



Osmanthus dechangensis (Oleaceae), a new and rare species from Sichuan, China


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
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Abstract

We describe and illustrate *Osmanthus dechangensis* J.L.Liu & Y.Yuan, a new species within the Oleaceae family, endemic to Sichuan, China. This evergreen shrub or tree is characterized by inflorescences clustered in the leaf axils and at branch tips. The leaves, which are either entire or exhibit spiny serrations, are complemented by bracts that are hairy or ciliate along the margins. The species is dioecious, bearing separate male and hermaphroditic flowers. While *O. dechangensis* shares some similarities with *O. yunnanensis* and other closely related species, it bears distinct morphological traits, including glabrous young twigs and larger leaves measuring (6.5–)8.2–23.3 cm in length, with (8–)10–25 pairs of lateral veins. The cymose inflorescences are supported by a peduncle of (0.5–)1–3 mm in length and feature more bracts, arranged in (5–) 6–8 layers with (10–) 12–16 individual bracts. The flowers are larger, with the calyx measuring 1.5–2 mm in length, the corolla 6–7 mm long, featuring a corolla tube of 1–2 mm and lobes measuring (4.5–)5–6 mm in length. The stamens are inserted near the mouth of the corolla tube. The filaments are partially fused to the corolla tube for about 2 mm, extending freely for 2.5–3.5 mm, with anthers measuring (2.5–)3–3.5 mm in length. In hermaphroditic flowers, the connectives do not protrude, while in male flowers, they extend slightly as a small apical projection. The species' distinct flowering period, from January to February, further differentiates it from closely related taxa.

Key words: morphology, new species, *Osmanthus yunnanensis*, plant taxonomy

Introduction

The genus *Osmanthus* Lour. (1790: 17, 28) was first established by the Portuguese botanist J. Loureiro in 1790, with *Osmanthus fragrans* Lour. (1790: 29) serving as the type species. Between the late 19th century and the 1940s, 21 species were described globally (Green 1958, Shang *et al.* 2002, Liu & Xiang 2003, Ji 2004, Xiang & Ji 2004). In 1958, the British botanist P. S. Green significantly advanced the taxonomy of the genus with his seminal monograph on *Osmanthus* in Asia and America, where he systematically classified the genus into four sections, encompassing 32 species, of which 27 were identified in China (Green 1958, Shang *et al.* 2002, Xiang & Ji 2004). Chinese botanists further expanded upon Green's work in the 1980s, with substantial contributions to the genus *Osmanthus*, and the description of 27 new species (Chang 1982, Bai 1983, Song 1984, Liu 1988, Lu 1989). Additionally, six new *Osmanthus* species were recognized in Taiwan (Lu 1985). Liu had documented 27 species in China in the late 20th century (Liu 1993), while *Flora of China* recognized 25 species and three varieties (Editorial Committee of *Flora of China* 1992). The English edition of *Flora of China* further consolidated these 25 species into 23 in China (Chang *et al.* 1996). According to a comprehensive examination of specimens from 13 major Chinese herbaria, along with a systematic review of previous studies, Ji (2004) reported in genus *Osmanthus* 31 species and five varieties globally, with 26 species and two varieties occurring in China. Recently, a new species was described, *O. austrozhejiangensis* (Xie *et al.* 2021). Therefore, currently the genus *Osmanthus* includes 32 recognized species and five varieties worldwide, with China hosting 27 species and two varieties, accounting for approximately 84.4% of the genus' global diversity.

Thus, China stands as the primary center of diversity and evolution for the genus *Osmanthus*, marked by a rich variety of species, extensive distribution, and abundant genetic resources. However, historically limited research has left the exact number of species within the genus somewhat unclear. Shang *et al* (2002) and Lei *et al* (2008) summarized *Osmanthus* species discovered in provinces such as Hubei, Hunan, Fujian, Guangxi, Guizhou, Zhejiang, Anhui, Jiangxi, Yunnan, and Sichuan, and underscored the need for further comprehensive surveys and in-depth studies to fully understand the genus genetic resources and species diversity.

In February 2010, during a survey of wild plant resources in Dechang County, Liangshan Prefecture, Sichuan Province, we discovered over 20 wild *Osmanthus* plants near Heilongtan. These plants were thriving in rocky debris, on nearby slopes, and along roadsides surrounding a high-altitude barrier lake. Among them were both shrubs and trees, with two particularly distinctive multi-branched shrubs, estimated to be over 100 years old, flourishing in the rocky debris beside the barrier lake. One shrub was a male, while the other bearing hermaphroditic flowers. Notably, apart from the cultivated variety *O. fragrans* 'Semperflorens', which blooms in winter, no other wild *Osmanthus* species have been reported to flower during this season. However, the wild *Osmanthus* at Heilongtan primarily blooms from January to February, marking a significant first within the genus. After years of field investigation, particularly during the flowering and fruiting periods, and through detailed observations of floral and fruit morphology, as well as internal structures, we observed significant differences between this plant and all previously known species of *Osmanthus*. These differences in leaf morphology, inflorescence structure, floral characteristics, and flowering time lead us to propose the recognition of this plant as a new species.

Material and methods

Preliminary observation with a magnifier was carried out on living plants of *O. dechangensis* J. L. Liu & Y. Yuan *sp. nov.* at the *locus classicus*, and photographs were taken of plants, habitats, flowering branches, fruiting branches, inflorescences and florets. The fresh materials were then sampled and brought back to the lab, and the details of branches, leaves and flower organ were observed or measured with the help of a dissecting microscope. While *O. yunnanensis* (Franch.) P. S. Green was surveyed both on wild living plants and dried materials kept in the following herbaria: PE, KUN, SM, and CDBI (acronyms according to Thiers 2024). In addition, literature data on taxa related to the newly described species were consulted (Notes Roy. Bot. Gard. Edinburgh 22(5): 495, 1958; Flora of China 61:101, 1992; Flora of Yunnan 4: 622, 1986; Flora of Xizang 3: 879, 1986; Atlas of Chinese Higher Plants 3: 354, 4662, 1974; Chang *et al.*, Flora of China 15: 286–292, 1996; Chen R, Classification of Chinese Trees: 1020, 1937; Ji C F, Systematic taxonomy of the genus *Osmanthus* (Oleaceae)[D]. Nanjing: Nanjing Forestry University: 1–105, 2004; Green P S, A monographic revision of *Osmanthus* in Asia and America. Note Roy Bot Gard Edinb, 22(5): 435–542, 1958; *Osmanthus forrestii* Rehd. in Not. Bot. Gard. Edinb. 14: 20. 1923; Man. Cult. Trees & Shrubs ed. 2, 789. 1940; *Pittosporum yunnanensis* Franch in Bull. Soc. Bot. France 33: 415, 1886; Chang H T, New records of Oleaceous flora from China[J]. Acta Sci. Nat. Univ. Sunyatseni, 21(2):3–16, 1982; Xie W Y, Liu X, Mei X D, *et al.* *Osmanthus austrozhejiangensis* (Oleaceae), a new species from Zhejiang[J]. Guihaia, 41(1): 10–15, 2021; Liu J L, Meng X X, Feng J Z, The seed plants in Panxi area of Sichuan Province, 342, 2007.).

Taxonomic treatment

Osmanthus dechangensis J.L.Liu & Y.Yuan, *sp. nov.* (Figs. 1–4, Table 1)

Diagnosis: The new species can be distinguished from the relatives by glabrous branchlets, relatively larger leaves, more lateral veins and involucre bracts, bracts on one side of the floret, much earlier flowering time, etc.

Types: CHINA. Heilongtan, Dawancun Village, Heilongtan Town, Dechang County, Liangshan Prefecture, Sichuan Province, 2400–2450 m a.s.l., within a pile of random stones, Feb. 1st, 2010, J. L. Liu & Q. Luo (Syntype: 5041 (male flower branch), 5042 (female flower branch), XIAS!); Jul. 17th., 2021, J. L. Liu, Y. Yuan & H. Chen (Syntype: 2021-53 (fruit branch), XIAS!).

Description: This species is a large evergreen shrub or tree, typically reaching heights of 6 to 20 meters. The bark is gray-black to black, with a diameter at breast height ranging from 9 to 40 centimeters. The trunk can be either multi-branched or unbranched at the base. Young branches are flattened near the nodes, gray to dark gray, glabrous, and

TABLE 1. Comparative morphological characteristics of *O. dechangensis* sp. nov. and related species.

Species	<i>O. dechangensis</i> J.L.Liu & Y.Yuan	<i>O. yunnanensis</i> (Franch.) P. S. Green	<i>O. austrozhejiangensis</i> Z. H. Chen, W. Y. Xie & Xi Liu	<i>O. serrulatus</i> Rehder	<i>O. reticulatus</i> P. S. Green	<i>O. venosus</i> Pamp.	<i>O. henryi</i> P. S. Green	<i>O. hainanensis</i> P. S. Green
Branches	Young branches glabrous.	Young branches covered with soft hairs.	Young branches covered with spreading soft hairs.	Young branches covered with soft hairs.	Young branches covered with soft hairs.	Branches covered with soft hairs.	Young branches covered with soft hairs.	Young branches glabrous.
Leaf								
Blade	(6.5–)8.2–23.3 cm long, 2.5–6.2 cm wide.	8–16.5 cm long, 2.5–4.2 cm wide.	(5.5–)8–10(–13) cm long, (2.2–)3–4.5(–5) cm wide.	(3–)4–14 cm long, 1.8–4.5 cm wide.	5.5–9 cm long, 2–5.5 cm wide.	(4.5–)8–14 cm long, (1.5–)2.5–4 cm wide.	(7–)8–9(–11) cm long, (2.5–)3–4.5 cm wide.	7–12.5 cm long, 2.5–4.5 cm wide.
Pairs of lateral veins	(8–)10–25	10–12	8–10	8–12	6–9(–12)	9–11	7–9(–10)	9–12
Inflorescence								
Peduncle	peduncle (0.5–)1–3 mm long.	Without a peduncle.	Without a peduncle.	Without a peduncle.	Without a peduncle.	Without a peduncle.	Without a peduncle.	Without a peduncle.
Involucral bracts	Involucral bracts (10–)12–16, arranged in (5–)6–8 layers, glabrous or with short appressed hairs externally, densely covered with short appressed hairs internally, margins with fine cilia.	Involucral bracts 2 in 1 layer, ciliate at the margins.	Involucral bracts 2 in 1 layer, densely covered with soft hairs externally.	Involucral bracts 2 in 1 layer, margins with fine cilia.	Involucral bracts 2 in 1 layer, glabrous or sparsely covered with soft hairs.	Involucral bracts 2 in 1 layer, densely covered with soft hairs externally.	Involucral bracts 2 in 1 layer, covered with soft hairs externally.	Involucral bracts 2 in 1 layer, glabrous.
Bracts	Present, located on one side of the flower.	Absent.	Absent.	Absent.	Absent.	Absent.	Absent.	Absent.

.....continued on the next page

TABLE 1. (Continued)

Species	<i>O. dechangensis</i> J.L.Liu & Y.Yuan	<i>O. yunnanensis</i> (Franch.) P. S. Green	<i>O. austrozhejiangensis</i> Z. H. Chen, W. Y. Xie & Xi Liu	<i>O. serrulatus</i> Rehder	<i>O. reticulatus</i> P. S. Green	<i>O. venosus</i> Pamp.	<i>O. henryi</i> P. S. Green	<i>O. hainanensis</i> P. S. Green
Flower	Calyx length 1.5-2 mm	ca. 1 mm	1-1.1 mm	ca. 1 mm	ca. 1 mm	1-1.5 mm	ca. 1 mm	ca. 1 mm
Corolla	Corolla 6-7 mm long, tube 1-2 mm long, lobes (4.5-)5-6 mm long.	Corolla ca. 5 mm long, tube very short or ca. 0.5 mm long., lobes (3.5-)4-4.5 mm long.	Corolla 4.4-5.3 mm long, tube 2.2-2.3 mm long, lobes 2.2-3 mm long.	Corolla 3-5 mm long, tube 0.5-1 mm long, lobes 2.5-3.5 mm long.	Corolla 3.5-4 mm long, tube ca. 2 mm long, lobes 1.5-2 mm long.	Corolla ca. 4.5 mm long, tube ca. 2.5 mm long, lobes ca. 2 mm long.	Corolla ca. 3 mm long, tube ca. 1 mm long, lobes ca. 2 mm long.	Corolla ca. 5 mm long, tube 2-2.5 mm long, lobes 2.5-3 mm long.
Stamens	Stamens inserted near the mouth of the corolla tube; filaments fused with the lower part of the corolla tube for ca. 2 mm, free for 2.5-3.5 mm; anthers (2.5-)3-3.5 mm long, connectives not protruding or forming a small pointed projection.	Stamens inserted at the mouth of the corolla tube; filaments ca. 1.5 mm long; anthers ca. 2.5 mm long; connectives forming a small pointed projection.	Stamens inserted at the base of the corolla tube; filaments 1.3-1.5 mm long, fused with the lower part of the corolla tube; anthers ca. 1.2 mm long; connectives forming a small pointed projection.	Stamens inserted at the base of the corolla lobes; filaments 0.5-1.2 mm long; anthers 1.8-2.5 mm long; connectives forming a small pointed projection.	Stamens inserted at the middle of the corolla tube; filaments ca. 1 mm long; anthers 1-1.5 mm long; connectives forming a small pointed projection.	Stamens inserted at the middle of the corolla tube; filaments 0.5-1 mm long; anthers ca. 2 mm long; connectives forming a small pointed projection.	Stamens inserted at the middle of the corolla tube; filaments ca. 1 mm long; anthers ca. 1.5 mm long; connectives forming a small pointed projection.	Stamens inserted at the lower half of the corolla tube; filaments ca. 0.8 mm long; anthers ca. 2 mm long; connectives forming a small pointed projection.
Flowering Period	January-February	(March-) April-June	September-October	(March-) April-June	September-November	August-September	August-November	October-November

exhibit prominent ridges and sparse to dense lenticels. Older branches are cylindrical, gray-black or black-gray, and feature large, raised lenticels. The leaves are opposite, sometimes arranged in whorls of 3–4, with a leathery to thick-leathery texture. The leaf blades range from long-elliptic-lanceolate, narrow-elliptic-lanceolate, long-elliptic, narrow-elliptic, elliptic, to broad-lanceolate, measuring (6.5–) 8.2–23.3 cm in length and 2.5–6.2 cm in width. The leaf apex varies from acuminate, long-acuminate, caudate to long-caudate, to occasionally short-acuminate, acute, or obtuse, and is either straight or slightly curved. The leaf base can be cuneate, broad-cuneate, obtuse to nearly rounded, and may sometimes be shallowly cordate to cordate, symmetrical, or distinctly asymmetrical. The upper leaf surface is dark green and glossy, while the lower surface is green; both sides are glabrous with punctate glandular dots. The midrib is flat to slightly raised on the upper surface and strongly raised on the lower surface. The lateral veins, numbering (8–) 10–25 pairs, form a reticulate pattern with finer veins, slightly raised or nearly flat on the upper surface and raised on the lower surface. The leaf margins are typically entire or exhibit sparse to dense spiny teeth (1–) 14–35 pairs, slightly recurved, and measure (0.5–) 1–4.5 mm in length. The petiole is (0.5–) 1–1.7 cm long, light green or yellow-green, glabrous, with a narrow groove on the upper side and rounded on the lower side. The cymose inflorescences are both axillary and terminal on the upper parts of the branches, with (1–) 2–3 flower buds per axil, of which only 1–2 typically mature. Each flower bud contains (3–) 5–9 flowers. The peduncle is robust, slightly flattened, (0.5–) 1–3 mm long, dark green or green, and glabrous. The Involucral bracts, either deciduous or persistent, are arranged in (5–) 6–8 layers with (10–) 12–16 bracts in total, arranged in opposite pairs. Except for the basal two bracts, which are fused at the base, the others are free. The bracts are leathery to thick papery, cup-shaped, and vary from broadly triangular, broadly ovate-triangular, broadly ovate, elliptic, obovate-lanceolate, to inverted lanceolate. They range from 2–3 mm at the base to ca. 7 mm in length and 3–4 (–5) mm in width at the upper layers. The apex is short-pointed, gradually pointed, acute, obtuse, rounded, or truncate, often with a small projection, notch, or minute teeth at the tip. The outer surface is glabrous or occasionally covered with short appressed hairs, while the inner surface is densely covered with short appressed hairs, with minute cilia along the margins. This species is dioecious, with male and hermaphroditic flowers occurring on separate plants. The flowers are pale green in the bud and transition to pale greenish-white to white upon opening. The pedicels are quadrangular, slightly flattened, (0.3–) 0.6–2 cm long, sometimes extremely short, light green or pale yellow-green, and glabrous. The calyx is 1.5–2 mm long, with a very short calyx tube or one ca. 0.5 mm long. The calyx lobes are unequal in size, typically with two larger and two smaller lobes, triangular, ovate, long-ovate to lanceolate, glabrous, with an acute, obtuse, gradually pointed, nearly truncate, or nearly rounded apex, and entire or finely toothed margins. The corolla is bell-shaped, white, glabrous, 6–7 mm long, with a corolla tube 1–2 mm long. The stamens are inserted near the mouth of the corolla tube, with two sides slightly longer, ca. 2 mm, and the other two sides shorter, ca. 1 mm. The lobes, usually 4, occasionally 5, are spreading or reflexed, elliptic to long-elliptic, 5–6 mm long, 2–4 mm wide, with a short-pointed, acute, gradually pointed, obtuse, rounded, or truncate apex, sometimes with two shallow lobes, a notch, or 1–5 minute teeth, with the margins either flat or slightly incurved at the apex and edges, forming a helmet shape. The stamens usually number 2, rarely 3 to 4, inserted near the mouth of the corolla tube ca. 0.2 mm from the edge. The filaments are slightly flattened, quadrangular, glabrous, fused to the corolla tube at the base for about 2 mm, with the upper part free and extending beyond the corolla tube for 2.5–3.5 mm. The anthers are ovate, broadly ovate, elliptic, ovoid-elliptic, rectangular-elliptic, heart-shaped, broadly heart-shaped, or broadly obovate, (2.5–) 3–3.5 mm long, (1.5–) 2–2.5 mm wide, with a rounded, obtuse, or slightly notched apex, and a heart-shaped notch at the base. In hermaphroditic flowers, the connectives do not protrude, whereas in male flowers, the connectives form a small, pointed projection. The developing pistil in hermaphroditic flowers is 3–4 mm long, with an ovary that is ovoid, broadly ovoid, ovoid-elliptic, or elliptic, (1.5–) 2–2.5 mm long, green or pale green, glabrous, with a cylindrical style ca. (0.5–) 1 mm long, pale green, glabrous, and a capitate stigma that is ovoid or elliptic, 0.5–1 mm long, with a distinctly bifid apex. The sterile pistil in male flowers is lanceolate, 2.5–3 mm long, and deeply bifid nearly to the base. The fruit is a drupe, either deciduous or persistent, elliptic, ovoid-elliptic, or sometimes long-ovoid, 1–1.7 cm long, 0.6–1 cm in diameter, often slightly oblique, with a blunt or rounded apex, sometimes with a notch or slight indentation at the tip. The fruit surface has scattered round and raised lenticels and turns from green to purple-brown, purple-black, or black upon ripening. The fruit stalk is green, glabrous, 0.5–2 cm long, quadrangular, and slightly flattened. The endocarp is (0.6–) 1–1.3 cm long and 0.5–0.7 cm in diameter, with a blunt or rounded apex, a slightly notched tip, and a rounded base, bearing 11–16 longitudinal ridges, with one prominent ridge on each side.

Habitat and Distribution: The new species grow around a mountain lake in a cool humid subalpine climate, ecologically excellent, 52 km from Dechang County seat, where the establishment of the Heilonghaizi Provincial Forest Park was approved in May 2017. More than 100 families of plants (Ericaceae, Theaceae, Fagaceae, Pinaceae, etc.) and over 300 animal species (*Sus scrofa*, *Moschus moschiferus*, *Phasianus colchicus*, etc.) coexist in harmony. Up to now, only 40 living plants have been found, and of these only 25 individuals are mature.

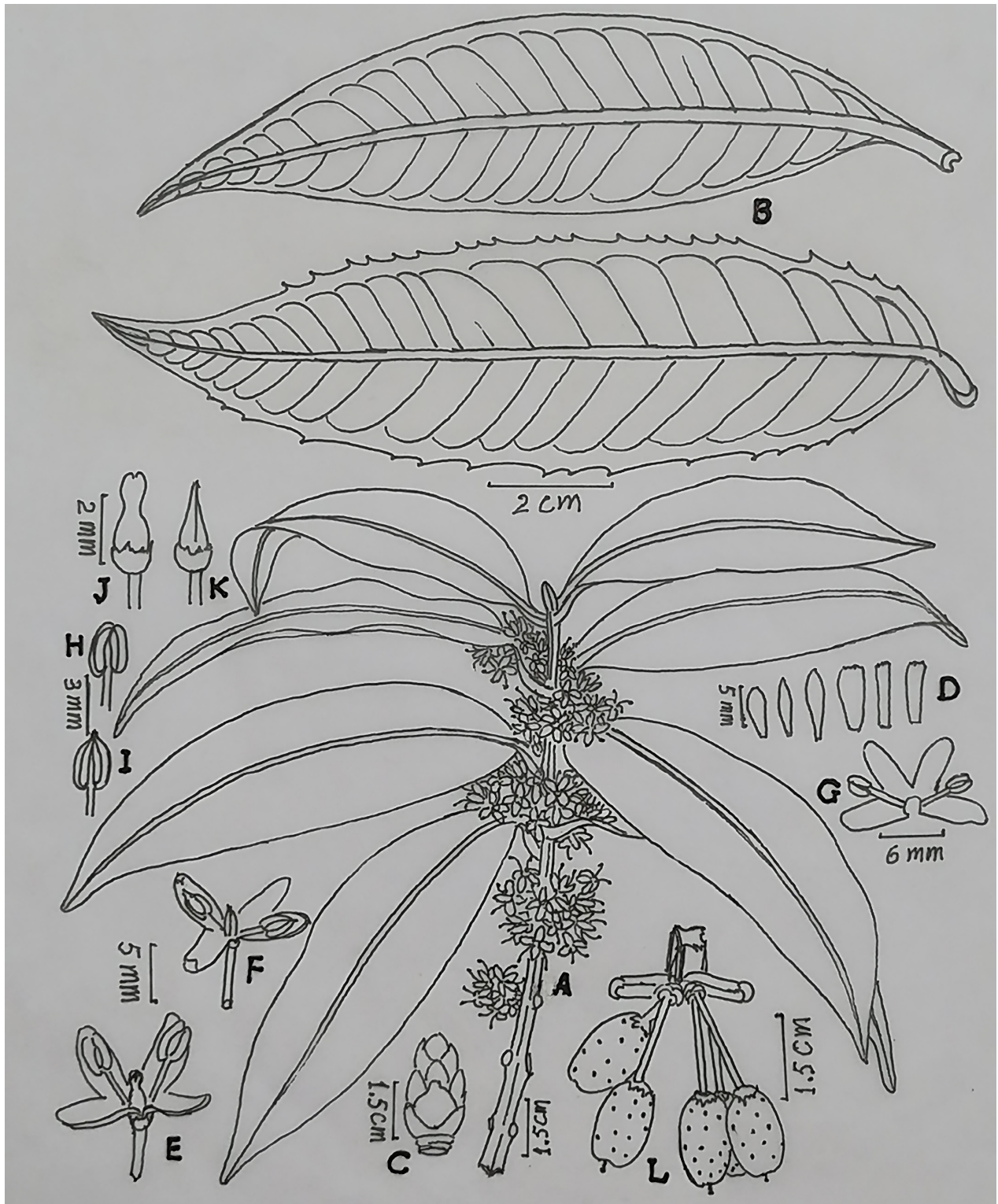


FIGURE 1. *Osmanthus dechangensis* J.L.Liu & Y.Yuan sp. nov.

A. Flower branches. B. Leaves (showing leaf blade morphology and lateral veins). C. Involucre (showing arrangement of involucre bracts). D. The different morphology of bracts. E. Bisexual flower. F. Male flower. G. Corolla longitudinal section (showing the lower part of the stamen filament is fused with the corolla tube). H. Bisexual flower anthers without protrusions at the apex. I. Male flower anthers with small pointed protrusions at the apex. J. pistil of bisexual flowers. K. sterile pistils of male flowers. L. Fruits.

Etymology: The epithet ‘dechangensis’ refers to the locality of the type specimen, located in Dechang County, Liangshan Prefecture, Sichuan Province, China.

Phenology: Flowering from January to February, fruiting from May to August, with mature fruits typically dropping in July to August.

Conservation status:—*Osmanthus dechangensis* is currently known from a single growing site, rare and vulnerable to threats, as more and more people enter its habitat with the development of local tourism. Currently, our recommended endangered status is CR according to the IUCN (2024) category. Further in field research is necessary for searching more occurring sites, studying the population dynamics and assessing the possible threats affecting the new species. These data are necessary for the correct assessment of the IUCN (2024) category, as demonstrated by different assessments of newly described species, as CR (El Zein & Bottcher 2024), EN (Brullo *et al.* 2015, Ben Mahmoud *et al.* 2024), VU (Swanepoel *et al.* 2021), NT (Latt *et al.* 2023), LC (Siti-Munirah & Dome 2023), DD (Chinchilla 2020).

Taxonomic remarks: The new species differs from allied species (*O. yunnanensis* (Franch.) P. S. Green) in branchlet surface, leaf morphology, inflorescence structure, floral characteristics, and flowering time (Table 1, Figs 1–3). The main differences are as follows: As far as *O. dechangensis* J. L. Liu & Y. Yuan *sp. nov.* is concerned, the branchlets glabrous when young, leaves (6.5–) 8.2–23.3 cm long, 2.5–6.2 cm wide, lateral vein (8–) 10–25 pairs; cyme, with peduncle (0.5–) 1–3 mm long; involucre bracts (10–) 12–16 arranged in (5–) 6–8 layers; bract on one side of the floret; the floret is relatively large, with calyx 1.5–2 mm long, corolla 6–7 mm long, corolla tube 1–2 mm long, corolla lobes (4.5–) 5–6 mm long, lower part of stamen filament, ca. 2 mm long, connate with corolla tube, and the upper part, ca. 2.5–3.5 mm long, distinct, anther (2.5–) 3–3.5 mm long, connective of hermaphrodite flower non-protruding, and that of male flower point-like protruding; flowering time Jan. to Feb. While for *Osmanthus yunnanensis* (Franch.) P. S. Green, the branchlets pilose when young; leaves 8–14 cm long, 2.5–4 cm wide, lateral vein 10–12 pairs; absent of peduncle; involucre bracts 2; absent of bract; the floret is relatively small, with calyx 1 mm long, corolla 5 mm long, corolla tube very short or ca. 0.5 mm long, corolla lobes 4–4.5 mm long; stamen filament not connate with corolla tube, ca. 1–1.5 mm long, anther ca. 2.5 mm long, with apex of connective point-like protruding; flowering time Apr. to May. In summary, the new species *O. dechangensis* J. L. Liu & Y. Yuan is remarkably different from *O. yunnanensis* (Franch.) P. S. Green in terms of morphological structure and flowering time.

Paratypes: CHINA. Heilongtan, Dawancun Village, Heilongtan Town, Dechang County, Liangshan Prefecture, Sichuan Province, 2400–2450 m a.s.l., within a pile of random stones, Feb. 1st, 2022, J. L. Liu & Y. Yuan 2021-10, 2021-11, 2021-12, 2021-13 (XIAS!); CHINA. Heilongtan, Dawancun Village, Heilongtan Town, Dechang County, Liangshan Prefecture, Sichuan Province, 2400–2450 m a.s.l., within a pile of random stones, Feb. 12th, 2023, J. L. Liu, H. Chen & X. F. Teng 2023-1, 2023-2, 2023-3, 2023-4, 2023-5 (XIAS!).

Examined material of *O. yunnanensis*: CHINA. Xiling Snow Mountain, Dayi County, Sichuan Province, 1900m a.s.l., on a slope, Z. M. Tan, May 20th, 1993, 92-2, 00869621 (PE!); CHINA. Renqinping, Motuo County, Tibet, 1800m a.s.l., in a forest, S. Z. Cheng, B. S. Li, Jan. 24th, 1983, 03532, 01506179 (PE!); CHINA. Guodong Village, Aziying Town, Songming County, Yunnan Province, 2400 m a.s.l., understory of limestone montane evergreen broad-leaved forest, L. S. Xie, May 1st, 2003, 1253091 (KUN!); CHINA. Hanyuan County, Sichuan Province, 2300m a.s.l., Hanyuan Botanical Expedition, Jun. 14th, 1978, 0614, SM716301546 (SM!); CHINA. Jiancao Village, Mianning County, Sichuan Province, 1700m a.s.l., in an evergreen broad-leaved forest, Z. G. Liu, Q. Q. Wang, May 4th, 1980, 21198, CDBI0114505 (CDBI!); CHINA. Houshan Scenic Area, Xiling Snow Mountain, Dayi County, Sichuan Province, 2024 m a.s.l., H. F. Wang, H. He, Y. P. Du, Apr. 28th, 2019, DY0234, CDBI0269527 (CDBI!).



FIGURE 2. *O. dechangensis* *sp. nov.* in the natural habitat.

A. Male flower plants. **B.** Bisexual flower plants

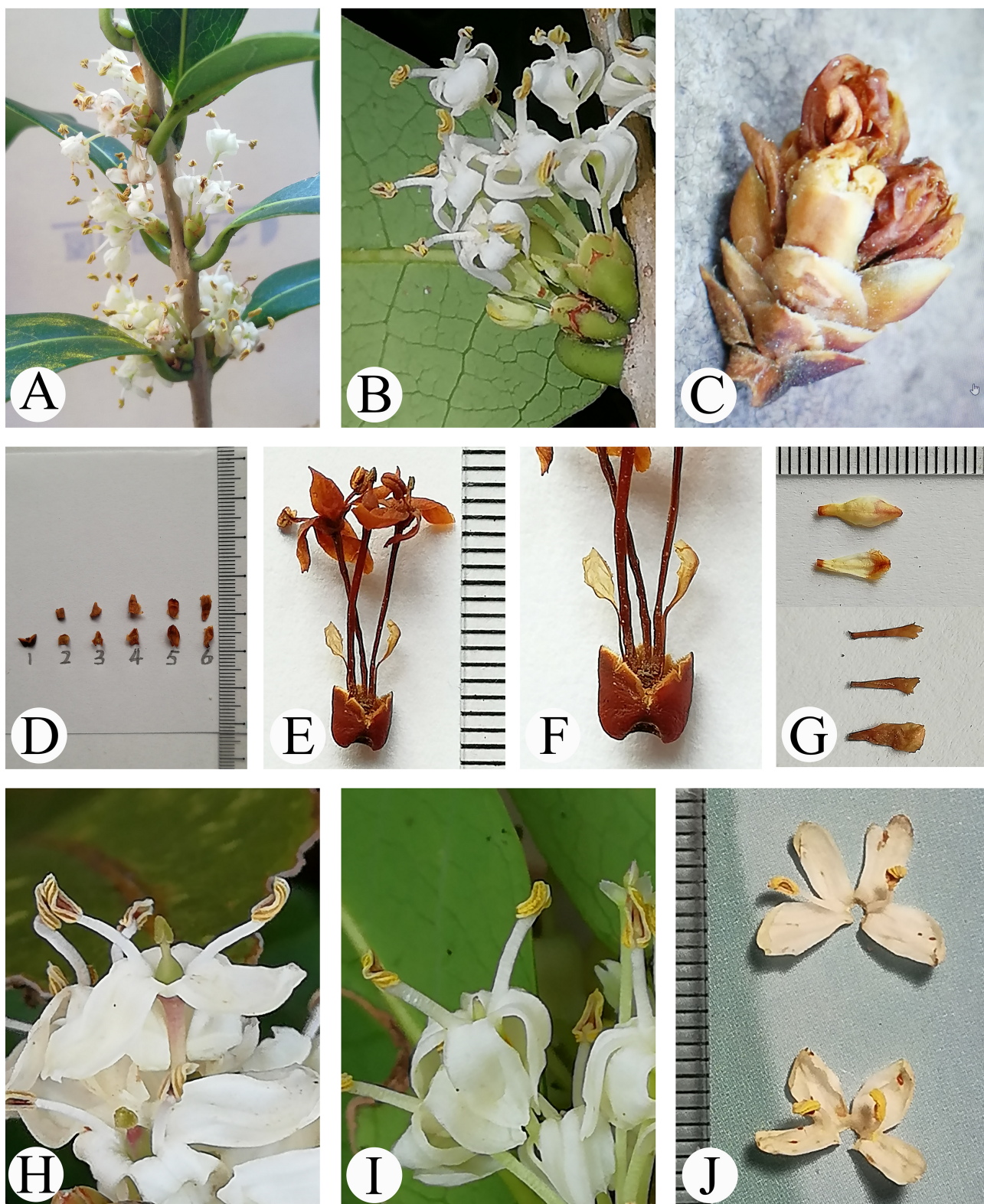


FIGURE 3. Floral morphology of *O. dechangensis* sp. nov.

A. Flower branches. **B.** Inflorescence. **C.** Inflorescence (showing peduncle, persistent involucre bracts and small flowers). **D.** Morphology of involucral bract and order of arrangement from the base upwards. **E.** Inflorescence (showing small flowers, bracts and a pair of involucral bracts at the base). **F.** Bracts growing on one side of the small flower. **G.** Different morphology of bracts. **H.** Bisexual flowers. **I.** Male flowers. **J.** Corolla longitudinal section.



FIGURE 4. Fruit morphology of *O. dechangensis* sp. nov.
A. Fruit branches. **B.** Fruit morphology. **C.** Mature fruits. **D.** Fruit nucleus.

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