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## 紫堇属突尖紫堇组的订正

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**A** 摘要 突尖紫堇组计 6 种 2 变种, 特产于中国西部的四川、云南、贵州, 而集中分化于四川西部。本文描述了本组的特征集要, 4 新种和 2 新变种, 即龙溪紫堇, 凯里紫堇, 羽叶紫堇, 长距紫堇, 无囊紫堇, 多裂长距紫堇。

关键词 紫堇属; 突尖紫堇组; 新分类群; 订正

### A REVISION OF CORYDALIS SECT. MUCRONATAE

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**Abstract** *Corydalis* Sect. *Mucronatae* Fedde ex C. Y. Wu et Z. Y. Su is an endemic section from west China, which comprises 6 species and 2 varieties, belonging to two series. It distributes in Sichuan, Yunnan and Guizhou provinces and reaches its greatest morphological diversity and concentration of species in W. Sichuan region. A brief diagnosis of the section is provided and four new species, two new varieties are described, viz. *C. longkiensis*, *C. kailiensis*, *C. pinnata* and *C. longicalcarata* in company with its var. *non-saccata* and var. *multiplinata*.

**Key words** *Corydalis*; Sect. *Mucronatae*; New taxa; Revision

#### Introduction

Sect. *Mucronatae* Fedde was published as nom. nud. in 1928, only based upon *C. mucronata* Franch. The diagnosis written by Fedde is that "fein zerschletzten kelch-blatter und vor allem durch eine faste pyramidal (Franchet: stigma deltoideum) narbe mit nicht weniger als 12 papillen". Undoubtedly this distinct enough to establish a section, but we don't know why he didn't mentioned it in his monograph published in *Nat. Pflanzenfamilien* (1936). It seems approaching to Sect. *Asterostigmata* Fedde by its stigma with numerous papillae, but the shape of that is quite different and no hibernation-buds on the rhizomes. As a section including so many species, it should be revised. The conservation of the specimens cited here can be found in appendix behind the paper.

Sect. *Mucronatae* Fedde ex C. Y. Wu et Z. Y. Su emend—Sect. *Mucronatae* Fedde in Fedde *Repert.* sp. nov. 24: 241. 1928 nom. nud. descr. german.

Herbae perennes in sylvis. Rhizoma nunc breve nunc longum, radicibus fibrosis praeditum. Caulis laterales ex axillis foliorum basaliu vel squamarum emittens. Sepala saepe magna. Flores petalis

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exterioribus ecristatis, calcaribus infundibularibus vel subulatis, laminis longioribus, glande nectarigera longa, stigmatibus deltoideis vel oblongo-deltoideis, papillis 7—12. Capsulae lanceolatae, obovatae vel oblongae.

Typus sectionis: *C. mucronata* Franch.

According to inflorescences and stigmas it can be fallen into two well-defined series.

Series Racemosa C. Y. Wu et Z. Y. Su. series nov.

Herbae altiores, inflorescentiis racemosis, floribus numerosis praeditis, sepalis majoribus, petalis exterioribus acuminatis, saepe mucronatis, stigmatibus deltoideis.

It includes three species and two varieties confined to Sichuan province. Except *C. mucronata*, the rest including *C. anthriscifolia*, *C. longicalcarata* and in company with its var. *non-saccata* and var. *multipinnata* are always provided with thick rootstocks.

Series Corymbosae C. Y. Wu et Z. Y. Su. series nov.

Herbae minores, inflorescentis corymbosis vel subumbelliformibus, floribus paucioribus, saepe 2—4—floribus praeditis, sepalis minoribus, petalis exterioribus emarginatis mucronatis (praeter *C. pinnatam*), stigmatibus oblongo-deltoideis.

It also comprises three species, viz. *C. kailiensis*, *C. pinnata* and *C. longkiensis* which scattered in Sichuan, Guizhou and Yunnan provinces. Except *C. kailiensis*, the rest has rootstick with fleshy scales.

### Key to the species

1. Inflorescences racemose with many flowers; sepals larger, circ. 4—5 mm long; stigmas deltoid, taller herbs (Series Racemosae)
  2. Rootstocks smaller; sepals ovate, fimbriate; outer petals acuminate with long mucro at apex; stigma usually with 12 papillae . . . . . *C. mucronata* Franch.
  2. Rootstocks larger; sepals entire; stigma with fewer papillae.
    3. Ultimate leaflobes ovate or rounded, entire; flowers larger; stigma with 7—9 papillae.
      4. Flowers larger; lower petal prominently saccate at base . . . . . *C. longicalcarata* H. Chuang et Z.Y.Su
      4. Flowers smaller and narrower; lower petal straight, not saccate at base.
        5. Leaves bipinnatisect, ultimate leaflobes larger; sepals ovate . . . . .
        5. Leaves 3—4-pinnatisect, ultimate leaflobes smaller; sepals subpandurate . . . . .
1. Inflorescences corymbose or subumbellate with 2—4—flowers; sepals smaller; stigma oblong-deltoid; smaller herbs (Series Corymbosae)
  6. Flowers 2.5 cm long; outer petals emarginate at apex, mucronate; spur slender.
    7. Rootstock shorter, with many fibrous roots at base, but without fleshy scales; stem with many leaves; leaves bipinnatisect . . . . . *C. kailiensis* Z.Y.Su
    7. Rootstock longer, with many fleshy scales and scattered fewer fibrous roots; stem often with single leaf only; leaves pinnatisect . . . . . *C. longkiensis* C.Y.Wu, Liden et Z.Y.Su
  6. Flowers larger, 3.4—4.2 cm long; outer petals acuminate, not emarginate at apex; stem scapiform, not foliate; basal leaves pinnatisect . . . . . *C. pinnata* Liden et Z.Y.Su



Fig. 1 1—5. *Corydalis longicalcarata* H. Chuang et Z. Y. Su; 1. branch with flower and fruits; 2. sepal; 3. flower; 4. anticous petal; 5. gynoecium with stigma (Chen Shen-yong et al. 3318); 6—8. *Corydalis longicalcarata* var. *multipinnata* Z. Y. Su; 6. branch with flowers and fruits; 7. flower; 8. gynoecium with stigma (Xie Tsao-jun 41896). (painted by Wu Xi-lin).

### 1. 突尖紫堇

*Corydalis mucronata* Franch. in Nouv. Arch. Mus. Paris ser. 3(8): 197. 1885 et Pl. David. 2: 15. 1888; Maxim. in Act. Hort. Petrop. 11: 49. 1889; Pritz. in Engl.'s Bot. Jahrb. 29: 355. 1900; Fedde in Fedde Repert. Sp. Nov. 24: 241. 1928.

Habitat: Beside stream or under forest; 1500—2600 m.

Distribution: Sichuan, Baosin(Mupin), 1896. David(Type, P not seen, fragment of Isotype B); 2600 m, wterside, flower redish-purple, 27 April 1959, Sichuan Econ. Pl. Exp. 223 (KUN, PE, CDBI); Ya-an, 21 June 1977, Kuo Bung-chao et Wang Wei-yi 20151 (KUN, HNWB); 1500 m, 11 May 1979, Ya-an municipal drug bureau 78-0093 (SM); W. Wenchuan, 2250 m, in roadside of ravine, flower violet to light purple, 20 May 1930, F. T. Wang 20947 (KUN, NAS); Emei, 1700 m. Sichuan chinese herbal resource Exp. 12809 (SM); 21 March 1963, Shen Shan-yong et al. 3311 (SM); 9 June 1957, Shen Shan-yong 3321 (SM); May 1904, E. H. Wilson 4716 (JSCB); 17 May 1952, Xiong Ji-hua et al. 30607 (IBG); 1954, Sichuan Univ. Biol. Depart. 54273(KUN); 11 May 1936, S. L. Sun 0180 (KUN); Hongya, Wawushan, Chang Siu-shih 3290 (SZ); Tianquan, 1880 m, K. L. Chu 2286 (SZ).

The species is usually variable in leaf-size, but the characters on its flower, sepal and stigma are stable.

### 2. 峨参叶紫堇

*Corydalis anthriscifolia* Franch. in Nouv. Arch. Mus. Paris ser. 3(8): 196. 1885 et Pl. David. 2: 14. 1888; Forbes et Hemsl. in Journ. Linn. Soc. Bot. 36: 469. 1905; Fedde in Engler et Prantl, Nat. Pfl.-fam. 2 ed. 17b: 136. 1936; Icon. Corm. Sin. Suppl. 1: 680. f. 8730. 1980.

Habitat: Under forest or humid places; 1840—3800 m.

Distribution: Sichuan, Baoxin (Mupin), 1896, David(Type, P. not seen, Isotype B); 2700—2800 m, T. T. Yu 1914, 2002 (PE); Tianquan, 3800 m. 6 May 1936, K. L. Chu 2507 (PE, SZ, WUG); Erlongshan, 1840 m, Experimental field for Sichuan forestry 00076 (CDBI); 27 June 1951, W. K. Hu et Ho Zhu 10184 (WUG, SZ); W. Wenchuan, 3000—3600 m, F. T. Wang 20975 (PE, KUN, WUG); W. Sichuan, 1908, E. H. Wilson 23100 (A, B).



Fig. 2 *Corydalis longiscalcarata* var. *non-saccata* Z. Y. Su: 1. branch with flowers; 2. sepal; 3. flower; 4. posticus petal; 5. anticus petal; 6. inner petals; 7. stamen with anthers; 8. gynoecium with stigma (Sichuan Econ. Pl. Exp. 1531). (painted by Li Xi-chou).

### 3. 长距紫堇 新种 图 1: 1—5

*Corydalis longiscalcarata* H. Chuang et Z. Y. Su, sp. nov. Fig. 1. 1—5.

Fortasse affinis *C. mucronatae* Franch. quae floribus minoribus, petalis anticis postice attenuatis, non saccatis, sepalis fimbriatis, stigmatibus margine papillis 12 facile deffert.

Herba perennis glaucescens, 40—80 cm alta. Rhizoma plus minusve horizontale, circ. 5—9 cm longum, 1—1.2 cm crassum, radicibus fibrosis paucioribus, apice squamis brunneis vestitum, in sectione sulphureum, sapore amarum. Caules simplices usque aliquot, laterales ex axillis foliorum squamarumque emittentes, superne ramosi foliatique. Folia basalia pauca, caule paulo breviora, longipetiolata, petiolis basi vaginatis, laminis bipinnatisectis, quoad ambitum triangularibus, pinnis primariis petiolulatis, secundariis, subsessilibus, ultimis late ovatis vel suborbicularibus, integris circ. 1—1.5 cm longis, 5—10 mm latis. Folia caulina basalibus conformia. Inflorescentia racemosa pauciflora primum congesta demum remota. Bractee anguste lanceolatae vel subulatae, circ. 5—7 mm longae, 2—3 mm latae, infimae interdum foliaceae. Pedicelli graciles 1—1.2 cm longi. Sepala ovata, integra, circ. 5 mm longa, 3 mm lata. Flores purpureo-rubri, horizontales, 2.5—3 cm longi. Petalum posticum

acuminatum cristatum; calcar infundibulare, longitudine circ.  $2/3$ — $3/4$  petali partes occupatum, glande nectarifera gracile, apicem calcaris paene attingente. Petalum anticum circ. 1 cm longum, basi late saccatum, circ. 4—5 mm latum. Petala interiora circ. 9 mm longa, lamina oblonga unquam gracilem aequante. Stamina ovato-lanceolata, medio costata. Stigma deltatatum margine papillis 9. Capsula oblonga vel linearis, circ. 1.2 cm longa, 2—3 mm lata, seminibus 5—7, uni-usque biseriatis; semina subrotunda circ. 1.5 mm diametro.

Habitat: Thicket or margin of mixed forest formation of coniferous and evergreen trees or *sinarundinaria* and *Abies*; 1800—2800 m.

Distribution: W. Sichuan, Emei, Jiulaudong, 8 June 1957, Chen Shan-yong et al. 3318 (Type SM; Isotype NAS, SZ); 2150 m, 9 May 1964, Kuan Ke-chien et al 357 (SZ); 2700 m, 26 June 1966, Sichuan Herbal resources Exp. 12541 (SM); 1800 m, 1 May 1941, S. L. Sun 1812 (KUN); 1800 m, 19 May 1940, W. P. Fang 14708 (SZ); 27 June 1940 W. P. Fang 14595 (SZ); Xiao Yong-xiao 48544 (SZ); Yang Guang-hui 54754 (PE, NAS, SZ); Mabian, 2800 m, in thicket and forest floor, flower purple, 28 May

1931, F. T. Wang (KUN, PE, NAS); Sichuan, 2300 m, 6 May 1955, Xie Tsao-jun 40337 (SZ, PE).

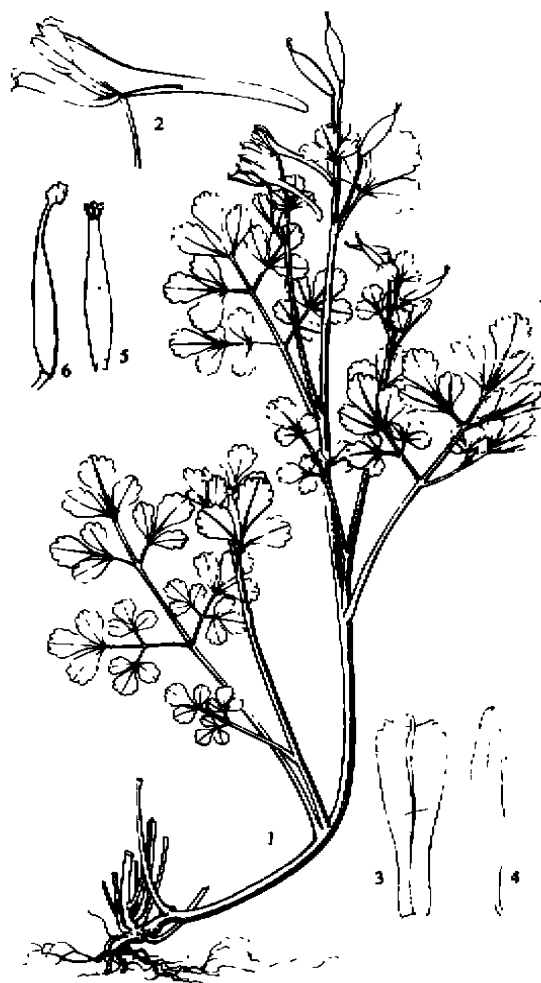


Fig. 3 *Corydalis kailiensis* Z. Y. Su: 1. plant; 2. flower; 3. anticous petals; 4. inner petals; 5. stamen with anthers; 6. gynoecium with stigma (S. Guishou Exp. 2078). (painted by Zeng Xiao-lian)

or beside water, 27 July 1959, Sichuan Econ. Pl. Exp. 1467 (KUN); 2600 m, in slope, 31 July 1959, Guan Zhong-tian 6804 (KUN); Mianning, 2800—2850 m, alongside stream, humid places or under forest, flower purple, 9 July 1959, Sichuan Pl. Exp. 2010 (KUN); 3000 m, rhizome yellow, flower pale purple. 8 July 1978, Mianning Pl. Exp. 0380(SM).

#### 4. 岷山紫堇 新种 图 3

*Corydalis kailiensis* Z. Y. Su, sp. nov. Fig. 3.

Affinis *C. mucronatae* Franch. quae inflorescentiis floribundis racemosis, sepalis obovatis fimbriatis, petalis exterioribus apice acuminatis differt.

Herba perennis glaucescens, circ. 30 cm alta. Rhizoma breviter crassum, radicibus numerosis fibrosis

#### 3a. 多裂长距紫堇 新变种 图 1: 6—8

var. *multipinnata* Z. Y. Su, var. nov. Fig. 1. 6—8

Differt a typo foliis 3—4-pinnatisectis, pinnulis ultimis minoribus, circ. 8 mm longis, 4—5 mm latis, sepalis angustioribus subpanduratis, circ. 4—5 mm longis, 1.5 mm latis, medio leviter constrictis, floribus tenuioribus, calcaribus sursum arcuato-curvatis, petalo antico naviculare basi angustato, non-saccato; a var. *non-saccata* Z. Y. Su foliis 3—4-pinnatisectos, pinnulis ultimis minoribus.

Distribution: W. Sichuan, Shimian, 1955, Xie Tsao-jun 41869 (Type PE, Isotype SZ).

#### 3b. 无囊长距紫堇 新变种 图 2

var. *non-saccata* Z. Y. Su, var. nov. Fig. 2.

Varietas nova typo simillima, sed inflorescentiis racemosis floribundis, floribus minoribus tenuioribusque, saepe 2 cm longis, calcaribus plus minusve sursum curvatis, petalo antico naviculare, basi angustato, non-saccato, facile differt.

Habitat: Under forest or humid places; 2400—3000 m.

Distribution: S. W. Sichuan, Ebian, 2450 m, humid slope, flower purple, 1 August 1959, Sichuan Econ. Pl. Exp. 1531 (Type KUN, Isotype PE, SM); 2600 m, 25 July 1976, Sichuan Pl. Exp. 13210 (CDBI); Meigu, flower purple—red, 21 September 1959, Sichuan Econ. Pl. Exp. 2010 (KUN, SM); Hongxi, 2400 m, flower purple, under dense forest

praeditum, apice polycephalum. Caules numerosi, ramosi foliolatique. Folia basalia pauciora minora, circ. 3—5 cm longa, saepe caduca. Folia caulina alterna, inferiora circ. 15 cm longa, longipetiolata, petiolis basi plus minusve vagunatis. lamina viridibus, subtus glaucescentibus, bipinnatisectis vel biternatis, pinnis primariis petiolulatis, secundis subsessilibus, cuneatis vel obovatis, circ. 1.5—2 cm longis, 1—1.5 cm latis, crenatis. Inflorescentia corymbosa vel subumbelliformis, floribus 2—4 disposita. Bractee foliaceae, tripartitae usque trisectae, circ. 10 mm longae, 8 mm latae, inciso-crenatae. Pedicelli circ. 1 cm in fructu usque ad 1.5—2 cm longi. Sepala minora, semiorbicularia denticulata. Flores purpurei, pallide purpurei vel albi, horizontales. Petalum posticum circ. 2.5 cm longum, ecristatum, expansum apice emarginatum, mucronatum; calcar infundibulare, tenuius, longitudine circ.  $\frac{2}{3}$  petali partes occupatum, glande nectarifera longitudine circ.  $\frac{1}{3}$  calcaris attingente. Petalum anticum circ. 1 cm longum, apice emarginatum, mucronatum, basi subtuberculatum. Petala interiora circ. 1 cm longa, cristata, unguiculo cuneato laminam subaequante. Stamina lanceolata superne gradatim angustata. Ovarium oblongum; stylus circ. 3 mm longus; stigma oblongo-deltaeum, margine papillis 10 praeditum. Capsula oblonga, circ.

14 mm longa, 4 mm lata. Semina subrotunda, nigra, nitida, circ. 1 mm diametro, carunculo parva, lineare.

Habitat, Waterside, roadside or under forest, 1400—1600 m.

Distribution: Central and S. E. Guizhou, Kaili, leishan, flower purple, 26 April 1959, S. Guizhou Exp. 571 (Type KUN, Isotype PE); flower pale purple, 30 April 1959, S. Guizhou Exp. 943(KUN); flower white, 21 May 1959, S. Guizhou Exp. 2078 ((PE, KUN); flower palepurple, 2 June 1965, Chang Wei et Pong Yu-fen 50645 (KUN); Tsien Cho-po et al. 40172 (PE); Qingzhen, maopo, Flower pinkish white, 26 April 1936, S. W. Teng 90177 (A, IGB).

#### 5. 龙溪紫堇 新种 图4

*Corydalis longkiensis* C. Y. Wu, Liden et Z. Y. Su, sp. nov. Fig. 4.

Secundum inflorescentiam paucifloram corymbosam et floris formam, species nova affinis *C. kailiensi* C. Y. Wu et Z. Y. Su, quae planta altiora, rhizomate breviora, haud carnososquamato, foliis bipinnatisectis, petalo antico basi tuberculato, stigmate papillis 10 facile differt.

Herba perennis glaucescens, circ. 15 cm longa. Rhizoma circ. 2 cm longum, 6 mm crassum, squamis numerosis carnosis dense obiectum, aliquot radices fibrosas ex axillis squamarum emittens. Caulis erectus, saepe simplex, medio vel ultra medium unifolius. Folia basalia numerosa, circ. 10 cm longa, petiolis



Fig. 4 *Corydalis longkiensis* C. Y. Wu, Liden et Z. Y. Su: 1. plant; 2. flower; 3. anterior petal; 4. inner petals; 5. stamen with anthers; 6. gynoecium with stigma; 7. stigma (Delavay 4966). (painted by Zeng Xiao-lian)

laminae subaequilongis, laminis viridibus, subtus glaucescentibus, pinnatis, pinnis 5—7, petiolulatis usque sessilibus, suboppositis, ovato-lanceolatis, circ. 1.5—2 cm longis, 7—12 mm latis, pinnatifidis, lobis apice rotundato-obtusis, leviter mucronatis. Folia caulina basalibus conformia. Inflorescentia corymbosa vel subumbelliformia, pauciflora, saepe 3 floribus disposita. Bractee foliaceae, circ. 1.3 cm longae, 7—10 mm latae, tripartitae, crenatae. Pedicelli circ. 1.5—1.8 cm longi. Sepala caduca. Flores purpurati(?) horizontales. Petalum posticum circ. 2.5 cm longum ecristatum, lamina expansa, circ. 4 mm lata, apice emarginata, paulo mucronata; calcar conspicue lamina longiore, tenuiter infundibuliforme, leviter curvatum, glande nectarifera 6 mm longa, longitudine 2/5 calcaris attingente. Petalum anticum 1.3 cm longum, postico simile. Petala interiora 1.1 cm longa, lamina 6 mm longa, unguiculo filiformi, 6 mm longo. Stamina 1.1 cm longa, lanceolata. Ovarium lanceolatum, ovulis numerosis biseriatis; stigma e fructu oblongo delatatum, apice et untrunque interrupt papillato-incrassatum. Capsula immatura lanceolata, 1.4—1.6 cm longa, circ. 3 mm lata; semina numerosa biseriata.

Distribution: N. E. Yunnan, Yanjin, Longki, 1894, Delavay 4966 (Type B).

The description only based upon the type specimen with one flower and few immature fruits. Unfortunately the stigma of the flower have naturally been broken and it is referred to that on the fruits.

#### 6. 羽叶紫堇 新种 图 5

*Corydalis pinnata* Liden et Z. Y. Su, sp. nov.

Fig. 5.

Valde affinis *C. longkiensis* C. Y. Wu, Liden et Z. Y. Su, quae rhizomatibus longioribus, floribus minoribus, petalis exterioribus apice emarginatis, mucronatis, calcaribus tenuioribus, petiolis foliorum caulinum basi non stipellatis facile differt.

Herba perennis glaucescens, circ. 25 cm longa. Rhizoma breve, circ. 6—10 mm crassum, squamis carnosus et radicibus paucioribus praeditum. Caules 1—3, erecti, supra medium alternatim 1—2-foliati. Folia basalia pauciora, caulem subaequantia, longipetiolata, pinnatisecta, pinnis viridibus subtus glaucescentibus, 5—3 partitis, lobis lanceolatis usque oblongis, integris apice obtusis plus minusve mucronatis. Folia caulina minora, basalibus similia, petiolis basi stipellatis. Inflorescentia corymbosa saepe 3 floribus disposita. Bractee foliaceae 1—1.5 cm longae, 4—10 mm latae, tripartitae, lobis inciso-crenatis. Pedicelli 2—2.5 cm longi. Sepala minora basifixia, paene semi-orbicularia, circ. 1 mm longa, denticulata. Flores purpurati vel liliacino-purpurascens, apice flavescens, horizontales, 3.5—4.2



Fig. 5 *Corydalis pinnata* Liden et Z. Y. Su: 1. plant; 2. flower; 3. sepal; 4. posticous petal; 5. anticous petal; 6. inner petal; 7. stamen with anthers; 8. stigma; 9. ovarium with stigma (F. T. Wang 50555). (painted by Li Xi-chou).

cm longi. Petalum posticum circ. 3 cm longum (calcar incluso), 5 mm latum, ecristatum apice acuminatum sursum curvatum; calcar infundibulare circ. 2 cm longum, medio circ. 5 mm latum, glande nectarifera circ. 1/2 calcaris partes attingente. Petalum anticum 1.6—2 cm longum conspicue ultra laminam petali postici, apice obtusum, recessim angustatum. Petala interiora 1.5—1.6 cm longa, ungue gracili, 1—1.1 cm longo. Stamina circ. 1.5 cm longa, lanceolata. Ovarium anguste lanceolatum, circ. 1 cm longum, ovulis numerosis, biseriatis; stylus circ. 5 mm longus; stigma oblongo-deltatum, papillis 10. Capsula lanceolata, circ. 1.8 cm longa, 4 mm lata, seminibus biseriatis.

Habitat: Beside water or on rocks: 1130 m.

Distribution: Sichuan, S. Guanhsien, 1130, watery cliff of ravine, flower lilac purple and yellow at apex, 19 April 1930, F. T. Wang 30555 (Type PE, Isotype KUN, SZ); side of stream, 3 April 1936, S. S. Chien 5113 (SZ); 10 April 1937, S. S. Chien 5328 (E, PE); Chengdu, on rock, flower purplish, 9 May 1937, W. P. Fang 13568(SZ).

**Appendix** The conservation of the specimens cited here is abbreviated as follows: A=Arnold Arboretum Harvard University (Combridge); B=Botanischer Garten und Botanisches Museum, Berlin-Dahlem (Berlin); E=Royal Botanical Garden (Edinburgh); CDBI=Chengdu Institute of Biology, Academia Sinica (Chengdu); IBG=Guangxi Institute of Botany (Guilin); NAS=Jiangsu Institute of Botany (Nanjing); KUN=Kunming Institute of Botany, Academia Sinica (Kunming); PE=Institute of Botany, Academia Sinica (Beijing); SM=Sichuan Institute of Chinese Materia Medica (Chongqing); SZ=Sichuan University (Chengdu); HNWB=North Western Plateau Institute of Biology, Academia Sinica (Xining).