Postprint: Three Newly Recorded Plant Species from the Zhoushan Archipelago, Zhejiang

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Abstract

Three newly recorded plant species distributed in the Zhoushan Islands of Zhejiang Province are reported: Silene fortunei Vis. var. kiruninsularis (Masam.) Ying (Caryophyllaceae), Tamarix chinensis Lour. (Tamaricaceae), and Melilotus albus Medik. (Fabaceae). Morphological descriptions and images are provided, and their economic value and utilization pathways are discussed. Voucher specimens are deposited in the Herbarium of Zhejiang A&F University (ZJFC).

Full Text

Three Newly Recorded Plants in the Zhoushan Islands, Zhejiang

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Abstract: Three newly recorded species in the Zhoushan Islands are reported. *Silene fortunei* Vis. var. *kiruninsularis* (Masam.) Ying represents a new record for mainland China, while *Tamarix chinensis* Lour. and *Melilotus albus* Medik. are new records for Zhejiang Province. Morphological descriptions and photographs are provided, and their economic values and potential uses are discussed. Voucher specimens are deposited in the herbarium of Zhejiang A & F University (ZJFC).

Keywords: *Silene fortunei* var. *kiruninsularis*, *Tamarix chinensis*, *Melilotus albus*, new record, Zhejiang

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During recent plant resource surveys in Zhoushan City, Zhejiang Province, the author collected specimens representing one species each from three genera: *Silene* Linn. (Caryophyllaceae), *Tamarix* Linn. (Tamaricaceae), and *Melilotus* Miller (Fabaceae). After consulting relevant literature (Wang, 1992; Qiu, 1993; Wei & He, 1993; Zheng, 2005), these were identified as new distribution records for mainland China or Zhejiang Province, and are hereby reported.

1.1 *Silene fortunei* Vis. var. *kiruninsularis* (Masam.) Ying

Plate I: A–B

Silene fortunei Vis. var. *kiruninsularis* (Masam.) Ying in Col. Ill. Herb. Pl. Taiwan 1: 128. col. pl. 41. 1980; Fl. Taiwan (2nd ed.) 2: 366. 1996. —*S. kiruninsularis* Masam. in J. Soc. Trop. Agr. Form. 6: 570. 1934.

This perennial herb grows 50–80 cm tall. The stem is erect or slightly inclined, glabrous, and green. Leaves are opposite; blades are obovate or lanceolate, oblong-obovate to spatulate-lanceolate, 5–6 cm long and about 5 mm wide, with acute apex, gradually attenuate base extending into a petiole-like structure, entire margin, glabrous surface, glossy green above, and prominent midvein. Inflorescences are terminal, cymose; pedicels are slender, 1–2 cm long, glandular-pubescent; calyx is long-tubular, 2.5–3 cm long and about 4 mm in diameter, glabrous, with triangular calyx teeth; flowers are white, with petal blades triangular-obovate, 2–2.5 cm long, bifid at apex, the lobes lacerate-lanceolate. Flowering occurs in July–August, fruiting in September–October.

Specimens Examined: Daishan Island, Zhoushan, Zhejiang, altitude 50 m, on seaside slopes and roadsides, 21 August 2016, GAO Haojie DS160821 (ZJFC); Zhejiang, Zhoushan, 1958, CHEN Genrong 2195 (KUN); Taiwan, China, Keelung, 15 July 1934, Masamune G. 34 (TAI). Previously recorded from coastal northern Taiwan and Keelung Islet (YING, 1996). This represents a new record for mainland China.

The authors of *Flora Reipublicae Popularis Sinicae* and *Flora of China* were unable to examine relevant specimens of *Silene fortunei* var. *kiruninsularis* and thus synonymized it with *S. fortunei* (TANG, 1996; ZHOU et al., 2001). In the *Flora of Taiwan* (2nd edition), both *S. fortunei* and var. *kiruninsularis* are recognized as distinct varieties. This study examined the original literature and type specimens of both taxa (SCHLECHTENDAL, 1851; MASAMUNE, 1934) and conducted detailed investigations of *Silene* specimens collected from Zhoushan. The results show that *S. fortunei* has pale red flowers with petal blades cuneate-obovate, 14–17 mm long and 3–4 mm wide, gradually narrowed into claws 11–13 mm long. In contrast, var. *kiruninsularis* has white flowers

with petal blades triangular-obovate, 22–25 mm long and 8–9 mm wide, gradually narrowed into claws 17–19 mm long. Geographically, var. *kiruninsularis* is restricted to coastal northern Taiwan, Keelung Islet, and Zhejiang islands, whereas *S. fortunei* is widely distributed in the Yangtze and southern Yellow River basins of mainland China, with essentially non-overlapping ranges. Based on these clear morphological and geographical distinctions, the author supports the recognition of var. *kiruninsularis* as a distinct variety of *S. fortunei*.

1.2 *Tamarix chinensis* Lour.

Plate I: C–D

Tamarix chinensis Lour. in Fl. Cochinch. 1: 182. Pl. 24. 1790; Flora Reipublicae Popularis Sinicae 50(2): 157. Plate 43: 1–7. 1990; Fl. China 13: 63. 2007.

Specimens Examined: Qushan Island, Zhoushan, Zhejiang, altitude 1 m, on coastal mudflats, 8 September 2016, GAO Haojie QS160908 (ZJFC). Previously recorded from Liaoning, Hebei, Henan, Shandong, Jiangsu, and Anhui provinces (LI, 1990; YANG & GASKIN, 2007). This represents a new record for Zhejiang Province.

Previous literature (ZHANG et al., 2003) reported that *T. chinensis* is native to northern China and cultivated in eastern and southwestern provinces, with no natural distribution in these regions. However, field investigations confirm that this species occurs naturally on Qushan Island and Huanniao Island in Zhoushan, primarily growing on inner mudflats or in coastal rock crevices—habitats that preclude artificial cultivation. Interviews with local farmers and forestry department officials revealed no records of deliberate planting. It is therefore hypothesized that the species may have escaped from previous cultivation attempts in coastal Zhejiang, possibly through seed dispersal by birds that consumed the fruits and deposited seeds in their droppings while stopping over in the area.

1.3 *Melilotus albus* Medik.

Plate I: E–F

Melilotus albus Medik. in Vorles. Churpfälz. Phys.-Öcon. Ges. 2: 382. 1787; Flora Reipublicae Popularis Sinicae 42(2): 298. Plate 77: 1–4. 1998; Fl. China 10: 552. 2010.

Specimens Examined: Daishan Island, Zhoushan, Zhejiang, altitude 20 m, on seaside slopes and roadsides, 9 July 2016, GAO Haojie DS160709 (ZJFC). Previously recorded from northeastern, northern, northwestern, and southwestern China (CUI, 1998; XU et al., 2010). This represents a new record for Zhejiang Province.

This species is morphologically similar to *M. officinalis*, which occurs in Zhejiang, but differs in several key characteristics. *Melilotus officinalis* has yellow flowers with a standard petal subequal to the wings, 8–12 pairs of lateral leaflets, falcate-linear stipules 3–7 mm long, and pods with obtuse apices. In contrast, *M. albus* has white flowers with a standard slightly longer than the wings, 12–15 pairs of lateral leaflets, acicular-conical stipules 6–10 mm long, and pods with pointed beaks at the apex.

2 Economic Value and Biogeographical Significance

Silene fortunei var. *kiruninsularis* produces large, dense inflorescences with pure white flowers, offering considerable ornamental value. The species is sun-loving, drought-tolerant, resistant to poor soils and salinity, and withstands sea winds and fog, making it an excellent groundcover, potted plant, or border plant for coastal landscapes.

Tamarix chinensis has medicinal value, with branches and leaves used to induce sweating and promote eruptions. Its slender, flexible, and wear-resistant twigs are suitable for basket weaving. The species blooms three times annually with large, showy inflorescences, making it valuable for landscaping in coastal wetlands and saline-alkaline soils, as well as for use in borders, pots, and ornamental garden trees.

Melilotus albus is an excellent forage, green manure, and groundcover plant. It has been introduced and developed in North America, where clonal types and numerous cultivars have been selected and bred.

The Zhoushan Islands, like Taiwan, are insular environments that were once part of the mainland. Taiwan became separated from the mainland during the subsidence of the Taiwan Strait in the early Quaternary. Consequently, the floras of these two regions share numerous connections. Among native seed plants of the Zhoushan Islands, 422 genera are shared with Taiwan, with a similarity coefficient of 0.868 at the generic level, demonstrating close floristic relationships. At the species level, 583 species are shared, with a similarity coefficient of 0.506, indicating continued close affinity. The discovery of *Silene fortunei* var. *kiruninsularis* in the Zhoushan Islands not only adds new data to China' s seed plant flora but also strengthens the floristic connection between Zhejiang' s island flora and that of Taiwan. Furthermore, the new record of *Tamarix chinensis* in Zhoushan extends the species' known distribution from northern Jiangsu and Anhui, while the new record of *Melilotus albus* expands its range from Fujian, Shanghai, Jiangsu, Anhui, and Shandong to include Zhejiang.

Note: A–B. Habitat and flower of *Silene fortunei* var. *kiruninsularis*; C–D. Habitat and flower of *Tamarix chinensis*; E–F. Habitat and flower of *Melilotus albus*.

Plate I Three newly recorded plants in Zhejiang

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