

32. DACTYLORHIZA Necker ex Nevski, Fl. URSS 4: 697, 713. 1935, nom. cons.

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Coeloglossum Hartman; *Dactylorchis* (Klinge) Vermeulen; *Orchis* subg. *Dactylorchis* Klinge; *Satyrium* Linnaeus (1753), not Swartz (1800, nom. cons.).

Herbs, terrestrial, small to large, slender to robust. Tubers palmately lobed, fleshy, neck with several slender roots. Stem usually erect, terete, with tubular sheaths near base and several leaves above, glabrous. Leaves cauline, alternate, green, with purple spots or not spotted, glabrous, base attenuate into clasping sheath. Inflorescence erect, terminal, racemose; rachis densely several to many flowered; floral bracts lanceolate to ovate, foliaceous, often exceeding flowers. Flowers resupinate, secund or not, rose-purple, violet, yellow, greenish yellow, or rarely white, small to medium-sized; ovary twisted, cylindrical-fusiform, glabrous. Sepals free, glabrous; dorsal sepal erect, often concave; lateral sepals spreading or reflexed, rarely connivent. Petals often connivent with dorsal sepal and forming a hood; lip simple, entire or 3- or 4-lobed, spurred at base; spur cylindrical, conic, or saccate, much shorter than to subequal in length to ovary. Column stout; anther erect, base firmly adnate to apex of column, with 2 parallel or divergent locules; pollinia 2, granular-farinaceous, sectile, each attached to a viscidium by a slender caudicle; each viscidium enclosed in a sticky globe, both globes enclosed in a common bursicle formed by folding of rostellar arms; rostellum slightly protruding, with 2 arms; stigma lobes confluent, concave, beneath rostellum; auricles 2, usually prominent, on each side of column. Capsule erect.

About 50 species: mainly in Europe and Russia, extending east to Korea, Japan, and North America, and south to alpine areas of subtropical Asia and N Africa; six species in China.

Owing to the occurrence of both hybridization and polyploidy, specific relationships within *Dactylorhiza* are complex. Accordingly, the taxonomy of the genus is problematic, and nomenclature largely remains open to debate.

Several recent molecular studies have shown *Dactylorhiza* to be monophyletic only when re-circumscribed to include the monospecific genus *Coeloglossum* (Pridgeon et al., *Lindleyana* 12: 89–109. 1997; Bateman et al., *Lindleyana* 12: 113–141. 1997; Pillon et al., *Biol. Conserv.* 129: 4–13. 2006).

From observations of many fresh flowers of this genus in the field, we infer that the bursicle formed by the rostellar arms is solitary but later becomes separate.

Dactylorhiza salina (Turczaninow ex Lindley) Soó (Nom. Nov. Gen. *Dactylorhiza*, 4. 1962; *Orchis salina* Turczaninow ex Lindley, Gen. Sp. *Orchid. Pl.* 259. 1835) has been recorded from China (World Checklist of Monocotyledons, <http://www.keew.org/wcsp/monocots/>). However, no material has been seen by the present authors.

- 1a. Flowers greenish yellow to greenish brown; spur saccate-ovoid, 2–4 mm 6. *D. viridis*
- 1b. Flowers magenta, lilac, purplish rose, pink, or white; spur cylindrical or conic, 4.5–15 mm.
 - 2a. Apex of sepals and petals acuminate; spur spreading backward to upcurved 5. *D. aristata*
 - 2b. Apex of sepals and petals obtuse or subacute; spur pendulous.
 - 3a. Leaves uniformly green, lacking purple spots or markings.
 - 4a. Lip ovate to orbicular, broadest below middle 1. *D. hatagirea*
 - 4b. Lip obovate or obcordate, broadest above middle 2. *D. umbrosa*
 - 3b. Leaves green with large purple spots or speckles.
 - 5a. Leaves with small purple spots; lip 5–6 mm, unlobed to obscurely 3-lobed; spur 4.5–6 mm 3. *D. incarnata*
 - 5b. Leaves with large purple blotches; lip 7–9 mm, deeply 3-lobed; spur 6–8 mm 4. *D. fuchsii*

1. *Dactylorhiza hatagirea* (D. Don) Soó, Nom. Nov. Gen. *Dactylorhiza*, 4. 1962.

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Orchis hatagirea D. Don, Prodr. Fl. Nepal. 23. 1825.

Plants slender to robust, 10–40 cm tall. Tubers palmately 3–5-lobed. Stem erect, stout, hollow in robust plants, with 2 or 3 tubular sheaths at base, 3–6-leaved. Leaves erect or spreading, clustered and subopposite near base of stem, widely spaced and alternate above, green, not spotted, oblong to linear-lanceolate, (5–)8–15 × 0.8–3 cm, apex obtuse or acuminate. Rachis 2–15 cm, subdensely several to densely many flowered; floral bracts lanceolate, basal ones to 4 cm, becoming smaller above, exceeding ovary, apex acuminate. Flowers not secund, lilac to

purplish rose, medium-sized; ovary and pedicel 8–14 mm. Sepals and petals lilac or purplish rose; dorsal sepal erect, ovate-oblong, concave, 5.5–7(–9) × 3–4 mm, 3-veined, apex obtuse; lateral sepals ovate-lanceolate to ovate-oblong, oblique, 6–8(–9.5) × 4–5 mm, 3–5-veined, apex obtuse. Petals erect, forming a hood with dorsal sepal, ovate-lanceolate, slightly oblique, 5.5–7 × 3–5 mm, 2- or 3-veined, apex obtuse; lip ovate to suborbicular, 6–9 × 6–10 mm, usually slightly broader than long, base spurred, margin entire to shallowly 3-lobed toward apex, margin slightly crenulate, apex or mid-lobe obtuse, disk minutely papillose, purplish red to rose, sometimes whitish toward base with a spoon-shaped patch of dark purple spots or lines; spur pendulous, ± straight to slightly curved forward, cylindrical to conic, to 12 mm, equaling to slightly shorter than

ovary, apex obtuse. Fl. Jun–Aug. $2n = 40, 80$.

Shrubby slopes, grasslands along ravines; 600–4100 m. Gansu, Heilongjiang, Jilin, Nei Mongol, Ningxia, Qinghai, W Sichuan, Xinjiang, E Xizang [Bhutan, Kashmir, Mongolia, Nepal, Pakistan].

This entity has been widely known as *Dactylorhiza latifolia* (Linnaeus) Soó, a name that can no longer be used because its basionym, *Orchis latifolia* Linnaeus, has been rejected outright (see *Vienna Code*, p. 477). In Europe, the name *D. latifolia* has been applied in the sense of what is now generally known as *D. incarnata*. We regard *D. hatagirea* as an Asian species that is taxonomically distinct from *D. incarnata*.

2. *Dactylorhiza umbrosa* (Karelin & Kirilov) Nevski, Trudy Bot. Inst. Akad. Nauk S.S.S.R., Ser. 1, Fl. Sist. Vyssh. Rast. 4: 332. 1937.

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Orchis umbrosa Karelin & Kirilov, Bull. Soc. Imp. Naturalistes Moscou 15: 504. 1842; *Dactylorchis umbrosa* (Karelin & Kirilov) Wendelbo; *Dactylorhiza chuhensis* Renz & Taubenheim; *D. incarnata* (Linnaeus) Soó subsp. *turkestanica* (Klinge) H. Sundermann; *D. knorringiana* (Kraenzlin) Ikonnikov; *D. kotschyi* (H. G. Reichenbach) P. F. Hunt & Summerhayes; *D. merovenssis* (Grossheim) Averyanov; *D. persica* (Schlechter) Soó; *D. renzii* Averyanov; *D. sanasunitensis* (H. Fleischmann) Soó; *D. umbrosa* var. *chuhensis* (Renz & Taubenheim) Kreutz; *D. umbrosa* var. *knorringiana* (Kraenzlin) Soó; *D. umbrosa* var. *longibracteata* Renz; *D. umbrosa* var. *ochroleuca* (Bornmüller) Renz; *O. hatagirea* D. Don var. *afghanica* Soó; *O. incarnata* Linnaeus var. *knorringiana* Kraenzlin; *O. incarnata* var. *kotschyi* H. G. Reichenbach; *O. incarnata* f. *ochroleuca* Bornmüller; *O. knorringiana* (Kraenzlin) Czerniak; *O. kotschyi* (H. G. Reichenbach) Schlechter; *O. merovenssis* Grossheim; *O. orientalis* (H. G. Reichenbach) Klinge subsp. *turkestanica* Klinge; *O. persica* Schlechter; *O. sanasunitensis* H. Fleischmann; *O. turkestanica* (Klinge) Klinge ex B. Fedtschenko.

Plants usually robust, 15–45 cm tall. Tubers palmately 3–5-lobed. Stem erect, stout, hollow, with 2 or 3 tubular sheaths at base, 4–8-leaved. Leaves usually congested at base of stem or sometimes widely spaced, green, not spotted, lanceolate to linear-lanceolate, 7–13 × 1–5 cm, apex acuminate. Rachis 3–15 cm, densely many flowered; floral bracts green, sometimes tinged with purplish red, narrowly lanceolate, basal ones exceeding ovary, apex acuminate. Flowers purplish rose, medium-sized; ovary and pedicel 12–15 mm. Sepals and petals purplish rose to pale purple; dorsal sepal erect, oblong, concave, 7–10 × 2.5–3 mm, 3-veined, apex obtuse; lateral sepals reflexed, ovate-lanceolate, oblique, 8–9 × 3–3.5 mm, 3-veined, apex subobtusely. Petals erect, forming a hood with dorsal sepal, narrowly oblong, oblique, 7–9 × 1.5–2 mm, 2-veined, apex subobtusely; lip obovate to obcordate, (7–)8–10 × (7–)8–11 mm, base spurred, margin entire to shallowly 3-lobed, apex or mid-lobe obtuse-rounded, disk densely minutely papillose, purplish rose to pale purple with a spoon-shaped patch composed of dark purple lines and dots; spur pendulous, slightly curved forward, cylindrical, 12–15 mm, almost as long as ovary, apex obtuse. Fl. May–Jul.

Swampy meadows, riverbanks, damp grasslands in valleys, mountain slopes; 600–4000 m. N Xinjiang [Afghanistan, Kazakhstan, Pakistan, Russia (SW Siberia), Turkmenistan, Uzbekistan; SW Asia].

3. *Dactylorhiza incarnata* (Linnaeus) Soó subsp. ***cruenta*** (O. F. Müller) P. D. Sell, *Watsonia* 6: 317. 1967.

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Orchis cruenta O. F. Müller, Fl. Dan. t. 876. 1782; *Dactylorhiza cruenta* (O. F. Müller) Soó; *O. latifolia* Linnaeus var. *cruenta* (O. F. Müller) Lindley.

Plants slender to robust, 11–30 cm tall. Tubers palmately 3- or 4-lobed. Stem erect, cylindrical, stout, hollow, with 2 or 3 tubular sheaths at base, 3–5-leaved. Leaves widely spaced, green, with fine purple spots on both surfaces, broadly lanceolate, lanceolate, or oblong-lanceolate, 6–11 × 1.5–2.5 cm, apex obtuse-acute. Rachis 3–10 cm, densely many flowered; floral bracts often tinged with pale purple and marked with purplish speckles, lanceolate, basal ones exceeding ovary, apex acuminate. Flowers not secund, purplish rose, medium-sized; ovary and pedicel 9–10 mm. Sepals purplish rose, oblong-ovate, 3-veined, apex obtuse, outer surface marked with a few dark speckles; dorsal sepal erect, concave, 5–6 × 2–2.5 mm; lateral sepals spreading to reflexed, oblique, 5.5–7 × 2–2.5 mm. Petals erect, forming a hood with dorsal sepal, purplish rose, obliquely lanceolate to oblong-ovate, 5–5.5 × ca. 2 mm, 3-veined, apex obtuse; lip broadly rhombic-ovate, 5–6 × 4.5–6 mm, base spurred, margin entire to obscurely 3-lobed near apex, margin slightly crenate, apex obtuse or sometimes apiculate, disk minutely papillose, purplish rose, marked with dark purplish dots and lines; spur pendulous, straight or slightly curved forward, conic to cylindrical-conic, 4.5–6 mm, shorter than ovary, 1.5–2 mm in diam. at base, attenuate toward apex, apex obtuse. Fl. Jun–Jul.

Humid grasslands, along streams, slopes; 1400–2800 m. NW Xinjiang (Fuhai to Zhaosu) [Russia; Europe].

4. *Dactylorhiza fuchsii* (Druce) Soó, *Nom. Nov. Gen. Dactylorhiza*, 8. 1962.

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Orchis fuchsii Druce, Rep. Bot. Exch. Club Brit. Isles 4: 105. 1915; *Dactylorchis fuchsii* (Druce) Vermeulen; *D. maculata* (Linnaeus) Soó subsp. *fuchsii* (Druce) Hylander.

Plants often slender, 18–45 cm tall. Tubers palmately 3- or 4-lobed. Stem erect, stout, nearly solid, with 2 or 3 tubular sheaths at base, 5- or 6-leaved. Leaves usually widely spaced, green, with large purple blotches adaxially, narrowly obovate, oblong-obovate, or oblong-lanceolate, 4–12 × 1.5–2.5(–4) cm, apex subobtusely or acuminate. Rachis 3–6(–10) cm, densely many flowered; floral bracts linear-lanceolate, shorter than flowers, apex acuminate. Flowers pale to deep pink, medium-sized; ovary and pedicel 9–10 mm. Sepals pale to deep pink, lanceolate to broadly lanceolate, apex slightly obtuse; dorsal sepal erect, 6–9 × ca. 2 mm, 3-veined; lateral sepals with dark spots on veins, oblique, 7–8 × ca. 2.5 mm, 3-veined. Petals erect, forming a hood with dorsal sepal, pink, sublanceolate, 6–9 × ca. 2 mm, 3-veined, apex subacute; lip pink with deep pur-

ple spots that sometimes form thick stripes along adaxial veins, orbicular-rhombic, 7–8(–9) × 8–10 mm, deeply 3-lobed at or above middle; mid-lobe oblong-ovate to ovate-triangular, 3–4 × 1.5–2.5 mm, apex obtuse or acute; lateral lobes rhombic to broadly triangular, broader than mid-lobe, margin crenate or obtusely toothed; spur pendulous, straight, cylindrical, 6–8 mm, slightly shorter than ovary, 1–1.5 mm in diam., apex obtuse. Fl. Jun–Jul. $2n = 40$.

Forests, grasslands, valleys; 900–2300 m. N Xinjiang (Altay, Fuyun, Habahe) [N Mongolia, Russia; Europe].

5. *Dactylorhiza aristata* (Fischer ex Lindley) Soó, Nom. Nov. Gen. Dactylorhiza, 5. 1962.

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Orchis aristata Fischer ex Lindley, Gen. Sp. Orchid. Pl. 262. 1835; *Dactylorhiza aristata* f. *alba* P. M. Brown; *D. aristata* var. *kodiakensis* Luer & G. M. Luer; *D. aristata* f. *perbracteata* (Lepage) Catling; *D. aristata* f. *rosea* P. M. Brown; *O. aristata* var. *immaculata* Makino; *O. aristata* var. *maculata* Makino; *O. aristata* var. *perbracteata* Lepage; *O. beeringiana* (Chamisso) Kudô; *O. latifolia* Linnaeus var. *beeringiana* Chamisso.

Plants robust, 10–35 cm tall. Tuber palmately 3- or 4-lobed. Stem erect, stout, with 2 or 3 tubular sheaths at base, 3–6-leaved. Leaves usually congested at base of stem, uniformly green or occasionally with small purple spots or speckles adaxially, ovate-elliptic to oblong-elliptic, 5–15 × 0.8–4 cm, apex obtuse to acute. Rachis 3–13 cm, densely many flowered; floral bracts lanceolate, basal ones exceeding flowers, apex acuminate. Flowers white, pink, or magenta, medium-sized; ovary and pedicel 4–8 mm. Sepals white, pink, or magenta, ovate to ovate-lanceolate, apex long acuminate; dorsal sepal erect, 9–12 × 3–5 mm; lateral sepals erect or spreading forward, concave, oblique, 8–11 × 3–5 mm. Petals erect, forming a hood with dorsal sepal, white, pink, or magenta, narrowly ovate-lanceolate, 6–8 × 2–3.5 mm, apex acuminate; lip white, pink, or magenta with deep purple spots usually forming 2 distinct arcs, suborbicular to obovate, 8–12 × 8–12 mm, 3-lobed near apex; mid-lobe narrowly deltoid, 2.2–3.5 × 1–1.8 mm, apex acuminate; lateral lobes ovate, much broader than mid-lobe, apex rounded-obtuse; spur spreading backward to upcurved, cylindrical, 6–9 mm, subequal in length to or slightly exceeding ovary, ca. 1.8 mm in diam., apex obtuse. Fl. Jun–Aug.

Grasslands. Hebei, Henan, Shandong, Shanxi [Japan, Korea, Russia (Far East); North America (Alaska)].

The present authors have seen no Chinese specimens of this species. The Chinese distribution is based on H. P. Wood (Orchid Digest 73: 52–55. 2009).

6. *Dactylorhiza viridis* (Linnaeus) R. M. Bateman, Pridgeon & M. W. Chase, Lindleyana 12: 129. 1997.

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Satyrium viride Linnaeus, Sp. Pl. 2: 944. 1753; *Coeloglossum bracteatum* (Muhlenberg ex Willdenow) Parlatores; *C. nankotaizanense* (Masamune) S. S. Ying; *C. taiwanianum* S. S.

Ying; *C. viride* (Linnaeus) Hartman; *C. viride* var. *bracteatum* (Muhlenberg ex Willdenow) A. Gray; *Gymnadenia viridis* (Linnaeus) Richard; *Habenaria viridis* (Linnaeus) R. Brown; *H. viridis* var. *bracteata* (Muhlenberg ex Willdenow) A. Gray; *Herminium nankotaizanense* Masamune; *Orchis bracteata* Muhlenberg ex Willdenow; *Peristylus bracteatus* Lindley; *P. viridis* (Linnaeus) Lindley; *Platanthera nankotaizanensis* (Masamune) Masamune; *P. viridis* (Linnaeus) Lindley.

Plants slender to robust, 14–45 cm tall. Tuber palmately 2- or 3-lobed. Stem erect, with 2 or 3 tubular sheaths at base, 3–5-leaved. Leaves usually widely spaced and alternate, green, not spotted, narrowly obovate-oblong or elliptic to elliptic-lanceolate, 5–12 × 1.5–5 cm, apex obtuse or acute, uppermost leaf

often smaller and bractlike. Rachis 3–15 cm, ± laxly to densely many flowered; floral bracts linear to narrowly lanceolate, 2–3 cm, lower ones exceeding flowers. Flowers greenish yellow to greenish brown, small; ovary and pedicel ca. 10 mm. Dorsal sepal erect, concave, ovate-elliptic, 4.2–8 × 2.5–3.5 mm, 3-veined, apex obtuse; lateral sepals oblique, ovate-elliptic, slightly longer than dorsal sepal, 4 or 5-veined, apex obtuse. Petals straight, forming a hood with dorsal sepal, linear-lanceolate, 5–6 × 1–1.2 mm, 1-veined; lip deflexed, oblong-lanceolate, 5–9 × 3–4 mm, fleshy, disk with a short, central, longitudinal keel, 3-toothed toward apex; lateral teeth 1.5–2 mm; mid-tooth smaller, less than 1 mm; spur saccate-ovoid, 2–4 mm. Fl. Jun–Aug. $2n = 40, 41, 42$.

Forests, thickets, alpine grasslands; 1200–4300 m. Gansu, Hebei, Heilongjiang, Henan, Hubei, Jilin, Liaoning, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shanxi, Sichuan, Taiwan, Xinjiang, NE Xizang, NW Yunnan [Bhutan, Japan, Kashmir, Kazakhstan, Korea, Kyrgyzstan, Mongolia, Nepal, Russia, Turkmenistan; SW Asia, Europe, North America].

The extensive extra-Chinese synonymy is not cited here.

