

国产唇形科香茶菜属一新记录种——暗红香茶菜

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摘要:报道了采自西藏错那县的唇形科香茶菜属的一个中国新记录种, 即暗红香茶菜 *Isodon atroruber* R. A. Clement. 本研究对该种进行了描述, 并应用扫描电子显微镜和光学显微镜对其叶表皮、花粉及小坚果的微形态特征进行了观察和测量。此外, 还编制了西藏产 19 种香茶菜属植物的检索表。

关键词: 暗红香茶菜; 唇形科; 香茶菜亚族; 新记录种; 中国

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Isodon atroruber (Lamiaceae): A Newly Recorded Species from China

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Abstract: *Isodon atroruber* R. A. Clement, collected from Cuona County in Tibet, is a new record for China. The species is described and illustrated here. Scanning electron microscopy and light microscopy are carried out to examine the micromorphology of the leaf epidermis, pollen, and mericarp of the species. A key to 19 taxa of *Isodon* distributed in Tibet is also provided.

Key words: *Isodon atroruber*; Lamiaceae; Subtribe Isodoninae; Newly recorded species; China

Isodon (Schrad. ex Benth.) Spach (Lamiaceae: Nepetoideae: Ocimeae), comprising approximately 100 species, is a morphologically diverse genus distributed mainly throughout tropical and subtropical Asia, with two representatives in tropical Africa^[1-6]. In China, 79 species and 11 varieties are currently recognized, with southwest China regarded as the center of morphological diversity of the genus^[3,4,7-9]. *Isodon* species are mainly shrubs and perennial herbs, and most are economically or medicinally important^[1,10]. The genus is characterized by pedunculate and bracteolate cymes, equally to sub-

equally 5-toothed or 3/2-bilabiate calyces, strongly 2-lipped (4/1) corollas, as well as free filaments inserted at the base of the corolla tubes^[3,11].

During our preparation of an account for *Flo-ra of Pan-Himalayas*, we discovered a herbarium collection held at the Herbarium of Kunming Institute of Botany, Chinese Academy of Sciences (KUN). It was collected from the Cuona County of Tibet, China, in August 1975 by the Comprehensive Scientific Expedition to the Qinghai-Tibet Plateau, Chinese Academy of Sciences. This specimen was identified as *Rabdosia phulchokiensis* Murata [= *I. phulchokiensis* (Murata) H.

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Hara] in August 1978 by Professor Hsi-Wen Li, a renowned Chinese expert on the taxonomy of Lamiaceae. The species was later recorded in *Flora Xizangica*^[12]. However, a label annotated as “not *Rabdosia phulchokiensis*, maybe (a) new species” in September 1982 by Gen Murata, who first described *R. phulchokiensis*^[13], was later attached to the specimen sheet.

To clarify the identity of this collection, we undertook a field investigation of Cuona County in September 2012 where we rediscovered plants of this species. After careful observations of *in situ* plants, comparison with herbarium specimens, as well as reviewing relevant literature^[3,4,12,13], we concluded that these Cuona County plants are *Isodon atroruber* R. A. Clement, which was first reported from Bhutan by Clement in 1993^[14]. Thus, the species is newly recorded from China. Detailed characters and micromorphological features of the leaf epidermis, pollen grains, and mericarps are described and illustrated in this paper, and a key to 19 taxa of *Isodon* distributed in Tibet is also provided.

Isodon atroruber R. A. Clement 暗红香茶菜(新拟) (Fig. 1, Fig. 2)

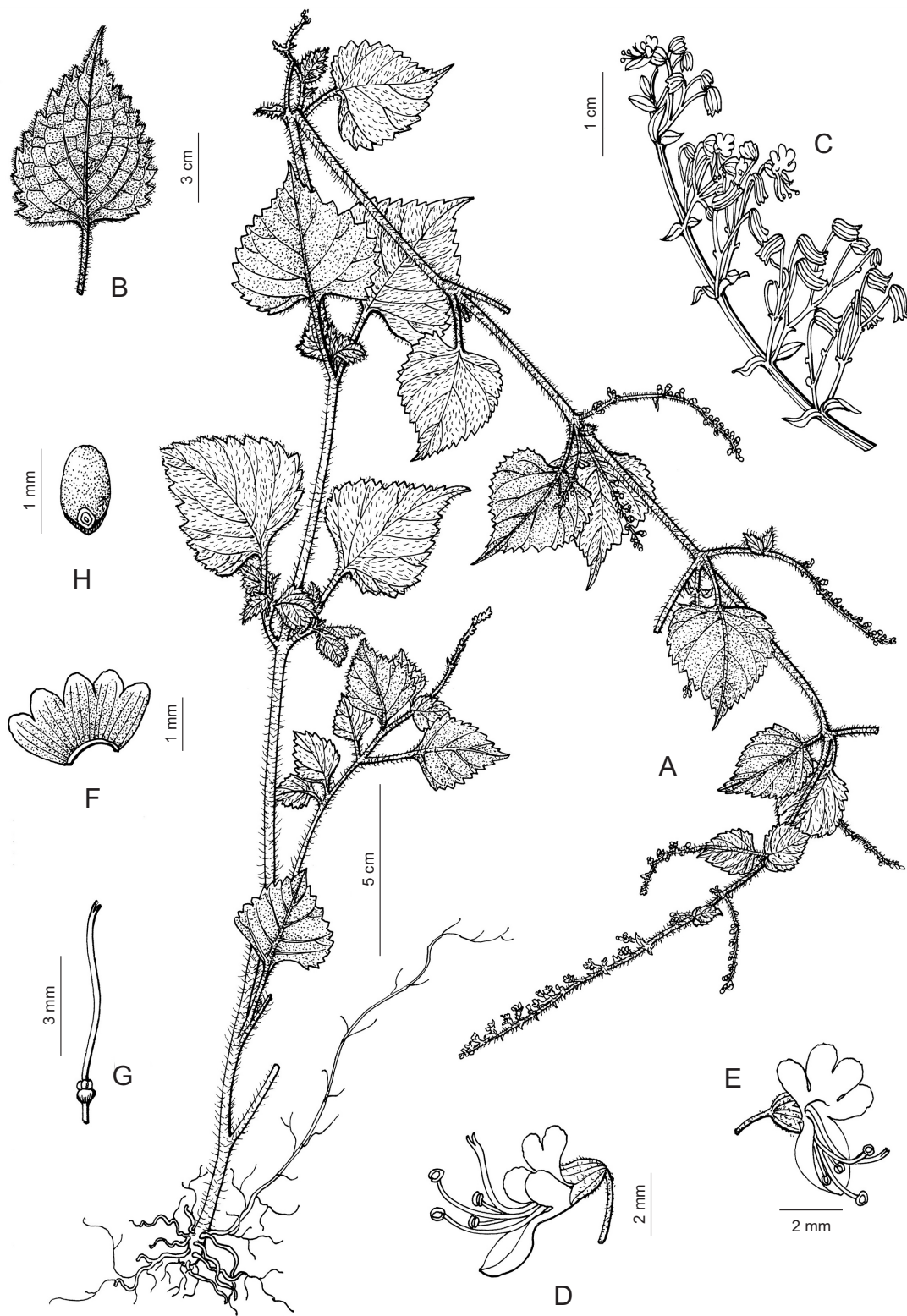
Isodon atroruber R. A. Clement, Edinburgh J. Bot. 50 (1): 33 (1993). — **Type:** Bhutan, Thimphu District, Dotena, Thimphu Chu, 27°35'N, 89°38'E, moss bank in *Quercus semecarpifolia* forest, erect herb, 30–40 cm, leaves unpleasantly scented, flowers dark crimson, 2550 m, 5 ix 1984, Sinclari & Long 4843 (Holotype, E, photo!). — *I. pulchokiensis* auct. non (Murata) H. Hara; H. W. Li in Fl. Xizangica 4: 213 (1985).

Herbs perennial, 60–90 cm tall. Rhizomes woody, massive. Stems erect to ascending, 4-angled, puberulent and pilose. Leaves opposite; petiole (1.5–) 2.5–6 (–8) cm, puberulent and pilose; lamina 3.5–10 × 3–7 cm, pa-

pery, broadly ovate, base broadly cuneate to truncate, margin crenate, apex acute to acuminate, adaxially olive green, sparsely hirsute, abaxially greenish, hirsute and glandular puberulent on veins, sparsely red-brown glandular on both sides. Inflorescence of narrow panicles, terminal and axillary, 3–8 × 0.5–1 cm; cymes secund, (3–) 5–7-flowered, densely puberulent, glandular, pedunculate; floral leaves bract-like, broadly ovate; bracteoles linear, ca. 1 mm; peduncle and pedicel ca. 3–5 mm. Calyx campanulate, ca. 1.5 mm, 2-lipped to its 1/3 length, densely red-brown glandular, 15-veined, puberulent on veins; teeth broadly triangular, apex obtuse; fruiting calyx elongated, ca. 3 mm, tubular-campanulate, slightly curved. Corolla dark brownish purple, densely red-brown glandular outside, tube short, included in calyx; 2-lipped, posterior lip 4-cleft, much recurved, ca. 2 × 4 mm, with dark spots on middle two lobes, anterior lip ca. 3.5 mm, entire, concave, much recurved. Stamens and style exserted. Mericarps brownish, elliptic, ca. 1 mm, glabrous. Fl. Aug–Sep, fr. Sep–Oct.

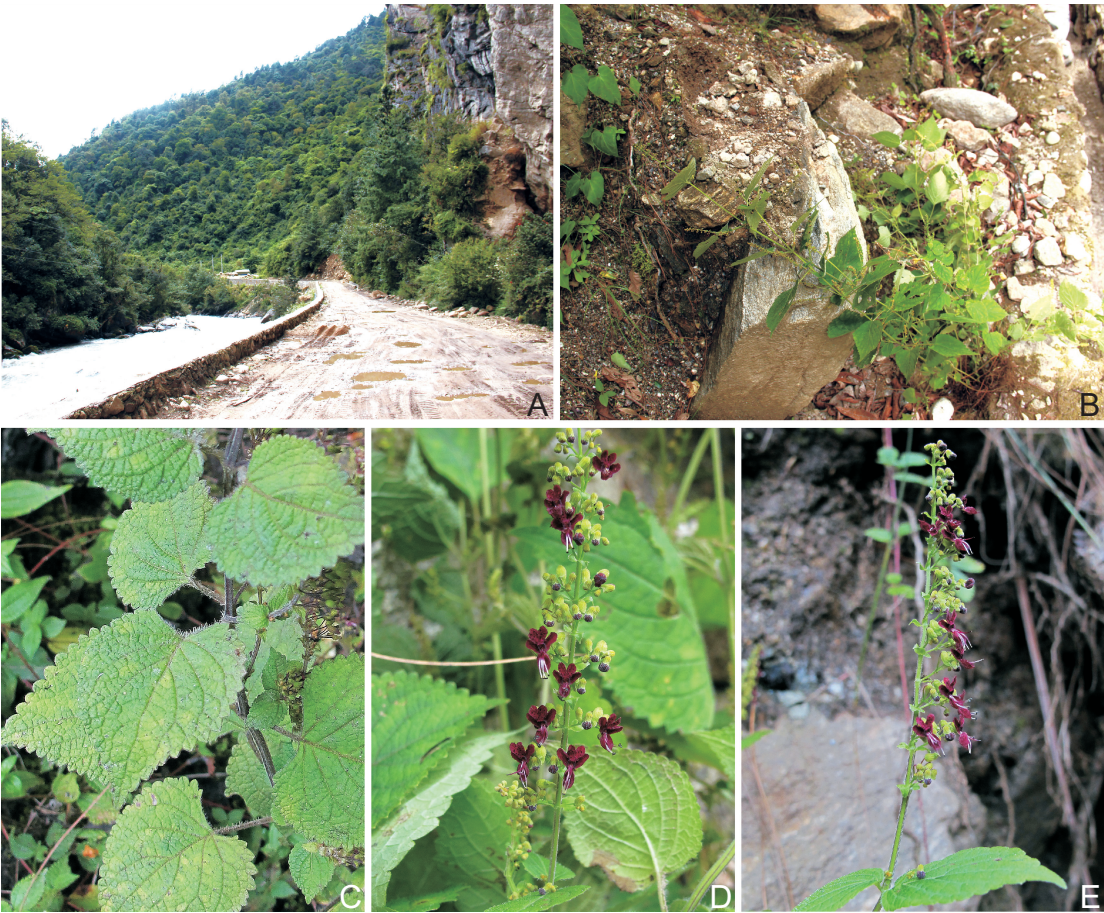
Taxonomic notes: This species is morphologically similar to *I. lophanthoides* (Buch.-Ham. ex D. Don) H. Hara, but differs in panicles narrow (vs. spreading in *I. lophanthoides*), cymes secund and (3–) 5–7-flowered (vs. not secund, 11–13-flowered *I. lophanthoides*), fruiting calyx ca. 3 mm (vs. 4.5–5 mm *I. lophanthoides*), corolla dark brownish purple (vs. white or pink *I. lophanthoides*), and corolla tube 1.5 mm (vs. 3.7–5 mm *I. lophanthoides*).

Leaf epidermis morphology: Fig. 3: A–C shows the indumentum on both sides and stomas on the abaxial epidermis of the leaf of *I. atroruber*. Two kinds of trichomes can be recognized: glandular and eglandular. Morphologically, eglandular trichomes are multicellular and distribute



A. Habit; B. Leaf; C. Part of a narrow panicle; D. Flower in lateral view; E. Flower in frontal view; F. Calyx; G. Pistil; H. Mericarp.

Fig. 1 *Isodon atroruber* R. A. Clement



A. Habitat; B. Habit; C. Leaves; D. Narrow panicle in frontal view; E. Narrow panicle in lateral view.

Fig. 2 Photographs of *Isodon atroruber* in the wild

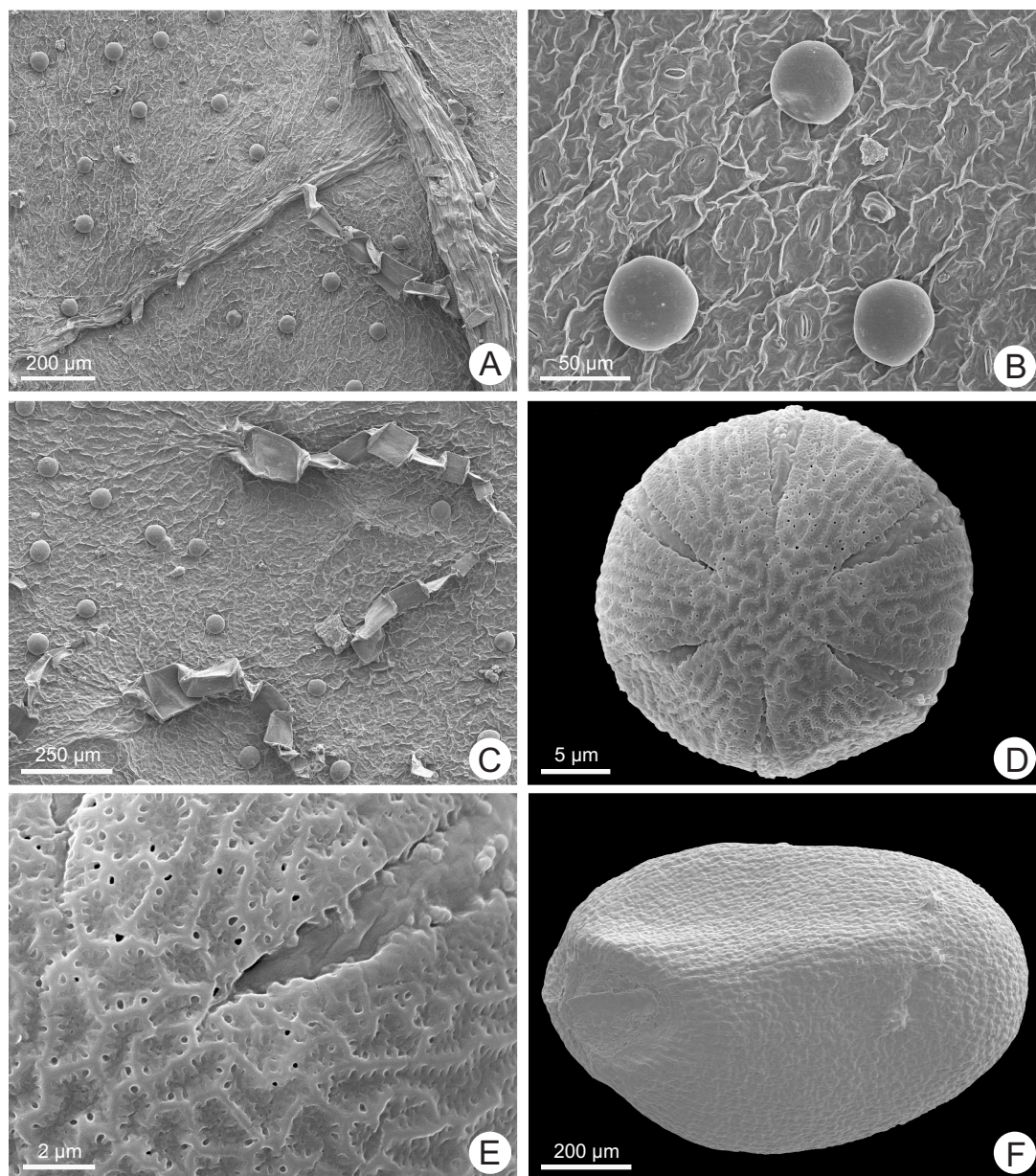
sparsely on the adaxial surface, and along veins of the abaxial side (Fig. 3: A, C). Both peltate and capitate glandular trichomes are present. The former mainly along veins on the abaxial side (Fig. 3: A), whereas the latter spread sparsely on both leaf surfaces (Fig. 3: A–C). Stomatal apparatuses are arranged irregularly in the abaxial epidermis (Fig. 3: B).

Pollen morphology: Fig. 3: D and E demonstrate the pollen grains of *I. atroruber*. From the polar view (Fig. 3: D), *I. atroruber* is characterized with hexacolpate pollen grains, a shared morphology of species from subfamily Nepetoideae^[15,16]. The pollen is oblate with polar axis (P) = $40.4 \pm 2.25 \mu\text{m}$, equatorial axis (E) = $45.5 \pm 1.90 \mu\text{m}$, and P/E = 0.887 ± 0.025 .

The exine sculpturing is incomplete reticulate and perforated (Fig. 3: E).

Mericaarp morphology: The mericaarp of *I. atroruber* is shown in Fig. 3: F. The surface ornamentation of the mericaarp is papillate. Length (L) = $1.17 \pm 0.055 \text{ mm}$, width (W) = $0.74 \pm 0.040 \text{ mm}$, the shape is elliptic.

Distribution and habitat: Bhutan, China (Tibet). It grows mostly on moist cliffs or on the edge of forests at an elevation of about 2800 m, together with *Anaphalis* sp., *Galium* sp., *Hedera nepalensis* var. *sinensis* (Tobler) Rehder, *Memorialis hirta* (Blume ex Hassk.) Wedd., *Ophiopogon* sp., *Polypodiodes* sp., *Rhododendron* sp., *Synotis alata* (Wall. ex DC.) C. Jeffrey & Y. L. Chen, *Urtica* sp., etc. In China, *Isodon*



A. Adaxial surface of leaf; B. Glands and stomata on adaxial epidermis of leaf; C. Abaxial surface of leaf; D. Whole pollen, equatorial view; E. Exine surface of pollen; F. Whole mericarp.

Fig. 3 Micromorphology of leaf epidermis, pollen grain, and mericarp of *Isodon atroruber* using scanning electron microscopy

atroruber is known only from one location in Cuona County, Tibet, and considered as a rare species before additional localities for the taxon are found.

Specimens examined: Tibet (西藏), Cuona (错那), Le Township, near the Hydropower Station (勒乡水电站附近), alt. 2850 m, 27°49'34.25"N, 91°43'32.42"E, on the edge of forest, 3 Sep 2012, G. X. Hu, X. C. Zhang & Z. X.

Fu. 1209005 (KUN); Tibet (西藏), Cuona (错那), on the way from Mama Township to Chachang (麻麻乡至茶场途中), alt. 2800 m, on the edge of forest, 26 Aug 1975, Qinghai-Tibet Plateau Expedition, Chinese Academy of Sciences 751694 (KUN).

An identification key for the 19 taxa of *Isodon* distributed in Tibet is here provided as follows.

Key to the Taxa of *Isodon* from Tibet, China

1. Corolla 1.2–1.5 cm, tube 2 × or more longer than limb 2

2. Calyx purplish, lamina sparsely hirtellous or puberulent *I. irroratus*

2. Calyx not tinged purplish, lamina glabrous *I. wardii*

1. Corolla shorter than 1.2 cm, tube 2 × or less longer than limb 3

3. Calyx with 5 equal or subequal teeth or inconspicuously 2-lipped 4

4. Lamina and calyx red-brown glandular 5

5. Corolla dark brown-purple; cymes in narrow panicles, secund *I. atroruber*

5. Corolla white or pink; cymes in spreading panicles, not secund 6

6. Calyx densely villous, lamina margin serrate *I. hispidus*

6. Calyx sparsely villous basally, lamina margin crenate 7

7. Plant 0.5 – 1 m tall; lamina 1.5 – 8.8 × 0.5 – 5.3 mm, apex obtuse ... *I. lophanthoides* var. *lophanthoides*

7. Plant to 1.5 m tall; lamina 20 × 8.5 mm, apex acuminate *I. lophanthoides* var. *graciliflorus*

4. Lamina and calyx not red-brown glandular 8

8. Branchlet, leaf, and calyx variously dense hairy; lamina mostly corrugate 9

9. Branchlet, leaf, and calyx densely stellate tomentose 10

10. Calyx teeth ca. 1/3 as long as tube *I. rugosus*

10. Calyx teeth ca. 1/2 as long as tube 11

11. Lamina 3 – 8 cm *I. grandifolia* var. *atuntzensis*

11. Lamina 0.7 – 1.5 cm *I. oresbius*

9. Branchlet, leaf, and calyx with different hairs than above 12

12. Lamina gray abaxially, conspicuously discolored 13

13. Lamina 2.5–4.4 mm *I. smithianus*

13. Lamina shorter than 2 mm *I. parvifolius*

12. Lamina pale green abaxially, not discolored *I. loxothyrsus*

8. Branchlet, leaf, and calyx sparsely hairy; lamina usually not corrugate 14

14. Stem leaf usually shorter than 2 cm *I. pharicus*

14. Stem leaf longer than 2 cm 15

15. Branchlet and petiole densely gray pubescent *I. silvaticus*

15. Branchlet and petiole densely glandular pubescent *I. pleiophyllus*

3. Calyx conspicuously 2-lipped 16

16. Calyx lips extending to middle of calyx 17

17. Cymes in narrow panicles, corolla purple *I. coetsa*

17. Cymes in spreading panicles, corolla yellow *I. sculponeatus*

16. Calyx lips extending below middle of calyx 18

18. Corolla whitish yellow, stamens and style long exserted *I. scrophularioides*

18. Corolla white, stamens and style included *I. weisiensis*

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