



Three new Malvaceae species to the flora of the United Arab Emirates

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ABSTRACT

In the United Arab Emirates (UAE), 7 species of the family Malvaceae have been described in the literature earlier. Here we reported three more species of the family that were found in different parts of the country. *Gossypium herbaceum*, a wild relative of cotton, was observed at 2 places in the emirate of Abu Dhabi. *Hibiscus trionum*, commonly known as flower-of-an-hour, was recorded on a roadside in Ajman, while *Sida spinosa*, a weedy plant, was noted at a farm in the mountainous region of Ras al Khaimah. The three taxa represent 30% of the Malvaceae species recorded in the UAE, which now stands at 10.

Key words: Abu Dhabi, Ajman, *Gossypium herbaceum*, *Hibiscus trionum*, Malvaceae, Ras al Khaimah, *Sida spinosa*

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INTRODUCTION

The Malvaceae generally called mallow or hibiscus family comprised of about 85 genera with some 1,500 species of herbs, shrubs and trees. A number of economically important members of the family include cotton, hibiscus and okra. The largest genus of the family is *Hibiscus* with 300 species followed by *Sida* and *Pavonia* having 200 and 164 species respectively.

The Malvaceae species are characterized by mucilaginous sap and stellate hairs. The leaves are simple, alternate and mostly palmately veined, while the flowers are bisexual and radially symmetrical. *Gossypium* is the only genus of the family that has toxic properties, while the other genera are considered to be fit for eating or medicinal use. In the United Arab Emirates, 7 species of the family that belong to 6 different genera have been reported (table-1) from its different regions (Jongbloed, 2003; Karim and Fawzi, 2007).

Table-1: The Malvaceae species recorded from the United Arab Emirates

S.N.	Species
1	<i>Abutilon pannosum</i> (Forst.f.) Schlecht.
2	<i>Althaea ludwigii</i> L.
3	<i>Hibiscus micranthus</i> L.f.
4	<i>Malvanicaeensis</i> All.
5	<i>Malvaparviflora</i> L.
6	<i>Pavonia arabica</i> Hochst. Ex Steud.
7	<i>Sida urens</i> L.

Gossypium is the cotton genus, which has about 50 species, found in arid and semiarid regions around the world (Wendel et al., 2009). The *Gossypium* species are very diverse, ranging from annual herb to perennial tree, though majority of them are shrubs. Most of the wild cottons are diploid, while five of the species, which are found in the Americas and the Pacific islands are tetraploids. In the Arabian Peninsula, which is mostly dry, 5 species of the genus have been reported from Oman, Qatar, Saudi Arabia and Yemen (Ghazanfar, 2003; Flora of Qatar online; Chaudhary, 1999; Wood, 1997).

Hibiscus is the largest genus of the Malvaceae family and most of its species are distributed in the warm-temperate, tropical and subtropical regions of the world. The genus comprised of both annual and perennial herbs along with shrubs and small trees. Many of its species with colorful flowers are used as ornamental shrubs. The flowers of some of its species are used to make tea in different countries of the world. In Arabia, around 28 species of the genus have been reported from Oman

(Ghazanfar, 2003), Qatar (Flora of Qatar online), Saudi Arabia (Chaudhary, 1999), UAE (Jongbloed, 2003; Karim & Fawzi, 2007) and Yemen (Wood, 1997).

Majority of the genus *Sida* species are found in the tropical and subtropical regions worldwide. Its species are mainly herbaceous, while some are shrubs and a few of them are trees. Many of its species have been used in traditional medicines for centuries in China, India and other countries of the world to treat various ailments (Dinda et al., 2015). About 9 species of the genus have been recorded from various Arabian Peninsula countries that include Oman (Ghazanfar, 2003), Qatar (Flora of Qatar online), Saudi Arabia (Chaudhary, 1999), UAE (Jongbloed, 2003) and Yemen (Wood, 1997).

MATERIALS AND METHODS

During 2014-16, several botanical explorations were carried out to different parts of the UAE for the documentation of its wild flora. For the location of the plant species, Garmin GPS 72H was used to record geographical coordinates. Data on the habitats and plant populations of the recorded taxa were also collected. Pertinent literature (Chaudhary, 1999) was used for the identification of the species.

RESULTS AND DISCUSSIONS

1. *Gossypium herbaceum* L. Sp. Pl. 2: 693. 1753 (Figs. 1, 2, 3 & 4)

Annual to perennial shrub, erect, 1-2 m tall, with or without hairs on stems and petioles. Leaves with petioles (2-6 cm) and stipules (3-15 mm); blades 3-7 lobed, 2-6 cm × 2-7 cm, upper surface glabrous, lower surface pubescent; lobes ovate to rounded, slightly contracted at the base; glands present on midribs. Flowers axillary, solitary, 1-2 cm long pedicels without glands. Epicalyx 3 segmented, 1-3 cm long, rounded or wedge shaped, 5-13 deeply toothed. Calyx cup shaped, 5 lobed, 5-10 mm long. Corolla yellow, pink or white, petals 2.0-3.5 cm long, obovate. Staminal tube 1 cm long. Stamens many, with short filaments and 1-celled anther. Carpel includes an ovary (3-5 valved), single style and an entire stigma with cleft. Capsule 2.5-3 cm long, sub-globose, surface smooth or slightly rough, beaked at apex, light brown to dark brown, 3-5 celled, with small number of oil glands. Each cell contains 5-11 seeds. Seeds dark brown to black, ovoid, covered with long, white lint or floss. Flowering: February to May

The origin of *Gossypium herbaceum* is considered to be semidry areas of the Middle East and sub-Saharan Africa. Commonly it is called Levant cotton. Though the species is cultivated in different parts of the world, it is also found as a wild species in the Arabian Peninsula (Flora of Qatar online) and southern Africa (Van Wyk and Gericke, 2000).

G. herbaceum in the UAE was found at 2 different places in the emirate of Abu Dhabi. At Al Faqa, 4 plants were growing outside a resident (24°20.571 N, 055°48.394 E), while 6 plants were observed on a roadside inside the village of Al Hayer (24°35.208 N, 055°44.790 E). The soil at both of the places was sandy. It is the first time that any species of the genus *Gossypium* has been recorded in the wild from the UAE, which brings the number of its documented Malvaceae genera to 7. In the Arabian Peninsula, the species has also been recorded from Oman (Ghazanfar, 2003), Qatar (Flora of Qatar online), Saudi Arabia (Chaudhary, 1999) and Yemen (Wood, 1997).



Figure 1. A *Gossypium herbaceum* plant growing at Al Hayer, Abu Dhabi



Figure 2. Flower of *Gossypium herbaceum*



Figure 3. Fruit (seed pod) of *Gossypium herbaceum*

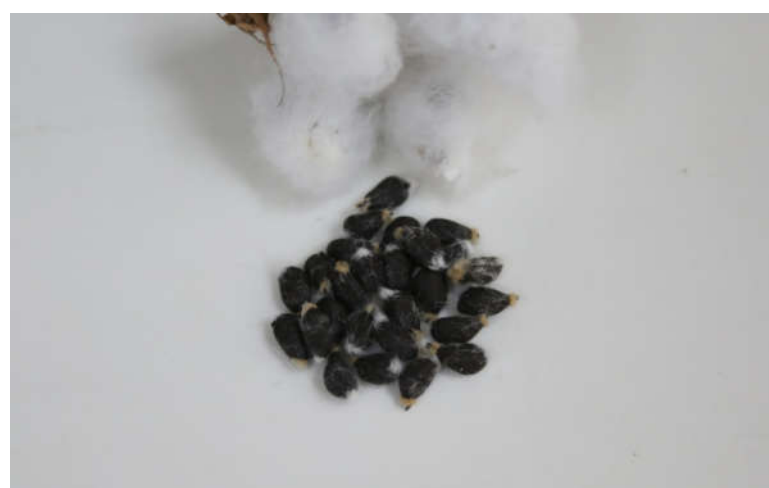


Figure 4. Seeds of *Gossypium herbaceum*

2. *Hibiscus trionum* L.Sp. Pl. 2: 697 1753 (Figs. 5 & 6)

Annual herb, erect or prostrate, branched, 20-70 cm, stems slender. Stipule 5-7 mm, filiform, pubescent; petiole 2-4 cm long, stellate hairs; leaf blade 3-5 lobed, middle lobe longer (5-7 cm long), lateral lobes shorter (3-3 cm long), dimorphic, glabrous or sparsely hirsute. Flowers axillary, solitary, 1.5-3 cm across; pedicel 2-2.5 cm, at fruiting elongated to 4.5 cm, stellate pubescent. Epicalyx 7-12

segmented, filiform, 5-15 mm long, connate at base, pubescent. Calyx greenish, 1-3 cm long. Corolla pale yellow with purple center; petals 5, obovate, 1-2 × 0.5-1.5 cm. Staminal column 3-5 mm long, purple; filament slim; anthers yellow. Ovary ovoid, 4 mm long, densely hirsute; styles 5, glabrous, connate at middle. Capsules oblong to globose, 1-1.5 × 0.5-1.2 cm, coarsely pubescent; mericarp 5. Seeds black, 2 mm across, reniform. Flowering: February to April

The native range of *Hibiscus trionum* is the tropics, subtropics and warm temperate regions of the Old world. Commonly it is known as flower-of-an-hour or bladder hibiscus. In the Arabian Peninsula, the species has been reported from Oman (Ghazanfar, 2003), Qatar (Flora of Qatar online), Saudi Arabia (Chaudhary, 1999) and Yemen (Wood, 1997). In many parts of the world, where it has been introduced as an ornamental, the plant has become weed of the agricultural lands there.

In the UAE, the species was spotted for the first time by the authors during a botanical expedition on a roadside in the emirate of Ajamn (25°21.551 N, 055°30.989 E), where only two of its plants were growing on sandy soil. It is the second species of the genus *Hibiscus* that have been recorded from the country. The other species, *H. micranthus* L.f. is found in the emirates of Abu Dhabi, Fujairah and Ras Al Khaimah (Western, 1987; Jongbloed, 2003; Karim and Fawzi, 2007).



Figure 5. A plant of *Hibiscus trionum* near a roadside in the emirate of Ajman



Figure 6. Fruit and seeds of *Hibiscus trionum*

3. *Sida spinosa* L. Sp. Pl. 2: 683.1753. (Figs 7, 8 & 9)

Annual or perennial undershrub, many branches, erect, 30-100 cm tall, stellate hirsute; main nodes with 2-3 thorns. Stipules 2-5 mm long; petioles 2-20 mm long; leaves alternate, lanceolate to ovate, rounded at base, acute at apex, serrated margins; blades 1-4 × 0.5-2.5 cm. Flowers axillary, solitary or in clusters of 2-5 on axillary shoots; pedicels 2-5 mm long, elongated to 2 cm during

fruiting. No epicalyx. Calyx campanulate, 4-5 x 3-5 mm; lobes triangular, 1-2 mm long. Corolla white or yellowish white, longer than calyx, petals obovate, rounded or emarginated at apex, 4-6 x 2-3 mm, glabrous. Staminal tube 1-2 mm long, glabrous, with anther at apex. Ovary ovoid; stigmas purple, globose; styles 5. Fruit depressed globular, 2-5 mm long, pubescent at apex, membranous, enclosed in calyx; mericarps 5, trigonous with 2 divergent awns. Seeds brown to black, ovoid, 1-1.5 mm long, no hairs. Flowering: February to July

The origin of *Sida spinosa* is South America, elsewhere it had been introduced and has become weed in the agriculture lands of those regions. Generally, the species is called prickly fanpetals. In the Arabian Peninsula, the species has been recorded in different countries including Qatar (Flora of Qatar online), Oman (Ghazanfar, 2003) and Saudi Arabia (Chaudhary, 1999).

Sida spinosa was observed and subsequently recorded by the authors in a farmland of wadi Baih in the emirate of Ras al Khaimah (25°47.731 N, 056°05.155 E). Around 25 plants were growing at different places inside a relatively large agriculture farm. The soil type of the place was sandy loam. It is the second species of the genus *Sida* that has been documented from the UAE. *S. urens* L. is the other species of the genus, which has earlier been reported from the Hajar Mountains of the country (Jongbloed, 2003).

The species grows well in arid and hot regions of the world and poses a threat as a weed to agriculture farms, meadows and wastelands (Haselwood and Motter, 1983). In the UAE, *S. spinosa* was also found growing in a farm as a weed. The climate in most of the country is suitable for its growth and it may become agricultural weed as well as an invasive species that could be harmful to the local flora.



Figure 7. A *Sida spinosa* plant growing at a farm in Ras al Khaimah



Figure 8. Leaves and buds of *Sida spinosa*

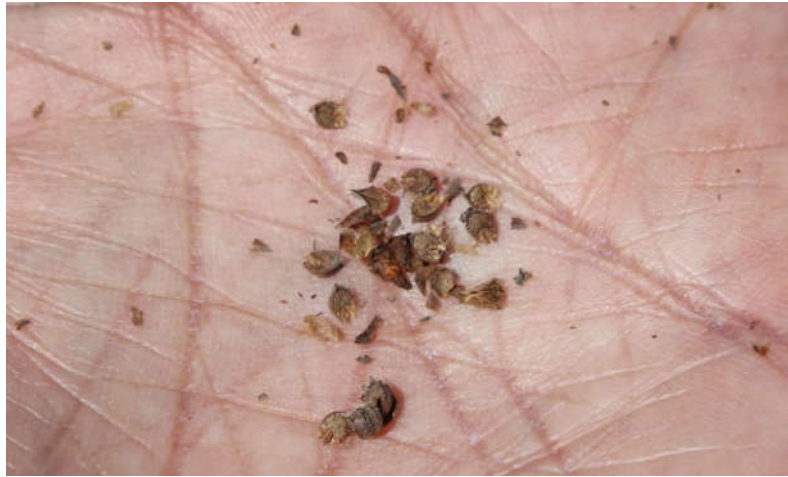


Figure 9. Seeds of *Sida spinosa*

CONCLUSION

In past, different studies reported the presence of 7 species of the family Malvaceae in the UAE (table-1). With the documentation of the three species, the number of the reported Malvaceae taxa in the UAE is 10 now. The increase in the documented species of the family found in the country is 30%. Two of the newly reported species, *Gossypium herbaceum* and *Hibiscus trionum* are native to the UAE; while *Sida spinosa* seems to be introduced in the country. *S. spinosa* being alien species, needs to be studied in detail to see its effect on agricultural as well as native flora in the country.

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