 × ca. 3 cm, thickly papery, glabrous, abaxially sparsely villous at base, base cordate, margin repand-serrate, apex acuminate. Stipules lanceolate, oblong, or ovate, 0.5–1.3 mm, lower ones 1–3 × shorter than petiole, upper ones subequaling or exceeding petiole, herbaceous, margin entire or remotely and large toothed; cauline leaf petiole 0.5–1 cm, glabrous or rarely villous; cauline leaf blade smaller than those of basal leaves, broadly ovate or triangular-ovate, base shallowly cordate or truncate; upper leaf blade ovate-lanceolate. Flowers in leaf axils at top, yellow, long pedicellate; pedicels exceeding blades, 1.5–3 cm, 2-bracteolate near top; bracteoles linear. Sepals linear, ca. 5 mm, glabrous or sparsely puberulous, apex acute, basal auricles very short, apex truncate. Upper petals obovate, ca. 1.2 cm, lateral ones 0.9–1 cm, anterior one broadly obovate, 8–9.5 mm, base purple striate; spur very short, only 0.5–1 mm, apex obtuse. Ovary ovoid, smooth, glabrous; styles slender in lower part, thickened in upper part; stigmas 2-lobed, lobes spreading, straight, broadly ovate, apex rounded. Capsule ovoid or nearly oblong, small, 3–4 mm, subequaling or slightly shorter than persistent sepals. Fl. May–Aug, fr. Jul–Oct.

• Forest margins on mountains, grassy slopes, moist places in stream valleys; 1800–2800 m. Guizhou, Sichuan, Yunnan.

84. *Viola urophylla* Franchet, Bull. Soc. Bot. France 33: 413. 1886.

粗齿堇菜 cu chi jin cai

Herbs perennial. Rhizome obliquely ascending, short, stout, densely covered with scales, with numerous dark brown roots. Stems to 22 cm tall, slender, glabrous or pubescent, usually simple, leafless in lower part. Basal leaves usually 1 or 2, sometimes absent, long petiolate; leaf blade deep green on both sides, deeply cordate, 5–9 × 3–7 cm at base, glabrous or pubescent, margin large serrate, apex long acuminate. Cauline leaves: lower stipules nearly ovate, 7–9 mm, much shorter than petiole, margin remotely and large toothed, upper ones rhombic-ovate or broadly lanceolate, 1.5–2.5 cm, subequaling or longer than petiole, margin remotely and large toothed or shallowly 3-lobed; petiole 1.5–4 cm; leaf blade slightly glaucous abaxially, usually triangular-ovate or broadly cordate, 3–5 × 3–6 cm, sometimes sparsely puberulous along veins and margin, base truncate or broadly cordate. Flowers in axils of cauline leaves, yellow; pedicels 3–4 cm, slightly shorter than leaves, 2-bracteolate below flower; bracteoles undeveloped, linear. Sepals linear, ca. 4 mm, apex acute, basal auricles short, 3-veined, apex truncate. Upper petals obovate, ca. 1.1 cm, lateral ones spatulate, ca. 1 cm, anterior one broadly obovate, ca. 8 mm, base

purple striate; spur short, 0.5–0.9 mm, apex obtuse. Stigmas 2-lobed, lobes spreading, straight, apex obtuse. Capsule ovoid-globose, small.

• Forest margins, meadows, grassy places, streamsides; 1600–3600 m. Sichuan, W Yunnan.

- 1a. Stems, petioles, and leaf blades
glabrous 84a. var. *urophylla*
1b. Stems, petioles, and leaf blades
puberulous 84b. var. *densivillosa*

84a. *Viola urophylla* var. *urophylla*

粗齿堇菜(原变种) cu chi jin cai (yuan bian zhong)

Viola subdelavayi S. H. Huang.

Stems, petioles, and leaf blades glabrous. Fl. May–Jul, fr. Jul–Sep.

• Forest margins on mountains, meadows, shaded and moist grasslands along streamsides; 1600–3200 m. SW Sichuan, NW Yunnan.

84b. *Viola urophylla* var. *densivillosa* C. J. Wang, Acta Bot. Yunnan. 13: 265. 1991.

密毛粗齿堇菜 mi mao cu chi jin cai

Middle and upper parts of stem and petiole densely white spreading puberulous, stipules and leaf blade sparsely puberulous on both surfaces, more densely so abaxially on leaf blade, along veins in particular; leaf blade densely ciliate along margin.

• Forest margins, grassy places on mountains, stream valleys; 2400–3600 m. Sichuan, SW Yunnan.

85. *Viola cameo* H. Boissieu, Bull. Herb. Boissier, sér. 2, 1: 1074. 1901.

阔紫叶堇菜 kuo zi ye jin cai

Viola henryi H. Boissieu var. *cameo* (H. Boissieu) Chang.

Herbs perennial. Rhizome procumbent, slightly robust, covered with scales, with numerous roots. Roots yellowish when dry, 7–10 cm, with numerous fibrous roots. Stems 15–20 cm tall, slender, smooth, glabrous. Basal leaves 1 or 2; petiole long, 6–8 cm, slender; leaf blade broadly ovate or triangular-ovate, 1.5–3 × 2–3.5 cm, abaxially puberulous, adaxially usually glabrous, base broadly cordate, margin crenate, apex long acuminate. Stipules lanceolate, 3–6 mm, herbaceous, margin remotely dentate, apex acute; cauline leaves similar to basal ones, but smaller; petiole short, 0.5–2 cm; leaf blade base shallowly cordate or truncate. Flowers solitary in upper leaf axils, golden-yellow or yellowish, often purple striate; pedicels 2–5 cm, more than 2 × as long as leaves, slender, 2-bracteolate at upper part; bracteoles undeveloped, subulate. Sepals very narrow, linear, ca. 0.5 cm × 0.5–0.8 mm, apex acute, basal auricles very short, often shallowly dentate. Upper and lateral petals oblong, ca. 1 cm × 3–4 mm, not barbate, anterior one obovate; spur tubular, 3–4 mm, ca. 1 mm in diam., slightly slender, straight or slightly curved. Ovary ovoid, smooth, glabrous; styles 2-lobed in upper part, lobes oblong, apex obtuse. Fl. May–Jul, fr. Aug–Sep.

• Thickets; 1800–3800 m. W Hubei, Sichuan, NW Yunnan.

86. *Viola hediniana* W. Becker, Beih. Bot. Centralbl., Abt. 2, 34: 262. 1916.

紫叶堇菜 *zi ye jin cai*

Herbs perennial. Rhizome procumbent or obliquely ascending, whitish, short, slightly robust, with numerous rootlets. Stems erect, 25–30 cm tall, slender, glabrous, usually simple, leafless in lower part. Basal leaves 1 or 2 or absent, long petiolate; lower cauline leaves shortly petiolate, upper one subsessile or sessile; stipules free, ovate-lanceolate or lanceolate, small, 3–5 mm, herbaceous, margin remotely dentate; leaf blade dark green adaxially, ovate-lanceolate or ovate, 3–7 × 1.5–2.5 cm, abaxially glabrous, adaxially sparsely puberulous or subglabrous, base shallowly cordate or rounded, margin crenate, apex long acuminate. Flowers solitary in upper leaf axils, yellow; pedicels erect, slightly shorter than leaves, slender, 2-bracteolate near middle; bracteoles subulate. Sepals linear, ca. 5 × 0.5–1 mm, apex acute, basal auricles very inconspicuous, apex truncate. Upper and lateral petals oblong, 8–12 × 3–4 mm, lateral ones inside not barbate, anterior one triangular-obovate, ca. 1.3 cm (spur included), base dark yellow; spur cylindrical, 5–6 mm, 1.5–2 mm in diam.; spur of anterior stamens cylindrical, 2–2.5 mm, slender. Ovary smooth, glabrous; styles slightly geniculate at base, conspicuously thickened upward, 2-lobed in upper half, lobes ovate, apex acute. Capsule ellipsoid, ca. 6 mm, glabrous. Fl. Apr–Jun, fr. Jul–Sep.

• Mountain forests, forest margins, grassy slopes, moist rock crevices; 1500–3500 m. W Hubei, Sichuan.

87. *Viola biflora* Linnaeus, Sp. Pl. 2: 936. 1753.

双花堇菜 *shuang hua jin cai*

Herbs perennial. Rhizome erect or obliquely ascending, slender or slightly robust, noded, with numerous rootlets. Stems 2 or several fasciculate, erect or obliquely ascending, 10–25 cm tall, slender, 3–5-noded, usually glabrous or sparsely puberulous when young. Basal leaves 2 to several; petiole 4–8 cm; leaf blade reniform, broadly ovate, or suborbicular to orbicular, 1–3 × 1–4.5 cm, abaxially glabrous, adaxially sparsely puberulous, sometimes puberulous on both surfaces, base cordate or subtruncate, margin obtusely dentate or shallowly repand-crenate, apex obtuse. Stipules free, ovate or ovate-lanceolate, 3–6 mm, margin entire or remotely denticulate, apex acute; cauline leaves shortly petiolate; petiole glabrous or puberulous; leaf blade smaller than basal ones. Flowers yellow, sometimes whitish at late anthesis; pedicels 1–6 cm, slender, 2-bracteolate at upper part; bracteoles lanceolate. Sepals linear-lanceolate or lanceolate, 3–4 mm, apex acute, basal auricles very short, margin membranous, glabrous or shortly ciliate in middle and lower parts. Petals oblong-obovate, 6–8 mm, purple veined, lateral ones inside not barbate, anterior one ca. 1 cm (spur included); spur shortly cylindrical, 0.5–2.5 mm; spur of anterior stamens shortly triangular. Ovary glabrous; styles clavate, base slightly geniculate, deeply 2-lobed in upper half, lobes obliquely spreading, with a conspicuous stigma hole in between lobes. Capsule oblong-ovoid, 4–7 mm, glabrous.

Alpine or subalpine meadows and grassy slopes, thickets, forests,

forest margins, rocks and rock crevices; 2500–4300 m. Gansu, Hebei, Heilongjiang, Henan, Jilin, Liaoning, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi, Sichuan, Taiwan, Xinjiang, Xizang, Yunnan [Bhutan, NE India, Indonesia (N Sumatra), Japan, Kashmir, Korea, Malaysia, Mongolia, Myanmar, Nepal, Russia; Europe, North America].

- 1a. Leaf blade reniform or broadly ovate, usually larger 87a. var. *biflora*
 1b. Leaf blade orbicular or nearly reniform, smaller, 1–1.5 × 1–1.5 cm 87b. var. *rockiana*

87a. *Viola biflora* var. *biflora*

双花堇菜(原变种) *shuang hua jin cai* (yuan bian zhong)

Viola biflora var. *acuminata* Maximowicz; *V. biflora* var. *hirsuta* W. Becker; *V. biflora* var. *nudicaulis* W. Becker; *V. biflora* var. *valdepilosa* Handel-Mazzetti; *V. chingiana* W. Becker; *V. kanoi* Sasaki; *V. nudicaulis* (W. Becker) S. Y. Chen; *V. schulzeana* W. Becker; *V. tayemonii* Hayata; *V. wallichiana* subsp. *brevicornis* W. Becker.

Stems usually 10–25 cm tall. Leaf blade reniform or broadly ovate, 1–3 × 1–4.5 cm, base deeply cordate or cordate, margin obtusely dentate, apex obtuse; spur 1–2.5 mm. Fl. May–Jul, fr. Jul–Oct. $2n = 12^*$.

Alpine or subalpine meadows, thickets, forest margins, rock crevices; 2500–4000 m. Gansu, Hebei, Heilongjiang, Henan, Jilin, Liaoning, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shanxi, Sichuan, Taiwan, Xinjiang, Xizang, Yunnan [Bhutan, NE India, Indonesia (N Sumatra), Japan, Kashmir, Korea, Malaysia, Mongolia, Myanmar, Nepal, Russia; Europe, North America].

87b. *Viola biflora* var. *rockiana* (W. Becker) Y. S. Chen, *comb. et stat. nov.*

圆叶小堇菜 *yuan ye xiao jin cai*

Basionym: *Viola rockiana* W. Becker, Repert. Spec. Nov. Regni Veg. 21: 236. 1925; *V. jizushanensis* S. H. Huang.

Stems usually 2(or 3), slender, to 10 cm tall, 2-noded, glabrous, with leaves only in lower part. Leaf blade orbicular or ovate-orbicular, ca. 1 × 1 cm, base shallowly cordate or subtruncate, margin shallowly repand-crenate. Spur shallowly sacate, 1–1.5 mm. Fl. Jun–Jul, fr. Jul–Aug.

• Thickets, alpine or subalpine grassy slopes, rocks; 2500–4300 m. Gansu, Qinghai, Sichuan, E Xizang, Yunnan.

88. *Viola tenuissima* Chang, Bull. Fan Mem. Inst. Biol., n.s., 1: 234. 1949.

纤茎堇菜 *xian jing jin cai*

Herbs perennial, small, 5–7 cm tall. Rhizome short, densely covered with few scales. Stems greenish when dry, filiform, slender, glabrous. Basal leaf usually 1, long petiolate; stipules narrowly ovate, 2–2.5 mm, margin subentire or sometimes remotely and inconspicuously serrate; cauline leaf petiole linear, long, to 5 cm, slender; cauline leaf blade abaxially glaucous, adaxially green, cordate, 1–1.5 × 1–1.5 cm, both surfaces sparsely white puberulous or subglabrous, base deeply cordate, lateral auricular lobes rounded and often overlapping, margin remotely and large serrate, apex shortly or inconspicuously

acuminate. Flowers solitary in upper leaf axils, yellow; pedicels filiform, 2–3.5 cm, slender, 2-bracteolate above middle; bracteoles linear, small. Sepals very narrow, linear, ca. 5 × 0.6–1 mm, basal auricles very short, glabrous, margin narrowly membranous, apex truncate. Upper petals oblong, ca. 1 × 0.3 cm, lateral ones not barbate, slightly longer than upper ones, anterior one narrowly obovate, ca. 1 cm × 4–7 mm, base purple striate; spur 3–5 mm, 1–1.5 mm in diam., apex small and obtuse. Ovary glabrous, red punctate; styles 2–2.5 mm, base geniculate, apex 2-lobed, lobes obtuse. Capsule subglobose, ca. 4 mm in diam., red punctate. Fl. Jun–Jul, fr. Aug–Sep.

• Mountain forests, rock crevices in shaded and moist places; 2300–3300 m. N Guizhou, W Sichuan.

89. *Viola wallichiana* Gingins in Candolle, Prodr. 1: 300. 1824.

西藏细距堇菜 xi zang xi ju jin cai

Herbs perennial. Rhizome short, robust, densely noded, covered with scales, with numerous rootlets. Stems 1–4, 5–10 cm tall, slender, 4–6-noded, leafless in lower part, glabrous or

very sparsely puberulous. Basal leaves 2–4; petiole long, 2.5–6 cm, slender; leaf blade reniform or suborbicular, 8–15 mm × 1.5–2.5 cm, both surfaces glabrous, puberulous only along margin, base cordate, margin crenate, apex rounded. Cauline leaves smaller; stipules free, narrowly ovate to lanceolate, ca. 3 mm, submembranous, apex acuminate; petiole shorter, 2–10 mm; leaf blade reniform or nearly cordate, base shallowly cordate or truncate, apex acute. Flowers in upper leaf axils, yellow; pedicels 2–3 cm, slender, bracteolate at upper part; bracteoles reduced, membranous. Sepals narrow, subulate, 4–6 × 0.8–1 mm, apex acute, basal auricles inconspicuous, margin narrowly membranous, glabrous. Upper and lateral petals oblong-obovate, 7–9 × 2.5–3 mm, anterior one broadly obovate, ca. 1.4 cm (spur included), ca. 7 mm wide, apex shallowly 2-dentate; spur tubular, 4–6 mm, ca. 0.8 mm in diam., apex acute; spur of anterior stamens angular, ca. 3 mm. Ovary ovoid-globose, glabrous; styles clavate, base conspicuously geniculate, 2-lobed in upper part, lobes spreading, thick. Capsule ovoid-globose, ca. 3 mm, glabrous. Fl. and fr. Jul–Aug.

Rock crevices in forest understories; ca. 2900 m. Xizang [India (Darjeeling, Sikkim), Nepal].

3. *Viola* subg. ***Chamaemelianum*** (Gingins) Juzepczuk in Schischkin & Bobrov, Fl. URSS 15: 446. 1949.

须毛柱头堇菜亚属 xu mao zhu tou jin cai ya shu

Viola sect. *Chamaemelianum* Gingins, Mem. Fam. Viol. 1. 1823.

Plant with aerial stem. Stipules free, small. Flowers yellow, rarely white or with violet or brown upper petals. Anterior petal spurred. Style gradually globose, incrassate and not beaked at apex; stigmas on front side of style incrassation, on hemispheric projection.

About 26 species: NE Asia, North America; three species in China.

- 1a. Rhizome procumbent, slender, long, yellow-brown to whitish, internodes longer, with scattered branched rootlets and nodes; flowers larger, 1.5–2 cm 92. *V. muehldorfii*
 1b. Rhizome short, stout, erect or obliquely ascending; flowers smaller, 1–1.5 cm.
 2a. Lowest cauline leaf above middle of stem; pedicel shorter, 1–3 cm 90. *V. orientalis*
 2b. Lowest cauline leaf below middle of stem; pedicel longer 91. *V. acutifolia*

90. *Viola orientalis* (Maximowicz) W. Becker, Beih. Bot. Centralbl., Abt. 2, 34: 265. 1916.

东方堇菜 dong fang jin cai

Viola uniflora Linnaeus var. *orientalis* Maximowicz, Enum. Pl. Mongolia, 81. 1889; *V. conferta* (W. Becker) Nakai; *V. orientalis* var. *conferta* W. Becker; *V. xanthopetala* Nakai.

Herbs perennial. Rhizome usually erect, sometimes obliquely ascending, 1–3 cm, robust, ca. 5 mm in diam., densely noded; roots numerous, white to yellowish brown, to 10 cm, with numerous filiform rootlets in lower part. Stems erect, 6–10 cm tall, usually puberulous. Stipules small, adnate to petiole only at base, free part ovate, 1–2 mm, margin entire or remotely serrulate; basal leaf petiole 3–10 cm; blade ovate, broadly so, or elliptic, 2–4 × 1.5–3 cm, abaxially puberulous, adaxially subglabrous, base cordate, sometimes subtruncate, margin obtusely serrate, apex acute; cauline leaves 3 (or 4), upper 2 very shortly petiolate or subsessile, subopposite, lower ones shortly petiolate, above middle of stem. Flowers yellow, ca. 2 mm in diam., usually 1–3 in cauline leaf axils; pedicels 1–3 cm, white puberulous, sometimes glabrous, 2-bracteolate at upper part; bract-

coles usually opposite, sometimes alternate, ovate, small, 1–2 mm. Sepals lanceolate or oblong-lanceolate, 5–7 mm, apex acute, basal auricles suborbicular, short. Petals obovate, upper and lateral petals curved toward outside, upper ones dark purple striate, lateral ones inside conspicuously barbate, anterior one shorter, 1–1.5 cm (spur included); spur saccate, short, 1–2 mm; spur of anterior stamens ca. 0.5 mm wide. Ovary glabrous; styles slightly straight at base, gradually thickened upward; stigmas capitate, with several series of long beards on lateral sides. Capsule greenish, ellipsoid or oblong, 7–12 mm, often dark purple punctate. Seeds white to brownish, ovoid-globose, ca. 2 mm. Fl. Apr–May, fr. Jun–Jul. $2n = 12$.

Sparse forests on mountains, forest margins, thickets, grasslands on mountain slopes; 100–1100 m. Heilongjiang, E Jilin, Liaoning, E Shandong [Japan, Korea, Russia].

91. *Viola acutifolia* (Karelin & Kirilov) W. Becker, Beih. Bot. Centralbl., Abt. 2, 34: 263. 1916.

尖叶堇菜 jian ye jin cai

Viola biflora Linnaeus var. *acutifolia* Karelin & Kirilov, Bull. Soc. Imp. Naturalistes Moscou 15: 163. 1842.

Herbs perennial. Rhizome obliquely ascending or erect, with numerous yellow-brown rootlets. Stems 1–3, 10–25 cm tall, usually flexible, glabrous or spreading puberulous. Basal leaves 1 or 2, rarely 5, usually withered after anthesis; leaf blade cordate or reniform, 3–5 × 3.5–5.5(–6) cm, both surfaces subglabrous or sparsely puberulous, base deeply cordate, apex obtuse or mucronate. Stipules adnate to petiole only at base, free part ovate-lanceolate, 4–6 mm, margin entire or remotely fimbriate-dentate, apex acute; cauline leaf only 1 in lower part of stem, long petiolate, without flowers in leaf axils; leaves at apex of stem subverticillate, shortly petiolate; leaf blade broadly ovate, 5–7 × 3–6 cm, both surfaces sparsely puberulous, base cordate, margin remotely serrate, apex acuminate. Flowers 1–3, usually 2 in leaf axils at apex of stem, yellowish, 1–2 cm in diam.; pedicels shorter than leaves, 2-bracteolate above middle; bracteoles linear. Sepals linear-lanceolate or linear, 6–8 mm, apex ± acute, basal auricles very short, 3-veined. Petals obovate, purple striate, anterior one shorter, 1.3–1.5 cm (spur included); spur saccate, very short, slightly curved upward. Capsule oblong, 6–12 mm, glabrous. Fl. May–Jun, fr. Jun–Jul.

Alpine or subalpine meadows, grasslands on mountain slopes, forest margins; 1000–2400 m. Xinjiang [Russia].

92. *Viola muehldorfii* Kiss, Bot. Közlem. 19: 92. 1921 [*“muehldorfi”*].

大黄花堇菜 da huang hua jin cai

Viola lasiostipes Nakai.

Herbs perennial. Rhizome procumbent, yellow-brown to whitish, long, slender, with small, dry, white membranous scales,

and white rootlets. Stems erect, simple, 20–60 cm tall, spreading white villous or subglabrous in lower part, usually with 1 small, white, ovate, membranous scale at base. Basal leaves 1–3, petiole to 10 cm; leaf blade cordate or reniform, both surfaces sparsely puberulous, more densely puberulous on veins abaxially, base cordate, margin serrate and ciliate, apex mucronate. Cauline leaves usually 3, rarely 4; stipules free, opposite, ovate, margin entire or glandular serrate, apex acute; petiole of lower one ca. 3 cm, densely minutely villous, blade of lower one orbicular-cordate, ca. 4 × 4.5 cm, base broadly cordate, apex acuminate; upper two short petiolate or sessile, leaf blade of upper two at apex of stem, subopposite, ovate, both surfaces white puberulous, base shallowly cordate, apex acuminate or acute. Flowers in second leaf axil at apex of stem, golden-yellow, 1.5–2 cm; pedicels glabrous, 2-bracteolate in upper part; bracteoles broadly ovate. Sepals narrowly ovate or lanceolate, ca. 8 mm, usually glabrous, 3-veined, margin entire, basal auricles short, ca. 0.3 mm. Petals obovate, purple striate, lateral petals inside barbate at base, anterior one subspatulate, 1.5–2 cm (spur included); spur ca. 2 mm, stout, apex obtuse; spur of anterior stamens undeveloped, short, broad. Ovary glabrous; styles gradually thickened upward; stigmas capitate, with a series of white beards on each lateral side, shortly beaked in central part, with a rounded stigma hole at tip of beak. Capsule ellipsoid, ca. 7 mm, apex ± acute, usually with persistent style. Seeds glaucous, globose, ca. 2 mm in diam., with white appendage. Fl. May–Aug, fr. Jul–Sep.

Mixed needle-leaved and broad-leaved forests, forest margins, streamsides; 300–500 m. Heilongjiang [Korea, Russia].

4. *Viola* subg. **Melanium** (Gingins) Petermann, Deutschl. Fl. 65. 1846.

美丽堇菜亚属 mei li jin cai ya shu

Viola sect. *Melanium* Gingins, Mem. Fam. Viol. 1. 1823.

Plant with aerial stem (in China plants). Stipules free, large, often leaflike, deeply lobed. Style globose and not beaked at apex; stigmas on front side of style incassation. Anterior petal broadly cuneate, spurred.

Between 80 and 100 species: N Africa, Asia, Europe, occasionally in North and South America; three species (two introduced) in China.

- 1a. Stem shorter, usually 1-flowered; leaf blade orbicular-ovate or oblong-ovate, leaves usually clustered 93. *V. altaica*
 1b. Stem longer, usually many flowered; blade of upper leaves oblong-lanceolate, leaves usually scattered, alternate.
 2a. Corolla flat; petals variously marked with yellow, white, or purple, ca. 3 × as long as sepals; blade of lower and median leaves basally rounded or cordate 94. *V. tricolor*
 2b. Corolla funnel-shaped; petals ivory or pale yellow, shorter to slightly longer than sepals; blade of lower and median leaves basally cuneate 95. *V. arvensis*

93. *Viola altaica* Ker Gawler, Bot. Reg. 1: t. 54. 1815.

阿尔泰堇菜 a er tai jin cai

Herbs perennial, 4–15 cm tall. Rhizome slender, branched. Stems very short, densely covered with numerous leaves usually clustered. Stipules ovate or oblong, 1–2.6 cm × 4–11 mm, pinnatifid, terminal lobe larger, oblong-ovate, lateral lobes 2 or 3 on each side, lanceolate or oblong-lanceolate, margin sparsely puberulous; petiole usually longer than leaf blade; leaf blade orbicular-ovate or oblong-ovate, 1.2–2 × 1–1.4 cm, both surfaces subglabrous or sparsely puberulous, base ± cuneate, margin rounded-dentate, apex obtuse. Flowers usually solitary, yellow or blue purple, large, 2–4.5 cm in diam.; pedicels 5–16 cm,

glabrous. Sepals oblong-lanceolate, 8–13 × 3–4 mm, margin usually remotely denticulate, apex ± acute, basal auricles broader, often denticulate. Upper petals subovate-orbicular, lateral ones and anterior one conspicuously purple-black striate, lateral ones inside usually slightly barbate at base; spur of anterior petal 3–4 mm, slightly exceeding basal auricles of sepals, usually slightly curved upward. Capsule oblong-ovoid. Fl. Jun–Aug, fr. Sep. 2n = 54.

Alpine and subalpine meadows, forests on mountain slopes, grasslands, among mosses and lichens; 1500–4000 m. Xinjiang [Kazakhstan, Kyrgyzstan, Mongolia, Russia (Siberia); SW Asia (Caucasus), SE Europe (Ukraine)].

94. *Viola tricolor* Linnaeus, Sp. Pl. 2: 935. 1753.

三色堇 san se jin

Viola tricolor var. *hortensis* Candolle.

Herbs annual, biennial, or perennial, 10–40 cm tall. Stems erect or slightly oblique, slightly robust, angled, simple or numerous branched. Basal leaf blade narrowly ovate or lanceolate, long petiolate; stipules large, leaflike, deeply pinnatifid, 1–4 cm; petioles of upper leaves longer, those of lower leaves shorter; cauline leaf blade ovate, oblong-orbicular, or oblong-lanceolate, base rounded, margin remotely crenate, apex rounded or obtuse. Flowers solitary in leaf axils, usually 3-colored (purple, white, and yellow), large, 3.5–6 cm in diam., with 3–10 flowers per stem; pedicels slightly robust, 2-bracteolate at upper part; bracteoles opposite, ovate-triangular, very small. Sepals green, oblong-lanceolate, 1.2–2.2 cm × 3–5 mm, margin narrowly membranous, apex acute, basal auricles developed, 3–6 mm, margin irregular. Corolla flat; upper petals deep purple-violet, lateral petals and anterior one 3-colored, purple-striate, lateral ones inside densely barbate at base; spur of anterior petal smaller, 5–8 mm. Ovary glabrous; styles short, base conspicuously geniculate; stigmas enlarged, globose, with a large stigma hole in front. Capsule ellipsoid, 8–12 mm, glabrous. Fl. Apr–Jul, fr. May–Aug. *2n* = 26.

Widely cultivated in China [native to Europe].

95. *Viola arvensis* Murray, Prodr. Stirp. Gött. 73. 1770.

野生堇菜 ye sheng jin cai

Herbs annual or biennial, 5–50 cm tall. Stems erect to ascending, simple or with ascending branches from base, very sparsely puberulous. Stipules 2–40 mm, pinnatifid, terminal segments largest, often leaflike, lateral ones linear to narrowly lanceolate; leaf blade 0.5–6.5 × 0.2–2.2 cm, sparsely puberulous, especially so along margin and along veins abaxially, margin crenate or serrate; lower leaves ovate or orbicular-ovate, base rounded, petioles equaling or exceeding blades; middle leaves oblong-ovate or oblong-elliptic, base cuneate, decurrent into a short petiole; upper leaves oblong-lanceolate, with indistinct petioles. Flowers few to numerous; pedicels 2.5–11 cm, glabrous, 2-bracteolate; bracteoles lanceolate. Sepals oblong-lanceolate, 4–15 mm, apex acute; basal auricles 1–4 mm, irregularly toothed. Corolla funnellform; petals yellow or ivory, obviously shorter than or nearly equaling sepals, 6–14 mm, upper ones pale, anterior one including spur 5.5–14 mm; spur 1–4 mm, not exceeding appendages, straight. Capsule 6–10 mm. Seeds oblong-ovoid, 1.5–1.8 mm. Fl. Apr–Sep, fr. Jun–Sep. *2n* = 34.

Weeds in exposed places, abandoned fields, or cultivated. Taiwan [native to N Africa, SW Asia, and Europe].

5. *Viola* subg. *Erpetion* (Sweet) Y. S. Chen, *stat. nov.*

无距堇菜亚属 wu ju jin cai ya shu

Basionym: *Erpetion* Sweet, Brit. Fl. Gard. 2: t. 170. 1826; *Viola* sect. *Erpetion* (Sweet) W. Becker.

Stipules free, brownish green, small. Flowers white to violet. Anterior petal shallowly saccate but not spurred.

One species: Australia; introduced in China.

96. *Viola hederacea* Labillardière, Pl. Nov. Holl. 1: 66. 1805.

常春藤叶堇菜 chang chun teng ye jin cai

Herbs perennial, stoloniferous. Stem erect, short. Leaves clustered; stipules linear-lanceolate, 1.5–8 mm, margin glandular-denticulate; petiole 0.5–6 cm, sometimes to 12 cm; leaf blade ovate, reniform, or suborbicular, glabrous or puberulous, base cuneate, truncate, or slightly cordate, margin entire to large repand or crenate. Flowers with scape to 10 cm high, glabrous or puberulous, bracteolate near middle. Flowers 3–10 mm in

diam., sometimes to 15 mm, scentless or faintly scented. Sepals green, ovate to linear-lanceolate, 1.5–5 mm, glabrous or sparsely puberulous, basal appendages short. Petals white or pale to dark violet, 2–10 mm, anterior one shallowly saccate, spurless, lateral ones somewhat falcate, bearded inside or glabrous. Stamens to 2 mm; filaments 0–0.3 mm. Capsule ovoid, 4–6 mm. Seeds white, brown, or black, ovoid, 1.5–2 mm. Fl. Feb–Apr, fr. May–Sep.

Weed communities under trees and shrubs, grasslands, introduced. Hong Kong [native to Australia].