

Tricyrtis xianjuensis (Liliaceae), a new species from eastern China

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Tricyrtis xianjuensis G.Y. Li, Z.H. Chen & D.D. Ma *sp. nova* (Liliaceae) is described from Zhejiang and illustrated. It resembles especially *T. ohsumiensis* and *T. perfoliata* (sect. *Flavae*), but differs from the former in having ascending stems, 70 cm long, and glabrous; widely-spaced, ovate-oblong and 2-ranked leaves with the apex acuminate to long acuminate, and without oil spots; pedicel 0.5–1.2 cm long; tepals ca. 0.8 cm wide, appearing purple-spotted inside, the outer tepals' mucro less than 1 mm long; and anthers ca. 3 mm long. *Tricyrtis xianjuensis* differs from *T. perfoliata* in having ovate-elliptic leaves, clasping at the base, not perfoliate, and without oil spots; axillary flowers, numbering one or two; and 20–25 mm long tepals with slightly larger and scattered spots. The present report extends the known distribution of *Tricyrtis* sect. *Flavae* from Japan to China.

Tricyrtis (Liliaceae) includes about 20 species divided into four sections, distributed from the Himalayas to East Asia (Takahashi 1987a, Chen & Takahashi 2000, Hong & Jury 2011). The plants thrive in rainy and species-rich areas in a wide range of terrain, from mountainous regions to low-lying, humid, subtropical forests, on sloping ground along creek beds, road edges and trail clearings.

Tricyrtis sect. *Flavae* was supposed to be endemic to Japan. Four species were recognized in this section: *T. nana*, *T. perfoliata*, *T. flava*, and *T. ohsumiensis*. They lack a distinct stolon, have infundibular, erect, axillary flowers, with the

pedicels densely beset with hairs, and a yellow perianth with many small red-purple spots on the inner surface. The stamens are exposed, with a glabrous filament, and an extrorse anther. Only *T. nana* has a wide distribution among the four species, the other ones being regarded as endangered, vulnerable, and near-threatened species, respectively (Takahashi 1987a, Maki *et al.* 1999, Takahashi 2011).

Recently, we discovered a *Tricyrtis* plant with yellow flowers on humid shaded cliffs located in Xianju County, Zhejiang Province, East China. After consulting relevant floras and other literature (Ohwi 1965, Takahashi 1980, 1984, 1987a,

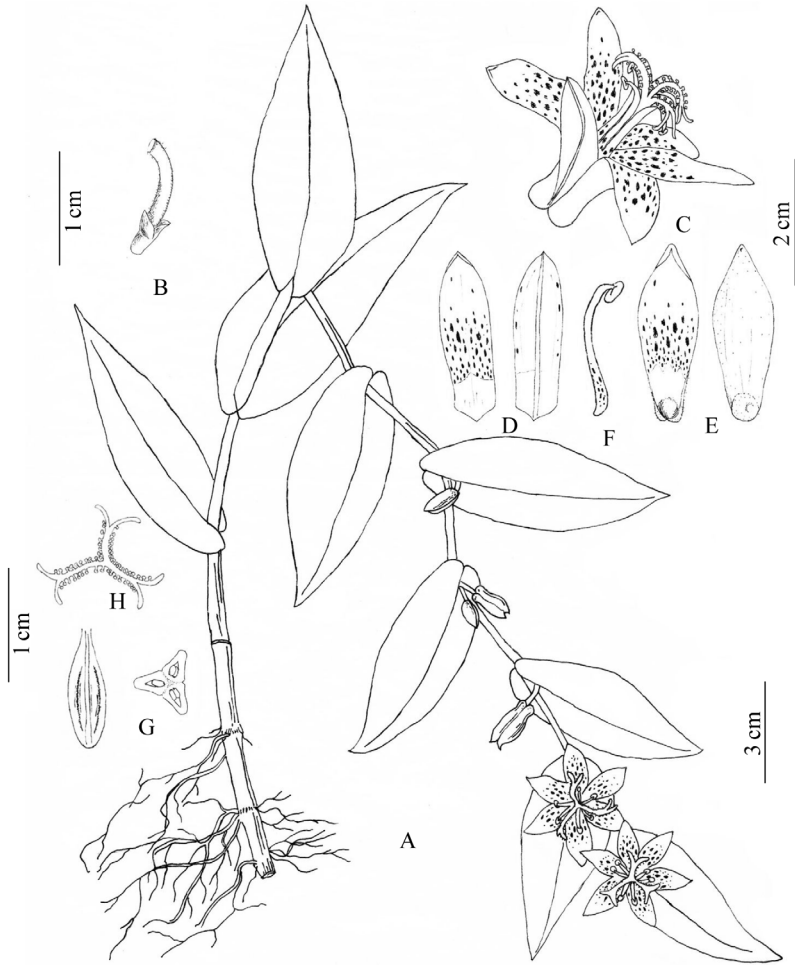


Fig. 1. *Tricyrtis xianjuensis* (from the holotype, drawn by Dan-dan Ma). — **A:** Flowering plant. — **B:** Pedicel and bracts. — **C:** Flower. — **D:** Inner tepal. — **E:** Outer tepal. — **F:** Stamen. — **G:** Ovary. — **H:** Stigma.

1987b, 2011, Maki *et al.* 1999, Hong & Jury 2011), we determined the plant belongs to sect. *Flavae*. It however has some clear differences from the already known species and cannot be identified using the published floras of China (Tsi 1980, Lin 1993, Chen & Takahashi 2000).

Tricyrtis xianjuensis G.Y. Li, Z.H. Chen & D.D. Ma, *sp. nova* (Figs. 1 and 2)

Type: China. Zhejiang Province, Xianju County, Da Shenxianju Scenic Area, on wet shaded rocky cliffs, alt. 680 m a.s.l., 28°41'14.2"N, 120°36'28.62"E, northeast facing slope of 85°, 9 Sep. 2012 Z. M. Zhu, G. Y. Li, Z. H. Chen, D. D. Ma *etc.* XJ20120911 (holotype ZJFC).

Herbs perennial, rhizomes short, roots with lower nodes fascicled. Stems ascending, simple,

purple in light, 50–70 cm long, glabrous. Leaves alternate, 2-ranked on stem, scattered; lower leaves ovate-long-elliptic, upper long-ovate, 4–14 cm long, 2–5 cm wide, base amplexicaul, apex acuminate to long acuminate, glabrous, bright green above, light green below, without oilspots; midrib recessed on adaxial surface, lateral veins obscure. Flowers axillary, solitary or sometimes in pairs; pedicel 5–12 mm long, slightly curved, densely pubescent, base with several yellowish brown to translucent bracts; flowers bright yellow, diameter 2.5–3 cm; tepals 6, free, subequal, not recurved after flowering, with purple-red spots inside; outer tepals 3, obovate-lanceolate, 20–25 mm long, ca. 8 mm wide, abaxial surface densely pubescent, glabrous inside, white near base, apex acute, mucro less than one mm long, base with one saccate

Fig. 2. *Tricyrtis xianjuensis* (photographs by Dan-dan Ma.). — **A:** Habit. — **B:** Flowers. — **C:** Roots and stem bases — **D:** Pedicel. — **E:** Outer tepals. — **F:** Inner tepals. — **G:** Stamens. — **H:** Ovary. — **I:** Pistil and stigma. Scale bars: **A** = 3 cm, **B** and **C** = 1 cm, **D–I** = 5 mm.



foveolate nectary, ca. 3 mm in diam.; inner tepals 3, oblong, ca. 7 mm wide, white near base, glabrous inside, having a midvein ridge and only veins sparsely pubescent outside, apex acute or obtuse. Stamens 6, 17–23 mm long, filaments flat, recurved, glabrous, lower part leaning to a short tube with pubescence and sparse reddish purple spots, white over tube, anthers yellow, ca. 3 mm, two-lobed, born in back, extrorse; pistil 17–20 mm high, ovary superior, triangular-spindle, 7–10 mm long, trilobed, many ovules per locule; style 4–10 mm long; stigma trifid, bent outwards, branches recurved-patent, with glandular protuberances. Capsule trigonous-fusiform, 2–3 cm long, glabrous, septicidally dehiscent. Seeds ellipsoid. Flowering in September to early October, fruiting in October.

Tricyrtis xianjuensis resembles *T. perfoliata* and *T. ohsumiensis*, and these three also thrive in similar, damp and shaded habitats on cliffs. However *T. xianjuensis* can be morphologically distinguished from all other species in *Tricyrtis* sect. *Flavae* (see Appendix).

There are about 500 individuals of *T. xianjuensis* in the community covering about 500 m². The main associated species are *Neyraudia reynaudiana*, *Pleione formosana*, *Aster turbinatus*, *Rabdosia inflexa*, *Bredia quadrangularis*, *Quercus phillyreoides*, *Fraxinus sieboldiana*, *Deutzia faberi*, *Cerasus schneideriana*, *Neolitsea aurata* var. *chekiangensis*, *Toxicodendron succedaneum*,

Quercus serrata var. *brevipetiolata*, and *Callerya dielsiana*.

Before this finding *Tricyrtis* sect. *Flavae* was thought to be endemic to Japan. The known distribution of sect. *Flavae* is hereby extended westward by about 10°.

Key to species of *Tricyrtis* sect. *Flavae*

1. Stem erect, less than 30 cm tall, pilose or nearly glabrous 2
1. Stem ascending, up to 70 cm long, glabrous 4
2. Pedicel distinct, nearly equaling to longer than capsules and flowers 3
2. Pedicel very short, much shorter than flowers and capsules; stem very short, 0.5–5 cm long *T. nana*
3. Tepals narrowly obovate, scarcely spotted, rounded, mucro reflexed, 1.5–2 mm. long *T. ohsumiensis*
3. Tepals oblong-spathulate, outer ones acute, with an erect or slightly recurved mucro 3–4 mm long, inner tepals obtuse to subretuse, mucro scarcely 1 mm long .. *T. flava*
4. Leaves perfoliate, long-acuminate at apex; flowers solitary in axils of median leaves, with small spots on edge of tepals *T. perfoliata*
4. Leaves clasping, acuminate to long acuminate apex; flowers axillary, one or two, with large spots scattered on tepals *T. xianjuensis*

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Appendix. Differences between *Tricyrtis xianjuensis* and other members of sect. *Flavae*.

	<i>T. xianjuensis</i>	<i>T. flava</i>	<i>T. nana</i>	<i>T. ohsumiensis</i>	<i>T. perfoliata</i>
Stem	ascending; 30–70 cm long; glabrous	erect; 2–30 cm long; pilose	erect; 0.5–5 cm long; short-pubescent	erect; 10–30 cm long; nearly glabrous	ascending; 50–70 cm long; glabrous
Leaves	scattered; lower ovate-long-elliptic, upper long-ovate, 4–14 cm long, 2–5 cm wide, base clasping, apex acuminate to long acuminate, without oil spots	fairly densely arranged; oblanceolate to broadly elliptic, 7–15 cm long, base clasping, apex acuminate; usually with oil spots	densely arranged; long-elliptic, 6–12 cm long, 1.5–4 cm wide; base clasping, apex acuminate; with oil spots	fairly densely arranged; lower oblong-lanceolate, upper elliptic to oblong, 5–20 cm long, 2–6 cm wide; base clasping, apex acuminate; sometimes with oil spots	scattered; lower narrowly ovate, upper broadly lanceolate to narrowly ovate-oblong, 6–18 cm long, 2–5 cm wide, base perfoliate, apex long-acuminate, sometimes with oil spots
Flowers	1 or 2; tepals 20–25 mm long, ca. 8 mm wide, with scattered purple-red spots inside; the outers' mucro less than 1 mm long; stamens 17–23 mm long, anthers ca. 3 mm; pistil 17–20 mm high	1 or 2; tepals 23–31 mm long, with dark purple spots inside; the outers' mucro 3–4 mm long, the inners' mucro about 1 mm long; stamens 18–22 mm long, anthers ca. 2.5–3 mm; pistil 18–21 mm high	1 or 2; tepals 19–23 mm long, with purple-brown spots inside; the outers' mucro 1.5–2 mm long, the inners' mucro about 0.5 mm long; stamens 14–17 mm long, anthers ca. 2 mm; pistil 15–17 mm high	1 or 2; tepals 25–33 mm long, ca. 10 mm wide; the outers' mucro 1.5–2 mm long; stamens 20–24 mm long, anthers ca. 4 mm; pistil 22–25 mm high	solitary; tepals 13–15 mm long, ca. 6–8 mm wide, with small purple-red spots scattered around the edge; the outers' mucro ca. 1 mm long; stamens 24 mm long
Pedicel	0.5–1.2 cm	2–6 cm	0.5–1.5 cm	2–5 cm	0.5–1 cm
Habitat	wet, shady cliffs	edges and well-lit forest floors	edges and well-lit forest floors	cliffs	wet, shady cliffs
Distribution	China (Zhejiang)	Japan (Kyushu)	Japan (Honshu, Shikoku, Kyushu)	Japan (Kyushu)	Japan (Kyushu)