



***Amsonia orientalis* Decne.:**

Distribution, habitat and current status in Greece

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Introduction

The genus *Amsonia* Walter (Fl. Carol.: 98. 1788) belongs to the Apocynaceae family, one of the 10 to 12 largest angiosperm families, with 378 genera and approximately 5,290 species (Endress et al. 2018; Liede-Schumann 2024). In Greece, the family is represented by 11 genera and 23 taxa (Dimopoulos et al. 2024). *Amsonia* comprises 22 species of annual or perennial erect herbs with latex. Only one species, *Amsonia orientalis* Decne., is native to Greece. Leaves are alternate, with blades lacking colleters at their base. Inflorescences are terminal and arranged in corymbose or paniculate cymes. Sepals are acuminate and lack internal colleters at their base. The corolla is typically blue or bluish, hypocrateriform, with spreading lobes that overlap to the left in bud. The slender, cylindrical corolla tube widens above the middle, and the throat is hairy. A corona is absent. Stamens are included within the corolla tube, inserted near its upper part. They have short filaments and ovate to oblong anthers that are obtuse at the base and lack sterile basal appendages. The anthers are free from the style head. A gynostegium and distinct nectaries are absent. The ovary consists of two free carpels, each containing numerous ovules arranged in two rows per placenta. The style is filiform, terminating in a style head with a thick apical ring of hairs and a basal collar. The fruit consists of a pair of erect, cylindric-fusiform follicles. Seeds are oblong-cylindric, obliquely truncate, glabrous, and lack a coma (Goula 2023).

The genus *Amsonia* is taxonomically complex, with an unresolved phylogeny, particularly regarding its close relationship to the genus *Rhazya* Decne., requiring comprehensive study (Potgieter & Albert 2001; Simões et al. 2007; Endress et al. 2014, 2019; Gürkanli et al. 2014).



Figure 1. *Amsonia orientalis* from the regional unit of Rodopi, NE Greece (photo: K. Goula).

***Amsonia orientalis* Decne. (Jacquemont, Voy. Inde 4 (Bot.): 105. 1844)**

Synonyms: *Rhazya orientalis* (Decne.) A. DC., *Rhazya thracica* Davidov

Amsonia orientalis is a perennial herb, 30–60 cm tall, with erect stems. Leaves are sessile or subsessile, approximately 4 × 2 cm, lanceolate to ovate, cuneate to occasionally rounded at the base, and acute to acuminate at the apex. They are pubescent when young, becoming glabrous at maturity except along the midrib and ciliate margins. The inflorescence is terminal and typically many-flowered. Calyx lobes are lanceolate, 2–3 mm long, acute, and ciliate. The corolla is hypocrateriform, pale blue to occasionally lilac-blue, glabrous externally, and hairy in the throat. The corolla tube is 10–15 mm long, slightly widened in the upper part, and darker than the lobes. Corolla lobes are 4–5.5 mm long, ovoid to obovoid or oblong, and subobtusate at the apex. Follicles are erect, (3–)5–8 cm long. Seeds are 6–8 mm long and tuberculate (Goula 2023, Figs. 1 & 2).



Figure 2. A specimen of *Amsonia orientalis* collected from the regional unit of Rodopi, NE Greece, and deposited in ATHU.

Amsonia orientalis has a limited distribution in northeastern Greece (Fig. 3) and northwestern Turkey (Zahariadi 1973; Drossos 1992; Akyalçin et al. 2006; Kavak 2014;

Dimopoulos et al. 2024). In Greece, it has been recorded in the regional unit of Xanthi, between the village of Porto Lagos and the town of Xanthi (Zahariadi 1973), and in the regional unit of Rodopi, in an area surrounding a complex of coastal wetlands formed by five lagoons (Drossos 1992). The species was once considered possibly extinct in Greece due to the absence of recent records. However, in 2015, E. and R. Willing collected two specimens from the regional unit of Rodopi, near the village of Nea Kallisti (B100689740!, B100689741!). In 2016, K. Goula photographed the species in the same regional unit, near the town of Komotini. In Turkey, previously known localities in Bursa and Halkalı (Istanbul) have been completely extirpated. Nevertheless, the species has been rediscovered in a highly restricted area within the Ömerli Basin (Kavak 2014).



Figure 3. Distribution map of *Amsonia orientalis* in Greece. Yellow dots indicate historical records and red dots represent new localities from the April 2025 survey.

Amsonia orientalis grows in seasonally wet habitats, particularly along the margins of lakes and streams (Kavak 2014). It has also been reported growing among *Paliurus spina-christi* shrubs (Zahariadi 1973; specimens of Willing E. & R.). The species prefers slightly alkaline, moderately calcareous, sandy-loamy soils low in organic matter but rich in iron and magnesium (Özen et al. 2008). It occurs at low elevations, within an altitudinal range of 0–50 m (Goula 2023), and flowers from late April to early June. Pollination is entomophilous, primarily by bees and butterflies (Ollerton et al. 2019). The seeds of *A. orientalis* have a thick testa and require a dormancy period or chilling treatments for germination (Öz et al. 2008). In vitro propagation has been achieved from both seeds and explants (Öz et al. 2008; Acemi et al. 2012, 2013).

Like other members of the Apocynaceae family, the species is rich in indole alkaloids, glycosides, and glycoalkaloids, which confer cardioactive and anticancer properties (Bolzani et al. 1984; Kavak et al. 2014; Abdul-Hameed et al. 2022). It also exhibits broad

antimicrobial activity (Akyalçın et al. 2006; Abdul-Hameed et al. 2022). *Amsonia orientalis* is a highly attractive plant and is cultivated as an ornamental (Kavak 2014).

Current status

In April 2025, a field survey was conducted in Thrace (northeastern Greece), specifically in the regional units of Xanthi and Rodopi (Komotini area), to locate historical occurrences of *Amsonia orientalis* and identify new ones, with the aim of assessing its current conservation status. The historical localities reported by Zahariadi (1973) and Drossos (1992), as well as the locality recorded by E. and R. Willing, could not be relocated. However, a new locality with approximately 1,500–2,000 individuals was discovered near the village of Messouni, forming small, scattered groups along seasonally damp field margins (Figs. 3 & 4).



Figure 4. *Amsonia orientalis* at a field margin, near the village of Messouni, regional unit of Rodopi, NE Greece (photo: K. Goula).

According to local residents, *Amsonia orientalis* was once relatively common in the area. However, land reforms over recent decades have altered field boundaries, converting field margins into cultivated land, resulting in habitat destruction and a significant decline in population size. The localities previously recorded around the villages of Egiros, Paradimi, and Nea Kallisti have likely been lost for this reason (S. Ispikoudis, pers. comm.). A new land reform is currently planned for the cultivated area surrounding Messouni. Without targeted conservation measures, this remaining subpopulation is at serious risk of extirpation. In addition to land reform, habitat loss due to other human activities remains a continuous threat. Over-collection, primarily for ornamental purposes, poses an additional risk.

The species is assessed as Critically Endangered (CR) in Turkey due to its extremely limited Extent of Occurrence (EOO)—less than 10 km²—and ongoing declines in habitat area, quality, and extent (Kavak 2014). The historical localities in European Turkey have been extirpated, and the species currently persists only on the eastern outskirts of the Asiatic part of Istanbul (Asian Turkey; Kavak 2014; POWO 2025). In Greece, assuming the species has not completely disappeared from its historical localities, the EOO is approximately 188 km², and the Area of Occupancy (AOO) is 28 km². The same threats are present across all known sites, indicating that the number of locations is likely fewer than five. Moreover, there is evidence of a continuing decline in habitat area, extent, and quality, along with a decrease in the number of mature individuals. Based on these factors, the species qualifies as Endangered under Criterion B [B1ab(iii,v)+B2ab(iii,v)], according to the IUCN Red List Categories and Criteria (IUCN Standards and Petitions Committee 2024). However, considering the Critically Endangered status in Turkey and the ongoing threat of land reform, which is expected to cause further habitat loss and population decline, the category of Critically Endangered is proposed as more appropriate.

Amsonia orientalis is listed under the Bern Convention and protected in Greece by Presidential Decree 67/81. Although most historical records fall within the boundaries of the NATURA 2000 site GR1130009, the localities reported here are outside its limits. Both in situ and ex situ conservation measures are proposed. In situ measures include yearly monitoring of the Greek subpopulation to track trends, flowering and fruiting success, and habitat changes; enforcement of restrictions on land reform to prevent habitat loss; and establishment of a micro-reserve in the area where the species occurs. Ex situ measures include seed collection and storage in national or international seed banks to preserve genetic material and propagation of the species in botanical gardens. Raising public awareness through educational campaigns is crucial for the species' survival.

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