

New species of *Corydalis* (Fumariaceae) from China

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Corydalis anthocrene Lidén & J. Van De Veire, *C. brachyceras* Lidén & J. Van De Veire and *C. helodes* Lidén & J. Van De Veire are described as new to science and compared with morphologically similar species.

Key words: *Corydalis*, Fumariaceae, new species, taxonomy

During fieldwork in Sichuan and Yunnan in the summer 2007, we encountered species of *Corydalis* that had not been previously collected. One was found in a very under-explored region (the area South of the Gonggashan massif in Central Sichuan), whereas another one turned up in a place that has been frequently visited by botanists during the last 100 years, Cangshan in W Yunnan. The finds underline the need for further field studies in the mountains of W China, where many species have very restricted distribution.

Corydalis anthocrene Lidén & J. Van De Veire, *sp. nova* (Fig. 1)

Herba perennis glabra. Rhizoma intricato-ramosum radicebus crassis anguste oblongis ramosis. Caules plures rubescentes 3–7-foliati valde ramosi. Folia intense viridia, petiolata (superiora sessilia) 4–5-ternata, foliolis linearis ad lanceolatis acutis. Racemi 10–15-flori; bracteae inferiores tri-ternato-divisae lobis linearis acutis; bracteae superiores minores et minus divisae. Pedicelli suberecti bracteis triplo longiores.

Sepala parva profunde dentata. Corolla anguste cristata subacuta azurea, calcar 7–9 mm longo. Petala interiora 7 mm longa basi pallida apice saturate azurea. Capsula et semina ignota.

TYPE: China. Sichuan Province, Shimian County, on the road from Jiziping to Xishan, 29°04'N, 102°11'E, 2960 m, steep gravelly humid NW-facing bare slope by the side of the road, 31.VII.2007 M. Lidén, J. Van De Veire & J. P. Yue 07-18 (holotype KUN; isotypes E, F, UPS).

ETYMOLOGY: Greek: *anthos* = flower, *krene* = fountain.

Glabrous perennial herb. Rhizome intricately branched. Roots fleshy, yellowish, narrowly oblong, often branched, mainly from central parts of rhizome, but also from nodes on subterranean stems. Stems several, ascending, with (depending on growth place) a pale flexuous branched subterranean portion (1–)5–10 cm and brownish red aerial parts 10–20 cm, much-branched and leafy throughout. Cauline leaves usually three to seven per stem, nearly always with flowering branches in their axils. Petioles brownish red, broad at base, 0.5–4.5 cm, or upper leaves sessile. Lamina bright green to glaucous, broadly triangular, four to five times ternately divided, 2–5 × 2–5 cm,



Fig. 1. *Corydalis anthocrene* (holotype).

decreasing in size upwards; ultimate leaflets cut into narrowly oblanceolate to linear acute somewhat channelled rather stiff lobes, 3–8 mm long. Leaf-lobes not held in one plane, but spreading in three dimensions, giving leaf a very crispy appearance. Principal racemes 10- to 15-flowered, lateral ones 4- to 10-flowered. Lower bracts like upper leaves, three times ternately (to subdigitately) deeply cut into linear acute segments, 10–15 mm long; uppermost bracts smaller and less divided. Lower and middle pedicels 30–45 mm, suberect in flowering stage. Sepals small, deeply lacerate-dentate, $1 \times 1\text{--}1.5$ mm, whitish. Corolla brilliant blue; inner petals whitish with blue apical third (especially dorsal crests); outer petals subacute, narrowly crested; upper petal 15–16 mm long with slightly tapering obtuse almost straight spur 7–9 mm; nectary rather thin, reaching to $2/3$ into spur; lower petal ca 9 mm with short claw rather abruptly expanding into a broad rhombic limb ca. 6 mm broad. Inner petals 7 mm long. Ovary with ca 12 ovules; style 3.5–4 mm, apically sharply curved and slightly swollen. Stigma distinctly broader than long, small (1 mm broad) with four apical papillae and geminate lateral and basal papillae on both sides; basal papil-

lae set on distinct triangular basal lobes. Fruit and seed unknown.

Only known from the type collection. A single large plant was growing in a steep gravely humid NW-facing bare slope by the side of the road. Two smaller plants were found by the roadside in close vicinity.

Corydalis anthocrene is one of the more spectacular species in the genus, with numerous clear blue flowers and crispy clear green leaves. It is not closely similar to any other species, and its sectional affinities remain obscure, although a relation to the sect. *Fasciculatae sensu* Lidén (unpubl. data) is possible. The geographically close *C. papillosa* has similar flowers, but differs substantially in unbranched stems, dense papillose pubescence, much less divided leaves (once to twice divided vs. four to five times) with obtuse lobes, shorter pedicels (6–14 vs. 20–45 mm) and less divided bracts.

Corydalis brachyceras Lidén & J. Van De Veire, *sp. nova* (Fig. 2A)

Herba perennis glabra. Rhizoma ignotum. Caulis

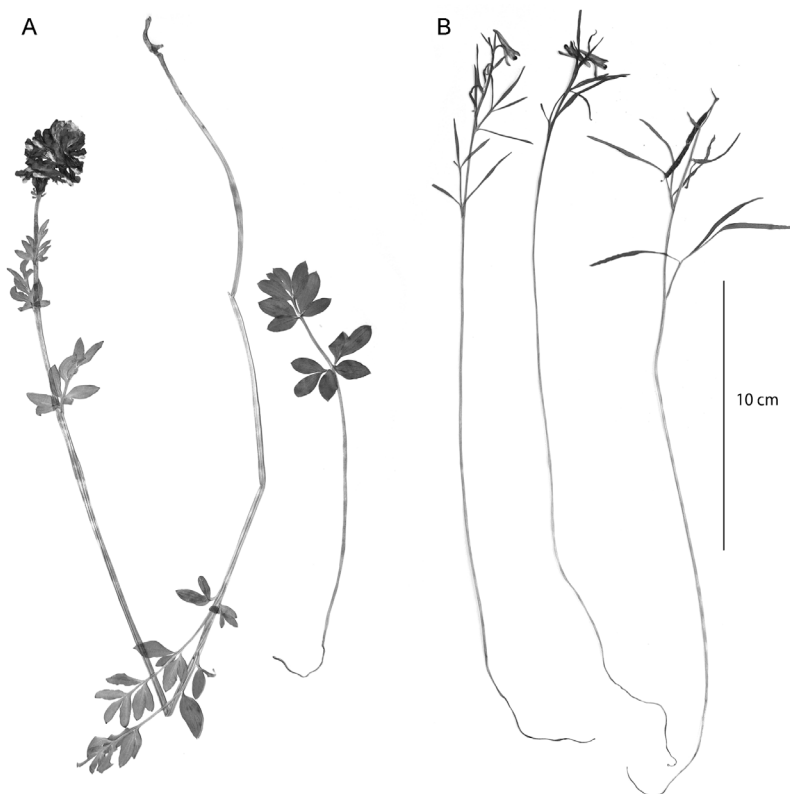


Fig. 2. — **A:** *Corydalis brachyceras* (holotype). — **B:** *Corydalis helodes* (holotype).

unicus 50 cm longus non ramosus superne 5-foliatus. Folium radicalium longepetiolatum lamina glauco-viridia ambitu ovata 2-jugi-pinnata foliolis primariis bi- vel tri-foliolatis foliolis acute ellipticis. Folia caulina sessilia, ambitu oblonga, 2-3-jugo-imparipinnata, radicalibus similia; folia superiora minora minus divisa pinnatipartita. Racemus densissimus, ca. 25-florus; bracteae 5-10 mm longae, infimae pinnatisectae, superiores integrae lanceolatae. Pedicelli 4-8 mm longi. Sepala parva dentata. Corolla late cristata subacuta azureo-purpurea, calcari 6 mm longo apice attenuato recurvato. Petala interiora 9 mm longa pallida. Capsula et semina ignota.

TYPE: China, Xizang (Tibet) Autonomous region, Jianga County, Ailashan, 31°38'N, 98°26'E, 4325 m, alpine stony meadow, among shrubs 21.VI.2007 J. P. Yue 0779 (holotype KUN).

ETYMOLOGY: Greek: *brachys* = short, *keras* = horn, alluding to the short curved spur.

Glabrous perennial herb. Roots unknown. Stem 50 cm, simple, with five leaves in upper

half. Radical leaf: petiole 12 cm, lamina slightly glaucous above, more glaucous beneath, 5 × 3.5 cm, ovate-oblong in outline, pinnately divided with two pairs of primary leaflets, each divided into two to three elliptic-acute lobes 12-20 × 5-8 mm. Cauline leaves like radical but sessile, decreasing in size upwards, and two uppermost leaves not cut to midrib. Racemes capitate (at least in early anthesis), to 3 cm long, ca 25-flowered, very dense. Bracts with a purplish hue, lower pinnatifid, upper entire, 5-10 mm. Pedicels 4-8 mm. Sepals 1 × 1 mm, sharply dentate. Corolla bluish purple; inner petals whitish. Outer petals with broad obtuse dorsal crests surpassing apex. Spur of upper petal 6 mm, tapering towards recurved apex. Lower petal with broad slightly saccate claw, margin clearly undulate. Inner petals pale, 9 mm long. Ovary with six ovules, style 4 mm. Stigma squarish, basal lobes small.

Corydalis brachyceras belongs in ser. *Feddeanae*. In that series, only *C. lathyrophylla* is similar in having blue or pale purplish blue short-spurred flowers, but it has regularly once

pinnate leaves, very long spike-like racemes, and broadly triangular and upturned spur. *Corydalis degensis* differs in having a longer spur and laxer few-flowered raceme.

Corydalis helodes Lidén & J. Van De Veire, *sp. nova* (Fig. 2B)

Herba perennis glabra. Rhizoma minutum radicibus crassis fusiformibus fasciculatis instructum. Caules 1 vel 2, tenuissimi eramosi superne bifoliati 20–30 cm longi. Folia caulina viridia, breve petiolata, 1–2-jugo-imparipinnata, foliolis linearis 1–4 cm longis. Racemi 1- ad 4-flori; bractee lanceolato-lineares, 7–25 mm longae. Pedicelli in stato floriferi erectopatentes 4 mm longi, in stato fructiferi valde recurvati 6–10 mm longi. Sepala minuta profunde dentata. Corolla ecrinata subacuta lutea distincte brunneonervosa, calcar 5–6 mm longo. Petala interiora 6–7 mm longa apice atro-fusca. Capsula linearo-oblonga 8- ad 10-seminalis uniseriata 15–17 mm longa; semina matura ignota.

TYPE: China. Yunnan Province, Dali County, Cangshan, W side close to the summit by the TV-station, 25°40'N, 100°05' E, 4040 m, between tussocks in very wet soil bordering a shallow pond, 15.IX.2007 M. Lidén, J. Van De Veire & J. P. Yue 07-90 (holotype KUN; isotype UPS).

ETYMOLOGY: Greek: *helodes* = growing in marshy places

Glabrous perennial herb. Rhizome 3–4 × 1–2 mm, vertical, with fasciculate, fusiform, sessile or indistinctly stalked, fleshy roots 8–14 × 1–4 mm, and with very small pale renewal bud(s). Stems one or two, erect, very slender, unbranched, 20–30 cm long (including subterranean part 4–5 cm), with two leaves in upper third or fourth. Radical leaf (only one seen) very small: petiole 6 cm, lamina ternate, with sessile narrowly elliptic leaflets ca 1 cm. Cauline leaves shortly stalked (petiole of lower leaf 3–13 mm, upper 1–5 mm); lamina green above, slightly glaucous beneath, triangular in outline, ternately

or pinnately divided, i.e. e. with one or two pairs of linear 1–4 cm long leaflets, below with raised midvein. Racemes two to four-flowered, dense in anthesis, slightly elongating in fruit; bracts linear-lanceolate, 7–25 mm, decreasing in size upwards; pedicels c. 4 mm and erectopatent in flower, in fruit elongating to 6–10 mm and sharply recurved at base. Sepals minute (ca 0.3 × 0.5 mm), deeply dentate. Corolla 12–14 mm, yellow with distinct brownish veins and inner petals tipped with dark brownish purple. Outer petals not crested, subacute; lower petal straight (i.e. without pouch or gibbosity at base) with indistinct claw and only slightly dilated limb; spur of upper petal 5–6 mm, almost straight or very slightly curved downwards, slightly tapering towards apex; nectary prominent, reaching halfway into spur. Inner petals 6–7 mm with low dorsal crests. Fruit (immature) linear-oblong, eight to ten-seeded, 15–17 mm including style 2 mm. Seeds unknown.

Only four plants were seen. Of accompanying species we noted *Corydalis oxypetala* and *Pegaeophyton scapiflorum* subsp. *robustum*.

Corydalis helodes clearly belongs in the series *Feddeanae* on account of its clustered fleshy roots, thin unbranched stems, long narrow leaflets with parallel veins, recurved fruiting pedicels and yellow corolla with darker veins. It differs from most other species of that group in the small dark-tipped flowers and few-flowered racemes. Most similar is *C. lopinensis*, which can be distinguished by more robust growth, more divided leaves, more floriferous racemes, ovate bracts and flowers with broadly saccate claw to the lower petal and shorter fruit with fewer seeds.

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