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A new genus record for the flora of Türkiye: *Sida* L. (*Malvaceae*)

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ABSTRACT
The genus *Sida* (*Malvaceae*) is added to Flora of Türkiye firstly here in as a new record genus. The alien weed species *Sida spinosa* L. was collected from Adana province. The species description supported by detailed photographs is given as well as a scientific name in Turkish for this species was suggested.

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Türkiye Florası İçin Yeni Bir Cins Kaydı: *Sida* L. (*Malvaceae*)

ÖZET
Bu çalışmada, *Sida* (*Malvaceae*) cinsi Türkiye florasına yeni bir kayıt olarak eklenmiştir. *Sida spinosa* L., yabancı orjinli bir yabancı ot türü olup, Adana'dan toplanmıştır. Türe ait örneğin tanımı, detaylı fotoğrafları ile önerilen Türkçe ismi makalede verilmiştir.

Bitki Koruma

Araştırma Makalesi

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Anahtar Kelimeler
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Ebegümecigiller
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Yabancı ot florası
Yeni kayıt

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INTRODUCTION

The family *Malvaceae* Juss. (Mallow family) comprises 245 genera worldwide (POWO, 2023). One of them, *Sida* L., is mainly distributed in the tropics and extends to temperate zones (Bayer & Kubitzki, 2003). Although there are 255 accepted *Sida* species worldwide, the genus is not present at Türkiye. *Sida* included many taxa that are now genera such as *Abutilon* Mill., *Malvella* Jaub. & Spach, *Meximalva* Fryxell, *Sidasodes* Fryxell and Fuertes etc. (Siedo, 1999). *Abutilon* and *Malvella* occur in Türkiye (Cullen, 1967). *Sida spinosa* L. occurs naturally in Azerbaijan, Georgia and Iran (POWO, 2023). In Iran it is only known from the port city of Minab near the Gulf of Umman and Basra (Riedl, 1976). Its limited distribution in Iran may be due to anthropological effects. There are fourteen *Malvaceae* genera in Türkiye (Uzunhisarcıklı, 2012). There is only one genus, *Abutilon*, which has been separated from *Sida* and does not have an epicalyx similar to *Sida* (Cullen, 1967).

However, no specimens or records belonging to the genus *Sida* were found in the databases, articles and herbaria cited in Uludağ et al. (2017). The genus *Sida* L., which has never been found in Türkiye before, is collected for the first time due to *S. spinosa* species and included in the Flora of Turkey as a mallow genus (Davis, 1967). Detailed description of the genus and species is given, supported by photographs.

MATERIAL and METHOD

The fresh samples of *Sida spinosa* were collected in Adana (S. Tünk, collector number CUBK-1MAVF-2) during a weed survey in cotton fields at Adana, Mersin, Osmaniye and Hatay provinces in Türkiye in September 2021 (Figure 1). After collection, the plant samples were dried and given a collector number in order to become herbarium material. The voucher specimens were kept at the Herbarium of Hacettepe University and the Herbarium of the Plant Protection Department of Çukurova University. Leica Zoom 2000 stereomicroscope was used for morphological examination of dried specimens and was photographed under a DMSZ7P Digital Microscope.

The Flora of Turkey and East Aegean Islands Volumes 2 (Davis, 1967), 10 (Davis, 1988) and 11 (Güner et al., 2000), Türkiye Bitkileri Listesi (Damarlı Bitkiler) (Uzunhisarcıklı, 2012) and the checklists since 2012 (Özhatay et al., 2013; 2015; 2017; 2019; 2022) were checked to identify the specimens. In addition, databases such as "Bizim Bitkiler" (http://www.bizimbitkiler.org.tr/v2/index.php), TÜBİVES (http://www.tubives.com/index.php), POWO (2023), GBIF (2023) were searched. A taxonomic search was made on academic web search pages with keywords such as "*Sida*, Türkiye, *Malvaceae*". Finally, the herbaria HUB, GAZI, ISTE, ISTO, AIBU, DUOF were checked to find a specimen identified as *Sida*.

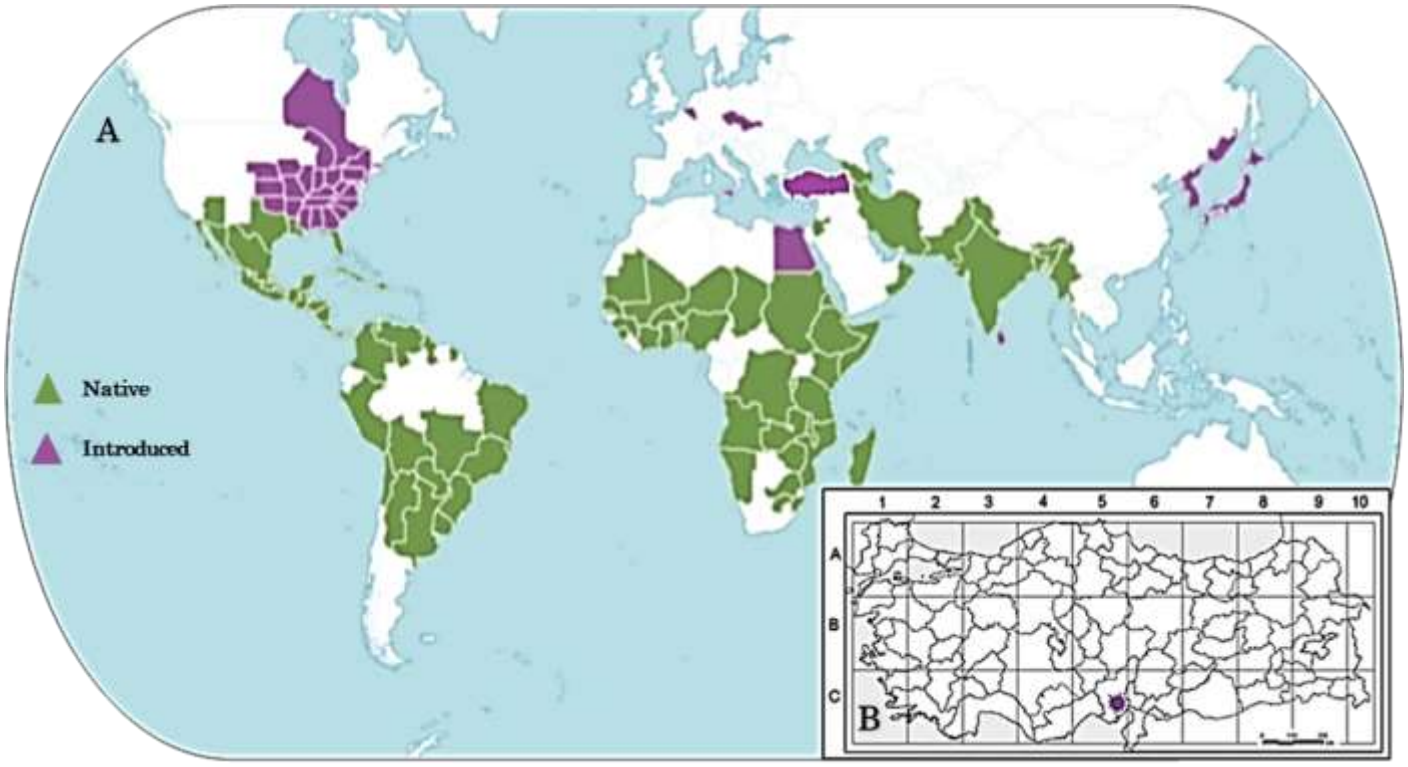

Figure 1. World distribution of prickly fanpetals (*Sida spinosa*) [modified from POWO (2023)] (A) and location in Turkiye (B).

Şekil 1. Dikenli Yelpaze Yaprak (Sida spinosa)' ın dünya yayılışı (POWO (2023)'dan değiştirilerek] (A) ve Türkiye'de bulunduğu yer (B).

RESULTS

Sida L.

Annual or perennial herb, sub-shrub or shrub. Leaves spirally arranged, stipules persistent, lamina simple. Inflorescence axillary solitary, c. 2/3 divided, often basally 10-ribbed, lobes triangular or ovate, apex acute or acuminate. Epicalyx absent. Petals white, cream, yellow, orange, pink, red or purplish. Fruit reticulate, glabrous or hairy, lateral walls usually persistent, indehiscent below with well-differentiated dorsal wall, apically indehiscent or partially dehiscent. Mericarps 1-seeded, seeds glabrous (Fryxell & Hill 2015; Bayer & Kubitzki, 2003).

Sida is distributed in South America, southern North America, Africa, the Arabian Peninsula, southern Asia, and Australia. It includes 255 accepted species (POWO, 2023).

Sida spinosa L.

Annual or perennial, erect, alternately branched herb, hairs minutely stellate puberulent, hairs up to 0.5 mm long. Leaves alternate; stipule filiform, up to 5 mm long; petiole 0.7-15 mm, minutely stellate; lamina ovate, 10-35 × 10-30 mm, base obtuse or cordate, margin crenate-serrate, apex acute, upper surface glabrous, glabrescent or sparsely minutely puberulent,

lower surface stellate pubescent. Flowers solitary, axillary, terminal or subterminal; pedicels 5-10 mm; calyx persistent, enclosing schizocarp, angulate, 3-5 mm, lobes ovate, 3-5 × 2-3 mm, purplish bordered, short pilose hairy, apex acute; petals yellow, ca. 2.5 mm. Schizocarp nearly globose, ca. 3-5 mm in diam.; mericarps 5, 2.5-4 mm, upper part densely short pubescent, lower part reticulate-veined, apex spiny, spines ca. 1 mm. Seeds clearly 3-sided, 1.5-2 × 1-1.5 mm, glabrous, brown (Figure 2).

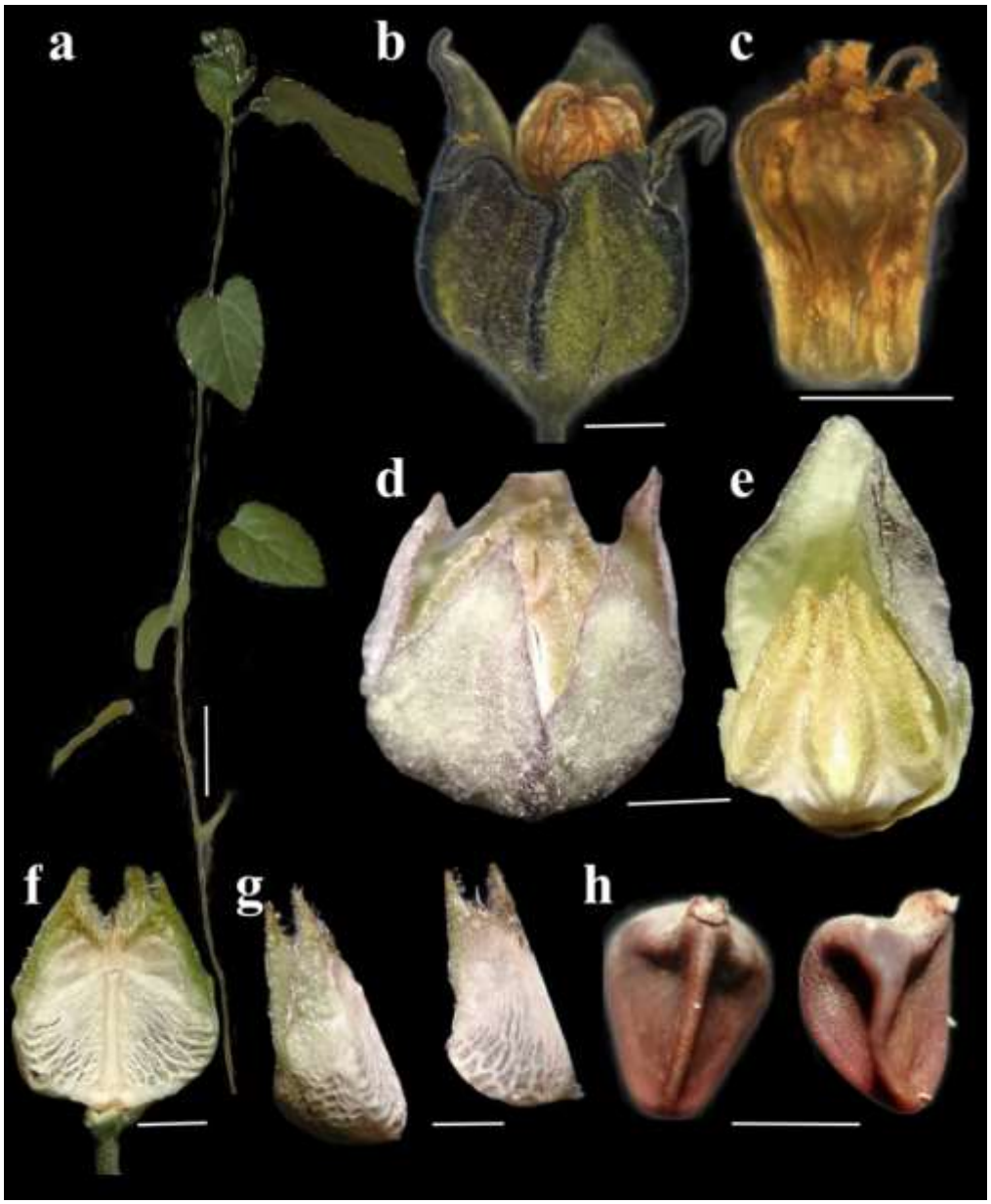

Figure 2. General appearance of *Sida spinosa* L. (S. Tünk, CUBK-1MAVF-2) (a), flower (b), corolla (c), fruit (d), Mericarps (e-g), seeds (h). Scale bars: 10 cm (a), 1 mm (b-h).

Şekil 2. Sida spinosa L.*'nın genel görünüşü (S. Tünk, CUBK-1MAVF-2) (a), çiçek (b), corolla (c), meyve (d), mericarp (e-g), tohum (h). Ölçek: 10 cm (a), 1 mm (b-h).*

Turkish name: Dikenli Yelpaze Yaprak

Flowering/Fruiting season: July-October

Examined material: South of Türkiye, Adana, Yakapınar, cotton field, 17 ix, S. Tünk, CUBK-1MAVF-2 (Çukurova University, Agricultural Faculty, Dept. of Plant Protection Herbarium)

As a new genus record for the flora of Türkiye. *Sida* can be easily distinguished from *Abutilon* by calyx and mericarp characteristics. The following identification key is proposed for these two genera distributed in Türkiye.

1. Epicalyx absent (Figure 2)
2. Mericarps 3-6 seeded ..... *Abutilon*
3. 2'. Mericarps 1 seeded ..... *Sida*
4. 1'. Epicalyx present the same as in Davis (1967:402)

Sida spinosa is clearly different from other *Sida* species by its erect habit, ovate leaves, cordate or subcordate leaf base, minute stellate hairy stem, spiny tubercles on petioles, 5 branched styles, 5 mericarps (Fryxell & Hill, 2015).

As conclusion, the number of *Malvaceae* genus increased by fifteen due to the new record of genus *Sida* in Türkiye.

DISCUSSION

Prickly sida (*Sida spinosa*) is not native to Türkiye. In summer crops in countries where it is present, this species is a problem due to its weedy characteristics. For this reason, many studies have been conducted on the biology of the plant, environmental requirements and its importance as weeds.

S. spinosa emerges in late spring and summer (Egley & Williams, 1991). It grows best under hot conditions (Teem et al., 1974). The optimal temperature range is 30-40°C, but light is not necessary for germination within that range. It germinates at depths above 5.0 cm (Baskin & Baskin, 1984; Smith et al., 1992). Less than 1% of this weed seeds remained viable after 5.5 years of burial (Egley & Chandler, 1983). It occurs most often in soils with a high P content (Korres et al., 2017). It grows better in soils with high K value than in low or medium soils (Hoveland et al., 1976). The growth of this species is significantly reduced to a pH of 5.2 and below (Teem et al., 1974; Buchanan et al., 1975). It prefers usually fertile loamy soil and poorly compacted, well-drained soils (Korres et al., 2017). It is able to maintain leaf function at higher water stress levels than other weeds and it was more efficient to use water than other C3 weeds (though not C4 weeds) (Patterson & Flint, 1983).

S. spinosa is a widespread broadleaf weed found in cotton, maize, peanut and soybean in the southern United States (Webster & Coble, 1997; Webster & Nichols, 2012). It is difficult to control these weeds in cotton (Buchanan, 1974a). It occurs all over the cotton belt of the USA and has been listed as one of the ten most troublesome weeds (Buchanan, 1974b). Seed cotton yields were not reduced in competition with *S. spinosa* for seven weeks or less after the emergence of cotton and were weed-free for the rest of the season. Cotton yields were unaffected when pure *Sida spinosa* stands were monitored for 5-6 weeks after cotton emerged and then allowed to grow uncontrolled for the rest of the season. In more severe treatments of weed competition, cotton height and the diameter of the main stem were reduced (Buchanan et al., 1977). The seed cotton yield was the most sensitive indicator of *S. spinosa* competition and the cotton yield reduced 40% at high population of this weed (Buchanan et al., 1977; 1978; 1980). The growth of prickly sida was significantly decreased in terms of the number of main stem nodes, primary, secondary and third branches, amount of seed capsules generated and dry mass under narrow row compared with wide row. However, plant height was not affected by the management system (Molin et al., 2004).

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Author's Contributions

The contribution of the authors is equal.

Statement of Conflict of Interest

The authors have declared no conflict of interest.

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