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A new alien species record for the flora of Türkiye: *Cucumis maderaspatanus* (Cucurbitaceae)

Abstract

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Cucumis maderaspatanus (Cucurbitaceae) is reported here as a new species for the flora of Türkiye. Specimens of this species, which is native to tropical Africa and South Asia, were collected from a field margin and a roadside in a disturbed habitat in the Tarsus district of Mersin Province in southern Türkiye. The identity of the species was confirmed by detailed morphological examination of leaves, flowers and fruits under the stereomicroscope. In this study, a comprehensive description of the species, detailed photographs and a distribution map are provided. This record has been added to the Turkish flora as a new casual alien species.

Key words: *Cucumis*, new record, flora, Tarsus, Turkey.

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Introduction

The genus *Cucumis* L., which belongs to the *Cucurbitaceae* family, was reported to comprise 32 species according to Kirkbride (1993). However, recent molecular studies have significantly revised this classification and the boundaries of the genus have been expanded, and the number of species has increased to 52 worldwide, of which 13 occur in India (Schaefer 2007; Sutar & al. 2014). Molecular studies have also revealed that the species of *Mukia* Arn. should be included in *Cucumis* (Renner & al. 2007; Schaefer 2007; Telford 2011). Consistent with this expansion, Plants of the World Online (POWO 2026) currently recognizes 63 accepted species. However, traditional taxonomy, which emphasizes distinct and consistent differences in seed morphology, maintains that the two genera should remain separate (de Wilde & Duyfejes 2006; Pratami & al. 2019).

The genus *Cucumis* is generally found in drier and more open habitats (except for *C. rostratus* J.H.Kirkbr., which occurs in forests). While most species have soft, herbaceous stems with tendrils, *C. rigidus* E.Mey. ex Sond. differs in that it lacks tendrils and forms an erect, dioecious subshrub (Kirkbride 1993). South Africa is considered as diversity center of *Cucumis*. Most

wild species are found in the arid and semi-arid regions of Africa (Křístková & al. 2003). The wild forms of cultivated species are distributed as far as the Middle East, Türkiye and India (Dane 1991). Central India, particularly the regions at the foothills of the Himalayas, is likely the centre of diversity for *C. sativus* L. (Jeffrey 1989, cited in Křístková & al. 2003). Cucumber (*C. sativus*) and melon (*C. melo* L.), two economically important species of the genus *Cucumis*, are among the major crops globally cultivated within the *Cucurbitaceae* family, including in Türkiye (Chomicki & al. 2020). In addition to cultivated forms of *Cucumis melo*, some populations have escaped from cultivation and have been recorded as weeds in certain regions (Kuru & Üremiş 2021).

In the most recent updates, exotic plant lists comprising 340 taxa were documented for the flora of Türkiye (Uludağ & al. 2017); however, with the appearance of new records of alien species since then, this number has continued to increase (Hançerli & al. 2018; Terzioğlu 2020; Uygur & al. 2021; Terzioğlu & Coşkunçelebi 2022; İlideniz & al. 2022; Bani & Yaşayacak 2023; Merrick & al. 2024; Tünk & al. 2024). This study documents *Cucumis maderaspatanus* L. as a new record for the flora of Türkiye.

Materials and Methods

Specimens of this study were collected from Tarsus district of Mersin province, Türkiye, in 2025. They were dried using standard herbarium techniques, and assigned a collector number.

The presence or absence of these specimens was checked against the Flora of Turkey and the East Aegean Islands (Jeffrey 1972; Davis 1988; Güner & al. 2000), Plant List of Türkiye (Vascular Plants) (Güner & al. 2012), Türkiye İstilâcı Bitkiler Kataloğu (Catalogue of the Invasive Plants of Türkiye) (Önen 2015), Alien Flora of Turkey: Checklist, Taxonomic Composition and Ecological Attributes (Uludağ & al. 2017) and no record of the species was found in these sources. Subsequently, the species was determined using the identification keys of the floras of the countries in which its origin is predominantly known online databases (e.g., African Plant Database, Flora of Sri Lanka, Flora of South Africa, Global Biodiversity Information Facility (GBIF), World Flora Online (WFO), e-Flora of India, India Biodiversity Portal), and relevant scientific literature (de Wilde & Duyfjes 2006, 2007; Telford 2012; Yadav & al. 2014; Abid & al. 2015; Uludağ & al. 2017; Pratami & al. 2021).

Finally, a comprehensive description of the species was prepared based on detailed morphological examinations conducted under a stereomicroscope and supported by the literature (African Plant Database, Flora of Sri Lanka, Flora of South Africa, e-Flora of India, India Biodiversity Portal). In addition, a Turkish vernacular name is here proposed in accordance with Menemen & al. (2016). The voucher specimens were deposited in the Herbarium of the Faculty of Science, Akdeniz University (AKDU).

Results and Discussion

Cucumis maderaspatanus L. Sp. Pl.: 1012 (1753) (Figs. 1-2).

Type: 170, f. 2 (Plukenet, 1691, South Africa — Lectotype designated by Meeuse, 1962, seen here in the original illustration).



Fig. 1. *Cucumis maderaspatanus* A- fruits; B- flower; C- leafy climbing stem [F. Yüceol 1301 (Akdeniz University Herbarium)].

≡ *Bryonia maderaspatana* (L.) Lam. Encycl. 1: 496 (1785) ≡ *Mukia maderaspatana* (L.) M.Roem. Fam. Nat. Syn. Monogr. 2: 47 (1846) ≡ *Melothria maderaspatana* (L.) Cogn. A.L.P.P.de Candolle & A.C.P.de Candolle, Monogr. Phan. 3: 623 (1881).

Proposed Turkish name: “Madras kavunu”, suggested for this new record for Türkiye, as no local name is known; the name is derived from the genus and the species epithet indicating its origin.

Description: Annual monoecious herb. Stem slender, trailing or climbing up to 3 m, densely hispid-strigose. Tendrils simple, solitary in leaf axils and at tips tightly coiled.

Leaves simple, alternate, palmately 3–5-lobed; blade 1.5–6 × 1.5–4 cm, entire or remotely and minutely denticulate to coarsely sinuate-denticulate at the margins, basally pentangular to hastate-like in outline, becoming smaller and more triangular towards the apex; terminal lobe longest, acute to apiculate at apex; lateral lobes shorter, broad-triangular, acute; strigose with spreading hispid hairs above, more densely beneath, hairs along veins more robust. Petiole hispid-strigose, 1–3.5 cm long, smaller and sessile towards the apex. Flowers yellow, densely hispid, solitary or borne in fascicles of 3–4. Male flowers



Fig. 2. A-Female (on the left) and male flowers B- Stamens C- Seeds D- theca.

Scale bar: A-C-D: 0.5 mm B: 1 mm.

mostly toward the upper parts of the plant; one in each fascicle borne on a distinctly longer pedicel; sepals 2–2.5 mm long, petals 1 mm long with 1–2.5 mm long pedicel; stamens 3, inserted about the middle of the hypanthium tube, with two 2-theous anthers and one 1-theous anther, ciliate. Female flowers with sepals 1.5–2 mm, petals 1–1.5 mm; ovary ellipsoid, 1.5–2 mm, borne on a short gynophore c. 0.5–1 mm long, densely hispid. Fruits 1–3 in axillary clusters, globose, 4–5 mm in diameter, indehiscent; pedicels 0.5–1.5 mm long, hispid; green with pale green longitudinal stripes when immature, turning bright red and glabrescent at maturity. Seeds 4, ovate to elliptic-ovate, 4–5 × 2–3 mm, slightly tumid on one side and shallowly concave on the other; surface irregularly rugose; clothed in a thin, translucent aril; margin bordered; dark brown to blackish when dry; apex rounded, shortly beaked. Flowering and fruiting in October (Figs. 1–2).

Key to *Cucumis* species in Türkiye

1. Fruits globose, 4–5 mm, bright red at maturity, seeds rugose *C. maderaspatanus*
1. Fruits larger (2.5–4 cm in wild forms), mostly ellipsoid, seeds smooth 2

- 2. Terminal lobe of leaf elliptic to broadly rounded, usually shallow *C. melo*
- 2. Terminal lobe of leaf triangular, acute *C. sativus*

Cucumis maderaspatanus is a wild alien species in Türkiye, recorded here for the first time. In contrast, *C. sativus* is known only from cultivation and has no wild populations in the region, while *C. melo* occurs both as a cultivated plant and as a weedy alien in Türkiye.

Collected specimen: Türkiye, C5 Mersin: South of Tarsus, 36°54'04.92"N, 34°54'18.74"E, along field margins, a.s.l 10–15m, 22 Oct 2025, *F. Yüceol 1301* (Akdeniz University Herbarium).

Habitat: Disturbed areas such as roadsides and field margins, where *C. maderaspatanus* specimens were collected, at intervals along the barbed-wire fence bordering the cultivated fields and citrus grove with cabbage planted in between, at 10–15 m a.s.l, with about 5–10 individuals observed. Two specimens were collected from this population and assigned the same collection number (*F. Yüceol 1301*), as they represent the same locality. However, detailed observations of population structure and distribution could not be made. Associated species along the roadside included *Arundo donax* L., *Torilis arvensis* (Huds.) Link, and *Malva sylvestris* L.

General distribution: Widespread. In the Old World tropics, ranging from West Africa to New Guinea and northern Australia; also occurring in Eswatini and South Africa (Limpopo, Mpumalanga, KwaZulu-Natal), and southern Türkiye (Fig. 3).

POWO (2026) lists Australia among the distribution areas of the species; however, molecular studies by Sebastian & al. (2010) indicate that the Australian records were based on misidentifications and that the species is not naturally present there. It has been suggested that this may have been caused by confusion with Australian endemic species such as *C. althaeoides* (Ser.) P. Sebastian & I. Telford, *C. argenteus* (Domin) P. Sebastian & I. Telford, or *C. variabilis* P. Sebastian & I. Telford (Telford & al. 2011).

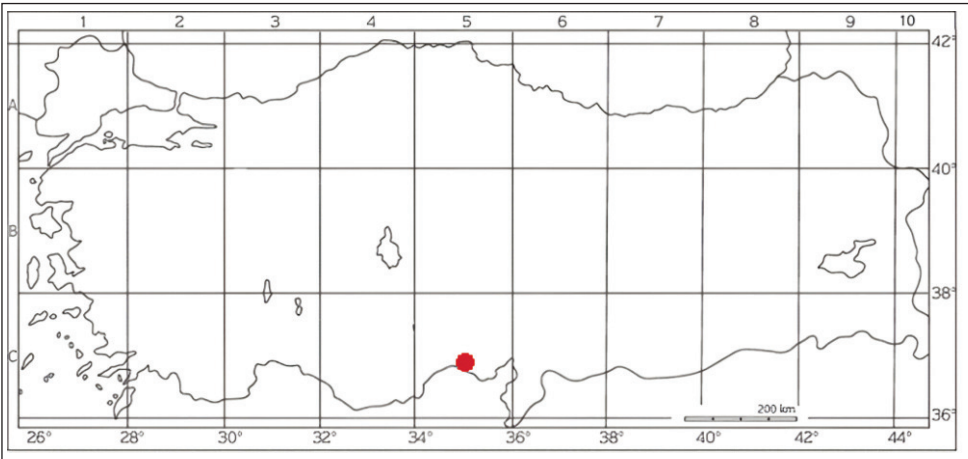


Fig. 3. Distribution map of *Cucumis maderaspatanus* in Türkiye.

Today's globalised world, with increasing transportation networks and large-scale trade, facilitates the movement of many plant species beyond their natural distribution areas, leading to the gradual erosion of biogeographic boundaries (van Kleunen & al. 2015; Glasnović 2022; IPBES 2023). While this process is primarily driven by human activities, natural vectors may also play a secondary role.

In this context, the most likely explanation for the presence of *C. maderaspatanus* in Türkiye is that the species reached the region through human-mediated pathways (e.g., the importation of contaminated agricultural seeds or animal feed). The fact that the species, previously known from tropical Africa and South Asia, was found in disturbed habitats such as fields and roadsides in Türkiye is also consistent with human-mediated passive dispersal. Such habitats are often directly associated with human transportation and trade and can become points of entry and establishment for invasive species. International trade routes and the movement of agricultural products constitute one of the most common pathways for the intercontinental transport of invasive species. Considering similar records in the Mediterranean Basin (Gönen & Uygur 2000; Üremiş & Kuru 2021; Uygur et al. 2021; Tünk et al. 2024), it appears more likely that the species reached the region through human-mediated pathways (e.g., the importation of contaminated agricultural seeds or animal feed).

However, the possibility that natural vectors may have played a role should not be overlooked; nevertheless, this possibility should be considered more remote than the hypothesis of human-mediated dispersal. Among natural vectors, migratory birds in particular play a critical role in the long-distance transport of plant seeds. Türkiye is situated as a strategic bridge on the African–Eurasian migratory flyway, which offers an extensive network used seasonally in both directions (Guilherme & al. 2023; Uludağ & al. 2024).

A study by Uludağ et al. (2024) revealed that the spread of newly recorded invasive species in the Eastern Mediterranean and Aegean regions significantly overlaps with the main bird migration routes in Türkiye, and these routes function as vital stopover points for migratory birds. These routes, particularly at critical stopover sites such as wetlands, enable migratory birds to transport seeds over long distances, thus serving a vital function in the dispersal of species (Yıldırım & al. 2019). In this context, the new record reported from Tarsus shows a clear geographical overlap with the main migration corridor extending from the Bosphorus and Dardanelles Straits through the Eastern Mediterranean to the Gulf of Iskenderun and the Belen Pass, and finally reaching Africa (Uludağ & al. 2024). The Çukurova Basin, of which Tarsus is a part, has been identified as one of the key stopover sites where migratory birds rest and feed. In such areas, birds can act as long-distance dispersal vectors by carrying seeds either internally (endozoochory) or externally (epizoochory) (Nogales & al. 2012; Reynolds & al. 2017; Uludağ & al. 2024). Similarly, rivers also function as effective natural corridors for the transport of plant seeds (Göktürk 2016; Güzel 2017). The rich river network in and around Tarsus provides a suitable environment for such a dispersal mechanism. However, there is no direct evidence that these natural vectors played a primary role in the species' entry into Türkiye. Rather, these mechanisms may have contributed to the species' secondary spread within the region.

Cucumis maderaspatanus is registered with the code 'MEEMA' in the EPPO (European and Mediterranean Plant Protection Organization) Global Database and is not listed in EPPO's A1/A2 quarantine or invasive species lists. There is no evidence that the species

is widespread or strongly invasive in Türkiye. However, the rapid spread of *C. melo* var. *agrestis* Naudin from the same genus into soybean, cotton, peanut and corn fields shortly after its first record in Çukurova (Üremiş & Kuru 2021), along with the invasive behaviour of *Cucurbita foetidissima* Kunth, *Sicyos angulatus* L. and *Echinocystis lobata* (Michx.) Torr. & A. Gray, all belonging to different genera of the same family, in agricultural areas, indicates that such herbaceous-climbing cucurbits can quickly establish themselves in suitable agroecosystems (Petrova & al. 2013).

In addition to assessing its invasion risk, the value of this new record as a gene source should also be considered. As the genetic diversity of cultivated plants declines and new threats emerge, the importance of conserved resistance genes in wild relatives increases (Sebastian & al. 2010). In this context, wild *Cucumis* species carrying potentially useful traits such as biotic stress resistance constitutes fundamental genetic resources for the conservation and breeding of cucumber and melon (Křístková 2003; Chen & Zhou 2011). Therefore, studying wild relatives and natural populations provides a critical contribution to efforts in developing resistant cultivars (Sebastian & al. 2010). Indeed, transferring resistance genes from wild relatives to cultivated species constitutes one of the cornerstones of modern breeding programs (Luan & al. 2008; Huang & al. 2009). In this context, a wild species such as *C. maderaspatanus* possesses genetic potential that could be evaluated for traits sought in cultivated varieties, such as drought tolerance or disease resistance.

Conclusion

This record signifies the addition of a new alien species to the two previously known cultivated species (*Cucumis melo* and *C. sativus*) of the genus in the flora of Türkiye, bringing the total number of *Cucumis* species in the country to three and providing a significant biogeographic update. Based on the observed population size and limited distribution, *C. maderaspatanus* is considered a casual alien species in Türkiye. Future studies should investigate the distribution dynamics and potential ecological impacts of this newly recorded species in detail.

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