New Species and New Combinations of Lamiaceae from Zhejiang (Postprint)

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Date: 2018-10-26T00:00:00+00:00

Abstract

This paper describes two new species and one new combination in the Lamiaceae of Zhejiang: (1) Scutellaria yunyii differs from Scutellaria tenera mainly in that the stem, leaf blades, and bracts are all covered with white multicellular glandular hairs, the leaf blades are ovate, the corolla is approximately 6 mm long, and the inner surface is sparsely pubescent. (2) Paraphlomis breviflora differs from the allied species Paraphlomis octangularis mainly in that the stem is grooved and sparsely retrorse pubescent, the leaf blades are ovate-elliptic or ovate, membranous, 7–17 cm long and 3.5–8 cm wide, the margin is coarsely serrate, and the corolla is approximately 6 mm long. (3) Salvia bipinnata (new combination) is treated as an independent species because it differs distinctly from Salvia bowleyana in having nearly bipinnate compound leaves, a yellow corolla, and the corolla tube far exserted beyond the calyx tube, whereas Salvia bowleyana has unipinnate compound leaves, a corolla that is pale purple, purple, or blue-purple, and the corolla tube included or slightly exserted.

Full Text

Preamble

New Species and New Combination of Lamiaceae from Zhejiang, China

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Abstract

Two new species and one new combination of Lamiaceae from Zhejiang, eastern China are described and illustrated. (1) *Scutellaria yunyiana* differs from *S. tenera* primarily in having stems, leaf blades, and bracts covered with whitish multicellular glandular hairs, ovate-rounded leaf blades, and a corolla approximately 6 mm long that is sparsely pubescent on the inner surface. (2) *Paraphlomis breviflora* differs from the related species *P. kwangtungensis* mainly in having canaliculate stems sparsely retrorse-pubescent, ovate-elliptic or ovate leaf blades that are membranous, 7–17 cm long and 3.5–8 cm wide, with coarsely serrate margins, and a corolla approximately 6 mm long. (3) *Salvia subbipinnata* (new combination) is treated as an independent species due to its distinct differences from *S. bowleyana*: it has sub-bipinnately compound leaves, yellow corollas, and corolla tubes that are prominently exserted beyond the calyx tube, whereas *S. bowleyana* has once-pinnately compound leaves, corollas that are purplish, purple, or bluish-purple, and corolla tubes that are included or only slightly exserted.

Keywords: Lamiaceae, new species, new combination, Zhejiang
Chinese Library Classification: Q949
Document Code: A

Introduction

Lamiaceae is a large cosmopolitan family comprising 236 genera and 7,137 species worldwide (Harley et al., 2004), with primary distribution in the Mediterranean region and southwestern Asia (Li & Hedge, 1994). Plants in this family are often rich in essential oils, with many species used medicinally and numerous others cultivated ornamentally (Wu & Li, 1977). In China, Lamiaceae contains 96 genera and 807 species (Li & Hedge, 1994), while Zhejiang province is home to 43 genera, 110 species, and 24 varieties (Zheng, 2005).

Since the implementation of the project for the second edition of *Flora of Zhejiang* in 2014, the editorial team has organized six major scientific expeditions and dozens of specialized field surveys in poorly collected regions of the province, amassing a large number of specimens. These efforts have led to the discovery of numerous new plant species (Jin et al., 2015; Cen et al., 2016; Chen et al., 2017; Zhang et al., 2017; Lu et al., 2017; Ye et al., 2017a, 2017b; Chen et al., 2018). This paper reports two new species and one new combination identified during taxonomic studies of Lamiaceae.

1. *Scutellaria yunyiana* B. Y. Ding, Z. H. Chen & X. F. Jin, sp. nov. [Figure 1: see original paper]

This new species is similar to *Scutellaria tenera* C. Y. Wu & H. W. Li, but the latter has stems pilose and short-glandulose, upper leaves ovate-triangular or narrowly ovate, adaxially dark green and pilose, abaxially purple and pilose, bracts pilose and short-glandulose, corolla 7–8 mm long, and inner surface glabrous.

Type: China. Zhejiang, Hangzhou, Fuyang District, Xukou Township, Shanglian Village, in grasses under broad-leaved forest, alt. 200 m, 17 Apr. 2018, B. Y. Ding 16187 (holotype: ZM; isotypes: HTC, KUN, PE).

Description: Perennial herb with ascending rhizomes and slender stolons. Stems erect or ascending at base, 10–30 cm tall including inflorescence, obtusely quadrangular, canaliculate, often branched at base, densely covered with whitish multicellular glandular hairs. Basal leaves persistent; leaf blades ovate-rounded, 1–2 cm long, 0.8–1.5 cm wide, apex obtuse-rounded, base cordate, margin bluntly serrate, both surfaces sparsely covered with whitish multicellular glandular hairs, lateral veins 3 or 4 pairs, petioles 1.5–2.5 cm long, densely covered with whitish multicellular glandular hairs. Cauline leaves 2–4 pairs; leaf blades broadly ovate, yellowish-green when fresh, 2–4 cm long, 1.8–3.5 cm wide, apex acute, base cordate, margin bluntly serrate, lateral veins 4 or 5 pairs with the lower 2 pairs near the base appearing palmate, adaxially sparsely covered with whitish multicellular glandular hairs, abaxially similarly hairy but denser along veins, petioles 2–3 cm long in lower leaves, 5–8 mm long in upper leaves. Inflorescences 5–10 cm long, with 2 flowers per node; basal pair of bracts foliaceous, subovate, 1–2.5 cm long, 0.6–1.7 cm wide, hairy like leaves, subsessile; upper bracts lanceolate to linear, 1–1.5 mm long. Pedicels 2–3 mm long, slender, covered with whitish multicellular glandular hairs. Calyx ca. 2 mm long, whitish multicellular glandular hairy outside, glabrous inside, scutellum spreading in fruit, 2–2.5 mm high. Corolla initially purple, later becoming pale purple or nearly white, ca. 6 mm long, tube ca. 5 mm long, slightly geniculate at base, gradually enlarged upward, limb bilabiate, upper lip galeate, apex slightly emarginate, lower lip with middle lobe broadly ovate-delate, with purplish-red spots on both sides of midvein, lateral lobes ovate, externally pubescent, internally sparsely pubescent. Stamens 4, didynamous, filaments pubescent on lower middle portion, anthers 2-celled, clefts with short cilia. Style glabrous. Nutlets reniform-rounded, reddish-brown, ca. 1 mm long, dorsally tuberculate.

This species is close to *Scutellaria tenera* C. Y. Wu & H. W. Li, but differs in having stems covered with spreading articulate villous hairs and short glandular hairs, upper leaves ovate-triangular or narrowly ovate, adaxially dark green and abaxially often purplish, both surfaces articulate villous, bracts articulate villous mixed with short glandular hairs, corolla 7–8 mm long, and inner surface glabrous.

Additional specimens examined: China. Zhejiang, Hangzhou, Fuyang Dis-

trict, Xukou Township, Shanglian Village, in grasses under broad-leaved forest, alt. 200 m, 17 Apr. 2018, B. Y. Ding 16186 (ZM); same locality, 9 May 2018, B. Y. Ding & G. Q. Zhu 16301 (ZM).

Etymology: The specific epithet honors Professor Yunyun Fang for his outstanding contributions to the compilation of *Flora of Zhejiang* and taxonomic research on Lamiaceae in Zhejiang Province.

2. *Paraphlomis breviflora* B. Y. Ding, Y. L. Xu & Z. H. Chen, sp. nov. [Figure 2: see original paper]

This new species is similar to *Paraphlomis kwangtungensis* C. Y. Wu & H. W. Li, but the latter has stems not canaliculate, upper portion densely pilose, leaf blades oblong-elliptic, smaller (6–8 cm long, 2–3 cm wide), thick-papery, margin crenate, both surfaces densely pilose, and a longer corolla (ca. 9 mm).

Type: China. Zhejiang, Songyang, Fengping Township, Nansheng Village, in grasses under forest, alt. 800 m, 5 Jun. 2018, Y. L. Xu et al. 602 (holotype: ZM; isotypes: HTC, KUN, PE).

Description: Perennial herb with long rhizomes, sometimes with stolons. Stems 20–40 cm tall, obtusely quadrangular, canaliculate, sparsely retrorse-pubescent, denser near apex and at nodes. Leaves opposite; leaf blades ovate-elliptic or ovate, membranous, 7–17 cm long, 3.5–8 cm wide, apex acuminate or acute, base broadly cuneate and decurrent, margin coarsely serrate with ciliate teeth, teeth tips papillate-mucronate, adaxially with very sparse short hispid hairs (denser on veins), abaxially sparsely pubescent (denser on veins), scattered glandular punctate, lateral veins 5 or 6 pairs, midvein slightly impressed adaxially and prominent abaxially; petioles 1.5–2.5 cm long, sparsely pubescent. Verticillasters axillary, 8–16-flowered. Calyx obconical, ca. 5 mm long, puberulent outside, 10-veined with 5 intermediate veins less distinct, tube 3.5–4 mm long, teeth broadly triangular, ca. 1.2 mm long, 1.5 mm wide at base, widely spreading, apex sometimes slightly reflexed when dry. Corolla pale yellow or greenish-white, ca. 6 mm long, tube tubular, included, ca. 3 mm long, ca. 1.1 mm in diameter, slightly constricted near throat, glabrous on both surfaces, limb bilabiate, upper lip elliptic, ca. 2.5 mm long, puberulent and glandular punctate outside, lower lip 3-lobed, margin erose, puberulent and glandular punctate outside, middle lobe broadly obovate, ca. 3 mm long, apex slightly emarginate, with pale purple markings at throat, lateral lobes obliquely ovate. Stamens 4, didynamous, anterior pair slightly longer, posterior pair connivent, anthers glabrous, filaments ca. 1.5 mm long, pubescent at base. Ovary apex truncate, style apex extending between the two pairs of stamens, slightly 2-lobed. Nutlets trigonous-prismatic (outer side rounded), blackish-brown, 2–2.5 mm long, covered with very fine puberulent hairs.

This new species is somewhat similar to *Paraphlomis kwangtungensis* C. Y. Wu & H. W. Li, but differs in having stems canaliculate (vs. not canaliculate), upper

part sparsely pubescent (vs. densely pilose), leaf blades ovate-elliptic or ovate and membranous, 7–17 cm long (vs. oblong-elliptic, 6–8 cm long, thick-papery), margin coarsely serrate (vs. crenate), both surfaces sparsely hairy (vs. densely pilose), and corolla ca. 6 mm long (vs. ca. 9 mm).

Additional specimens examined: China. Zhejiang, Songyang, Fengping Township, Nansheng Village, 26 Jul. 1992, L. H. Lou, G. Y. Li & Z. C. Tang SY141 (ZJFC). Wuyi, Xilian, Zhangwuli Village, forest margin, alt. 380 m, 16 Jun. 2018, Y. R. Zhu & Z. H. Chen WY18061603 (ZM); same locality, 16 Jun. 2018, J. B. Chen, L. M. Wang & Z. H. Chen WY18061602 (ZM); same locality, 14 Jun. 2018, Y. R. Zhu WY18061401 (ZM).

3. *Salvia subbipinnata* (C. Y. Wu) B. Y. Ding & Z. H. Chen, comb. et stat. nov.

Basionym: *Salvia bowleyana* Dunn var. *subbipinnata* C. Y. Wu, Fl. Reipub. Popularis Sin. 66: 582. 1977.
Type: China. Zhejiang, Yongjia, 15 May 1926, K. K. Tsoong 1048 (holotype: PE!).

When originally published, this taxon was treated as a variety of *Salvia bowleyana* Dunn. The author noted differences in having sub-bipinnately divided leaves with smaller leaflets, and stems and petioles densely covered with spreading setae (actually multicellular long and short bristle-like hairs). Upon examination of the type specimen K. K. Tsoong 1048, as well as specimens Zhejiang Agri. Coll. 563 and H. S. Guo 720243, we found that in addition to the above characters, the corolla tube is prominently exserted beyond the calyx tube, unlike *S. bowleyana* where the corolla tube is included or only slightly exserted. Furthermore, field collections with flower color records and field observations reveal that this taxon consistently has yellow corollas, whereas *S. bowleyana* has corollas that are purplish, purple, or bluish-purple. These substantial differences warrant recognition at the specific rank.

Description: Perennial herb. Stems 40–60 cm tall, quadrangular, canaliculate, covered with multicellular long and short bristle-like hairs (denser long bristles below, denser short bristles above), densely glandular punctate. Leaves opposite; blades 15–28 cm long, 5–10 cm wide; petioles 5–10 cm long, together with rachises covered with multicellular long and short bristle-like hairs; leaves once or twice pinnately divided, leaflets opposite or subopposite, 2–4.5 cm long, 1–2.5 cm wide, ovate to ovate-lanceolate, apex acute or acuminate, base broadly cuneate or rounded, often slightly asymmetrical, margin coarsely bluntly serrate, sometimes basally divided into smaller lobes, adaxially densely strigose with dense light gray glandular punctations, abaxially short-bristly on veins with dense light brown glandular punctations. Verticillasters 6–8-flowered, arranged in racemes or panicles 10–20 cm long at stem and branch apices; rachises densely multicellular glandular hairy and glandular punctate. Calyx tubular-campanulate, 7.5–9.5 mm long, multicellular glandular hairy outside, glabrous

inside below, throat densely multicellular long-bristly, limb bilabiate, upper lip broadly triangular, ca. 1.8 mm long, apex entire, lower lip divided into 2 teeth, slightly longer than upper lip. Corolla yellow or golden-yellow, 2–2.4 cm long, tube 1.2–1.4 cm long, prominently exserted beyond calyx tube, sparsely pubescent and glandular punctate outside, pubescent inside with an incomplete hairy ring near base (discontinuous on one upper side), limb bilabiate, densely glandular hairy outside, glabrous inside, upper lip falcate, 1.2–1.4 cm long, apex emarginate, lower lip nearly straight, 0.9–1 cm long, 3-lobed, middle lobe larger with purple spots on both sides of midvein, apex flabellate, irregularly dentate with an emargination; fertile stamens 2, filaments ca. 3 mm long, lower connective arms 4–5 mm long with sterile anther cells, apically united, upper arms 7–8 mm long with anther cells ca. 4 mm long, rudimentary stamens linear; style prominently exserted, apex unequally 2-lobed. Nutlets ellipsoid.

Additional specimens examined: China. Zhejiang, Yueqing, Mount Yandang, 25 May 1955, Zhejiang Agri. Coll. 563 (fl., HZU, NAS); same locality, under forest, 26 May 1972, H. S. Guo 720243 (HTC), 7 Jun. 1992, N. L. Zhao et al. s.n. (WZU), Lingyan, on slope, 11 Jun. 1971, C. S. Ding Cn0119 (fl., ZHFC), Nankeng, 12 May 1996, s.coll. s.n. (WZU), Xiaolongqiu, in grass, 23 May 2018, B. Y. Ding & D. F. Wu 16305 (fl., ZM), Fuxi, alt. 300 m, under forest, 23 Apr. 2011, B. Y. Ding et al. 9512 (WZU). Rui' an, Hongshuang Forestry Farm, Dayangkeng, 2 Jul. 1972, Q. Lin 1202 (ZJMI).

Acknowledgments

We thank Mr. Guangquan Zhu from Zhejiang Forestry Academy, Mr. Yirong Zhu from Xikou Township, Wuyi County, Mr. Liang Liao from Yandangshan Forest Park in Yueqing, Mr. Jiansheng Wang from Jinhua Polytechnic Medical College, and Mr. Xudong Mei from Jingning County Science Committee for their participation in field surveys.

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Figure Captions

Fig. 1. *Scutellaria yunyiana*. A: habit; B: stem indumentum; C: flower; D: calyx; E: corolla and stamens; F: nutlet (drawn by Xiao-Feng Jin).

Fig. 2. *Paraphlomis breviflora*. A, B: habit; C: stem and inflorescence; D: stem indumentum; E: calyx; F: corolla and stamens; G: nutlet (drawn by Xiao-Feng Jin).

Note: Figure translations are in progress. See original paper for figures.