

***Orostachys japonica* (Maxim.) A. Berger
(Crassulaceae), a newly recorded genus and species
from the Matsu Islands
馬祖產新紀錄屬及新紀錄種：晚紅瓦松**

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Abstract

In this paper, we report a newly recorded species, *Orostachys japonica* (Maxim.) A. Berger (Crassulaceae) from the Matsu Islands. It is also an unrecorded genus of Matsu. This species is distributed in Russia, China, South Korea, and Japan. It has been recorded in Anhui, Heilongjiang, Jiangsu, Shandong, and Zhejiang provinces in China. Although the Matsu Islands are closely adjacent to China, it has not been recorded there. In this report, we provide descriptions, line drawings, and colored photographs captured from the natural habitat for helping with identification.

Key words: *Orostachys japonica*, Crassulaceae, Matsu

摘要

本文報導馬祖地區景天科 (Crassulaceae) 新紀錄瓦松屬 (*Orostachys* Fischer) 的新紀錄種植物—晚紅瓦松 (*Orostachys japonica* (Maxim.) A. Berger)。本種分布於俄羅斯、中國、韓國及日本，在中國安徽、黑龍江、江蘇、山東及浙江有記錄。馬祖地區鄰近中國，但未曾紀錄過此種。本研究提供晚紅瓦松的形態特徵描述、線繪圖及彩色照片等資料，並提供其分布、生育環境及分類學注釋以供鑑定參考。

關鍵詞：晚紅瓦松、景天科、馬祖

收件日期：2024年3月27日

Received: March 27, 2024

接受日期：2024年7月31日

Accepted: July 31, 2024

Introduction

The Matsu Islands mainly consist of five islands: Dongyin, Peigan, Nangan, Dongju, and Xiju, and numerous small islets. They are located approximately 211 km west of Keelung, Taiwan, and approximately 16 km east of Fujian, China. The fauna and flora composition of the Matsu Islands is similar to that of China (Ota and Lin 1997). The vascular plants within the Matsu flora comprise 677 species (including intra-specific taxa) in 472 genera and 131 families that have been reported (Huang 2002; Kuo 2004; Tzeng *et al.* 2012; Tzeng *et al.* 2014). In recent years, many newly recorded and naturalized plants have been documented in Matsu (Jung 2017). The family Crassulaceae DC., belonging to the order Rosales, includes succulent herbaceous plants (The Angiosperm Phylogeny Group 2016). Approximately 1,400 species in 35 genera have been reported (Christenhusz and Byng 2016), and they are mainly distributed throughout the

Northern Hemisphere. According to Kuo (2004), two genera of Crassulaceae, i.e., *Bryophyllum* and *Sedum*, are recognized in the Matsu Islands. These include one naturalized *Bryophyllum* species (i.e., *B. pinnatum* (Lam.) Kurz), and three native *Sedum* species (i.e., *S. formosanum* N.E. Brown, *S. lineare* Thunb., and *S. drymarioides* Hance) (Kuo 2004; Tzeng *et al.* 2012). Moreover, a recent report indicated that *S. lineare* in the Matsu islands was misidentified and has been published as a new species, *S. matsuese* (Lu and Wang 2023). From a botanical exploration in the Matsu islands, we found an *Orostachys* species that has occurred in Gordon Island, and the distribution range of *Orostachys* species includes the Matzu Islands. However, this species has never been recorded in the Matzu Islands. In the present study, we recognized the presence of this unrecorded genus and species in the Matzu Islands, and provided the morphological description, line drawing,

photographs, and distribution map to facilitate the identifications.

Systematic treatment

Orostachys is a newly recorded genus for the Flora of Matzu islands.

Orostachys Fisher, Mém. Soc. Imp. Naturalistes Moscou. 2: 270. 1809. 瓦松屬

A biennial monocarpic herb, roots fibrous, rhizome absent. Leaves alternate of first year arranged in solitary dense rosette, basal, linear to ovate, often with dull purple dots; apex usually cuspidate or obtuse, cartilaginous appendage to rarely softly obtuse or acuminate. Flowering stem solitary, arising the center of rosette in two years; stem leaves alternate. Inflorescence terminal, a dense raceme or thyrses, narrowly pyramidal to cylindric, many flowered thyrsoids, bracteate; flowers bisexual, subsessile or pedicellate, 5-merous; sepals usually shorter than petals; petals subconnate at base, white, pink, or red,

lanceolate; stamens $2 \times$ as many as petals, 2 whorled. Nectar scales small. Carpels erect, free, stipitate, ovules many. Stigma slender. Follicles erect, beaked at apex, many-seeded.

About 13 species in preliminary East-Asian distribution and like origin (Ohba 1978; Ohba 2003): China, Japan, Kazakhstan, Korea, Mongolia, and Russia (Thiede and Eggli 2007); eight species in China (Fu and Ohba 2001). No records from Taiwan.

Orostachys japonica (Maxim.)

A. Berger, Nat. Pflanzenfam., ed. 2 [Engler&Prantl] 18a: 464 (1930). 晚紅瓦松

Cotyledon japonica Maxim., Bull. Acad. Imp. Sci. Saint-Petersbourg xxx. (1883) 122.

Rosette leaves linear or narrowly oblong, 0.8–1.4 cm long, 0.4–0.5 cm broad, short; appendage white, suborbicular, not cartilaginous, centrally spinose. Stem leaves linear, lanceolate,

lanceolate to ovate, 1.9–2.8 cm long, 0.2–0.7 cm broad, apex narrowly acuminate spinose. Flowering plant 12–18 cm. Inflorescence racemose or basally branched and conical, dense, 8–10 cm long, 2–4 cm in diam; bracts lanceolate to ovate, apex acuminate; pedicels ca. 3 mm long. Sepals greenish, narrowly oblong, 4–5 mm long, 1–2 mm broad, glabrous. Petals white, narrowly oblong to oblong, 5–7 mm long, 1.2–1.3 mm broad, base connate for ca. 1 mm, apex acuminate. Stamens 10–12, 5–7 mm long, shorter than or equaling petals; anthers purple. Nectar scales subquadrangular, apex subemarginate. Follicles oblong, 6 mm long, apical beak slender. Seeds numerous, ovoid, minute.

Specimens examined: Lienchiang County (Matzu Islands), Beigan Township, Gordon, alt. 0–5 m, 15 Jan. 2022, *W.Y. Wang 2970* (TAIF) [TAI551714]

Distribution: The native range of this species is in Southeast Asia. China

(i.e., provinces of Anhui, Heilongjiang, Jiangsu, Shandong, Zhejiang), Korea (Fu and Ohba 2001; Chang *et al.* 2014), Japan (Thiede and Eggli 2007) and Russia (Fu and Ohba 2001). It is a biennial plant that primarily grows in the temperate biome.

Habitat and Ecology: This population was found in the Gordon Island, Matsu Islands, and grew on rocks on seaside slopes at an elevation of 5 m (Fig. 3). Accompanying plants include *Peucedanum japonicum* Thunb., *Lysimachiamauritiana* Lam., *Euonymus japonicas* Thunb., *Dianthus superbus* L. var. *longicalycinus* (Maxim.) Will., and *Pittosporum tobira* (Thunb.) W.T. Aiton.

Phenology: Flowering occurs from August to September, with fruiting starting from September to October.

IUCN Red list category: In Russia, Japan, Korea, and China, *Orostachys japonica* inhabits rocks on slopes, house roofs, and mossy tree trunks (Fu and Ohba 2001). *Orostachys japonica* is

currently known only from one locality (Gordon) in the Matzu Islands, with an area of occupancy of less than 2 km². The estimated population size ranges from 200 to 400 individuals. According to the IUCN Red List categories criteria, we assessed *O. japonica* as Nationally Critically Endangered (CR) in the Matzu Islands [B1a+C1+D1+D2] (IUCN 2024). However, *O. japonica* was only found in Gordon and was under military protection. Besides, it is widely distributed in China, Japan, and Korea, and possibly was migrated from these neighboring areas. Therefore, we reconsider that the assessment of this species in Matzu Island should be downgraded from CR to Vulnerable (VU) based on the ICUN Red List category (IUCN 2024).

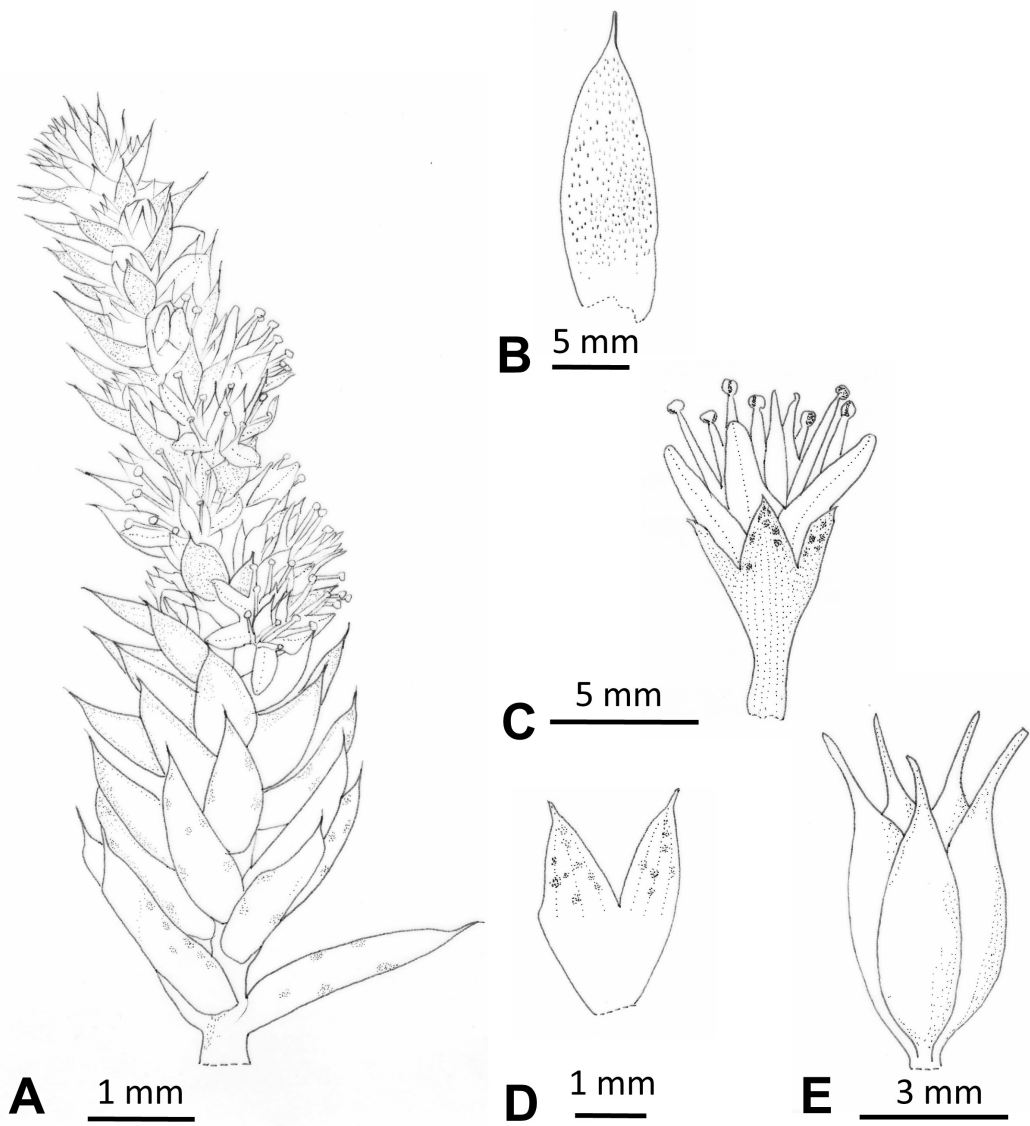


Fig. 1 Illustration of *Orostachys japonica* (Maxim.) A. Berger, A. Flowering plant; B. Leaf; C. Flower; D. Calyx; E. Fruit. (Illustrated by C.K. Yang, from *W.Y. Wang 2970*)

圖 1 晚紅瓦松 (*Orostachys japonica* (Maxim.) A. Berger) 。A. 開花植株；B. 葉；C. 花；D. 花萼；E. 果實。

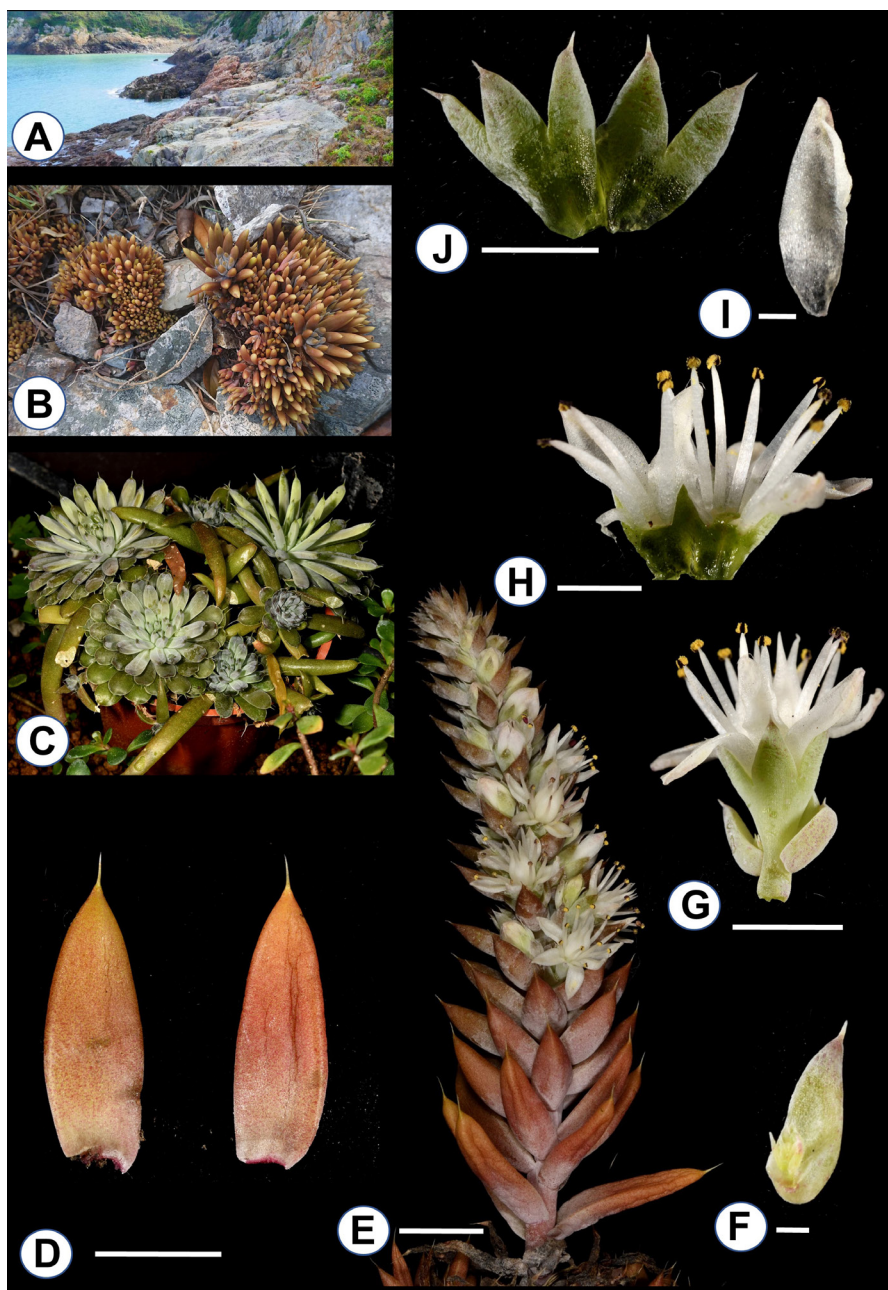


Fig. 2 Habitat and morphology of *Orostachys japonica* (Maxim.) A. Berger, A. Habitat; B. Habit (individual mature on rock); C. Individual cultivation; D. Stem leaves; E. Flowering plant; F. bract; G. A lateral view of flower; H. Calyx, petals and stamens; I. Petal; J. Calyx. Scale bars: D, G = 6 mm; E = 1 cm; F, I = 1 mm; H, J = 4 mm. (photos were taken by W.Y. Wang)

圖 2 晚紅瓦松 (*Orostachys japonica* (Maxim.) A. Berger) 。A. 生育地; B. 植株 (岩石上的成熟個體); C. 栽培的個體; D. 莖生葉; E. 開花植株; F. 苞片; G. 花側面; H. 花萼、花瓣及雄蕊; I. 花瓣; J. 花萼。

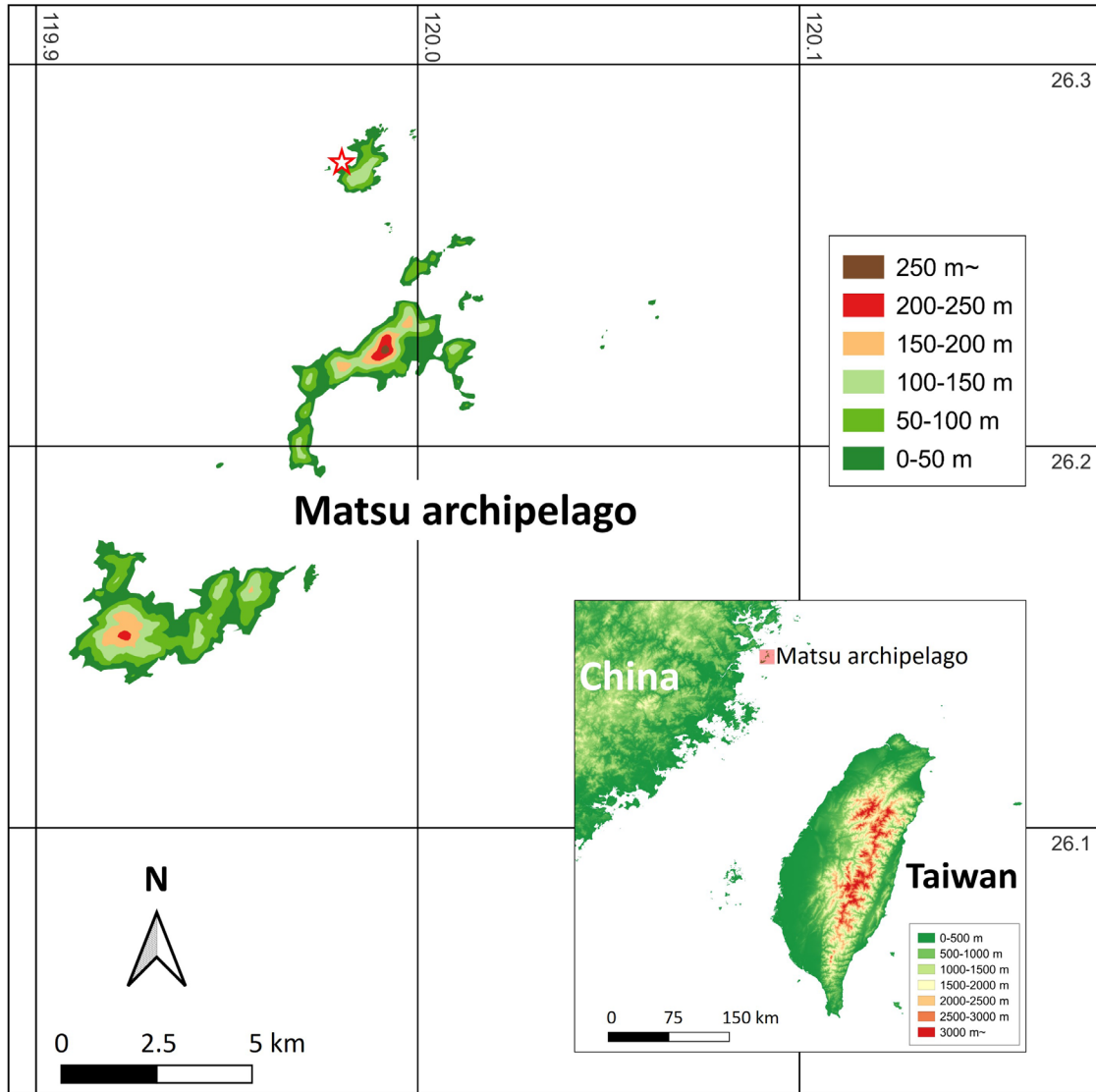


Fig. 3 Distribution of *Orostachys japonica* (Maxim.) A. Berger, (Star) in the Matsu islands.

圖 3 晚紅瓦松 (*Orostachys japonica* (Maxim.) A. Berger) 在馬祖的分布圖。

Acknowledgments

The author deeply acknowledged two anonymous reviewers for giving valuable taxonomic opinions. Many thanks also recognized to Chang Sheng Wang for providing the plant materials.

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