Journal on New Biological Reports
JNBR 5(3) 114 – 121 (2016)

ISSN 2319 – 1104 (Online)

Published by
www.researchtrend.net

New Records of three Convolvulaceae Species to the Flora of the United Arab Emirates

Mohammad Shahid and N.K. Rao

International Center for Biosaline Agriculture, P.O. Box 14660, Dubai, UAE

***Corresponding author**: m.shahid@biosaline.org.ae

| **Received**: 17 July 2016 | **Accepted**: 30 September 2016 |

ABSTRACT

Three species which belong to 3 different genera of the family Convolvulaceae were documented for the first time from various regions of the United Arab Emirates (UAE). *Convolvulus fatmensis*, a medicinal plant, was found at three farms in wadi Ghalilah of Ras al Khaimah emirate. *Cuscuta pedicellata*, a parasitic species, was recorded in an agriculture farm of wadi Baih in the mountainous area of Ras al Khaimah. Three of *C. pedicellata*'s host plant species, *Convolvulus arvensis*, *Cyperus rotundus* and *Allium cepa*, were also identified. *Ipomoea eriocarpa*, commonly known as tiny morning glory, was observed at Dhaid, a town in Sharjah emirate. The newly recorded taxa represent more than 15% of the documented Convolvulaceae species found in the UAE.

Key Words: Convolvulaceae, *Convolvulus fatmensis*, *Cuscuta pedicellata*, *Ipomoea eriocarpa*, Sharjah, Ras al Khaimah.

INTRODUCTION

The Convolvulaceae commonly called morning glory or bindweed family is comprised of 85 genera represented by about 2,800 species. The family is distributed primarily in the tropical and sub-tropical regions around the world. Though most species of the family are herbaceous vines, it also includes herbs, shrubs and trees. The family has typical funnel-shaped flowers with 5 sepals and 5 fused petals. The stems are generally winding with milky sap, whereas the leaves are simple and alternate without stipules. Several of its species are used as food, while many other have different medicinal values. Various members of the family serve as ornamentals for their bright colors flowers, however many are problematic weeds in the farmlands. In the UAE, 16 species of the Convolvulaceae have been documented from its various regions by different authors (Western, 1987; Jongbloed, 2003; Karim and Fawzi, 2007)

The genus *Convolvulus* is comprised of 190-200 species which are mostly found in the temperate zones, though they are distributed worldwide (Cairns and Robba, 2010; Wood et. al., 2015). More than 115 of its species are found in the Mediterranean regions, near East and Macaronesia (Sa'ad, 1967). Many of its species, which are climbing and creeping, are weedy in nature and difficult to control. Around 25 *Convolvulus* species have been reported from different countries of the Arabian Peninsula, whereas 9 of them have been

documented in the UAE (Western, 1987; Jongbloed, 2003; Karim and Fawzi, 2007).

Cuscuta, generally called dodder, is a genus of around 127 species found in the temperate and tropical regions of the world, however majority of them are native to the tropics and subtropics. In past, it was classified as the only genus of the Cuscutaceae family, but now it is accepted as a taxon of the Convolvulaceae (Stefanovic' and Olmstead, 2004). The genus comprised of parasitic plants that have thin stems and tiny scale like leaves with very small amount of chlorophyll. The genus *Cuscuta* is a parasite on a very broad range of agricultural and horticultural crops as well as wild plant species including alfalfa, flax, clover, potatoes, chrysanthemum, dahlia, jujube, and many others. In Arabia 5 species of the genus have been reported from its different countries, while a single *Cuscuta* species was documented from the UAE (Jongbloed, 2003; Karim and Fawzi, 2007).

Ipomoea is the largest genus of the Convolvulaceae with more than 500 species found in the temperate, subtropical and tropical regions around the world. The genus comprises of annual and perennial herbaceous plants (mostly creeping or climbing vines) as well as shrubs and small trees. Many of its species with colorful flowers are used as ornamental plants, while tubers of *Ipomoea batatas* (sweet potatoes) and leaves of *I. aquatica* (water spinach) are used as food on large scale in various countries of the world. About 19 species of the genus have been reported from various parts of the Arabian Peninsula, however only one species was documented from the UAE (Jongbloed, 2003; Karim and Fawzi, 2007.

MATERIAL AND METHODS

During 2014-16, several botanical expeditions were carried through different regions of the UAE to record its wild flora, especially the undocumented ones. For geographical coordinates of the documented plant species, Garmin GPS 72H was used. Data on the plant populations and the habitats of the recoded taxa were also collected. For the identification of the species, relevant literature (Chaudhary, 2001) was used.

RESULTS AND DISCUSSIONS

1. ***Convolvulus fatmensis*** Kunze, Flora 23(1):172. 1840 (Figs. 1,2 & 3)

Perennial herb, prostrate, much branched at base; stems sparingly hirsute, 20-50 cm long. Leaves oblong or ovate, sagittate-cordate at base, margins deeply crenate, 15-35 x 10-20 mm, hairless or hirsute; petioles 7-20 mm long. Inflorescence 1-3 flowered cyme; peduncles 0.5-1 cm long. Bracts leafy, minute; bracteoles 2-5 x 0.2-0.5 mm, filiform. External sepals obovate, 4-6 x 2-3.5 mm, thickly hirsute; inner sepals obtuse, glabrous, 3-4 x 2-3 mm. Petals white to pink, 5-10 mm long, pubescent outside. Stamens 3-4 mm; filaments with glands; anther yellow, oblong. Ovary hairless, ovoid, disc at base; styles glabrous, filiform, 2-3 mm long; stigma filiform, 1.5-2.5 mm long. Seeds hairless, black, ovoid, smooth. Flowering February to May.

The native range of *Convolvulus fatmensis* is North Africa and West Asia. In the Arabian Peninsula, the species has been recorded in Qatar (Abdel-Bary, 2012), Oman (Ghazanfar, 1992), Saudi Arabia (Chaudhary, 2001) and Yemen (Wood, 1997). The species has medicinal values to cure gastric-ulcer (Atta et al. 2007; Ali et al., 2013) and it also possesses antioxidant and anti-inflammatory properties (Awaad et al., 2011).

In the UAE, *C. fatmensis* was observed and documented for the first time by the authors at wadi Ghalilah (25°58.621 N, 056°09.057 E), in the mountainous region of Ras al Khaimah emirate. The species was observed at 3 different sites in the wadi, where it was growing in the fallow agriculture farms that were fenced to stop grazing animals, especially goats, from entering. The soil type of the area was loamy sand. As nine species of the genus *Convolvulus* have earlier been reported from the UAE, therefore *C. fatmensis* is the tenth species of the genus that has been documented from the country.

C. fatmensis needs special attention in the UAE, as it was found only in the fenced farms, where the plant species was growing quite profusely. Outside the farms there were many goats (*Capra hircus*) grazing on all kinds of edible plants and spare only poisonous flora like *Tephrosia apollinea*, which was the most abundant plant species in the area. No other grazing mammal was seen in the area. The situation points out the severity of the threat to the native flora of the region by the goats. Different studies have shown that goats eat most plant species in pastoral areas and regularly devour vegetation that is shunned by other grazing animals (Parkes, 1999). Decline in plant species number leads to the crash of ecological mechanisms, which is the ultimate cause of the biodiversity degradation.

2. ***Cuscuta pedicellata*** **Ledeb**., Fl. Altaic. 1: 293, 1829. (Figs. 4, 5, 6 & 7)

Annual parasitic vine, much branched; stems filiform, 2-5 mm in diameter, pale yellow to yellowish red, glabrous. Scales minute, acute, ovate. Inflorescence cymose, 4-10 mm wide, with 4-9 flowers. Flowers tetramerous to pentamerous, pedunculate; pedicel 0.5-1.2 mm long; bracts 1 x 0.5 mm, ovate. Calyx 4-5 lobed, whitish green, ovate, entire, smooth, 1 x 0.8 mm, erect, shorter than corolla, fused at base. Corolla yellowish white, 1.5-2 mm long, ovate to sub-ovate, entire, 4-5

petals, fused at base. Stamens 4-5, epipetalous, 0.5-0.7 mm long; filaments 0.3-0.5 mm long, flat; anthers ovoid, 0.2 mm across, yellow. Scales oblong, 0.7-1 mm, entire, converge over ovary, fimbriated. Ovary whitish green, globular, glabrous, with 2 cells and 4 ovules; Ovules green, 0.5-1 mm across; styles slight; stigmas subulate. Capsules glabrous, sub-globose, 2-2.5 mm long. Seeds ovoid, 1-1.5 mm long. Flowering: February to May

Cuscuta pedicellata is widely distributed in the North Africa and Asia. It is parasitic plant on berseem (*Trifolium alexandrinum*), a fodder crop and golden dewdrop (*Duranta erecta*), an ornamental (Mukhtar et al., 2012). The species have been reported from Qatar (Abdel-Bary, 2012) and Saudi Arabia (Chaudhary, 2001) in the Arabian Peninsula. Different researches have revealed the anti-obesity (Zekry et al., 2015) and antibacterial (Ali et al., 2014) properties of the plant.

In the UAE, *C. pedicellata* was found in an agriculture farm at wadi Baih (25°47.951 N, 056°05.173 E) of Ras al Khaimah, where it was parasitizing mostly on field bindweed (*Convolvulus arvensis*) and to some extent on nut grass (*Cyperus rotundus*) and onion (*Allium cepa*) plants (Figs. 4, 5 & 6). The soil of the farm was loamy sand. It is the first time that the parasitic species was observed in the UAE and it is the second species of the genus *Cuscuta* that has been reported from the country. The other species is *C. planiflora* which is widespread in the emirates of Fujairah, Ras al Khaimah, Sharjah and parts of Abu Dhabi (Jongbloed, 2003).

Fig. 1. *Convolvulus fatmensis* growing in a farm in wadi Ghalilah, Ras al Khaimah.

Fig. 2. Flower of *Convolvulus fatmensis*.

Fig. 3. Capsule (fruit) of *Convolvulus fatmensis.*

Fig. 4. *Cuscuta pedicellata* parasitizing on *Convolvulus arvensis* at wadi Baih, Ras al Khaimah.

Fig. 5. *Cuscuta pedicellata* growing on *Cyperus rotundus*.

3. ***Ipomoea eriocarpa*** **R. Br.** Prodr. 484 1810. (Figs. 8 & 9)
Annual herb, prostrate or twining; stems 1-2 m long, pubescent or hispid. Leaves alternate, simple; petiole 1-4 cm long; blades linear-lanceolate to ovate or lanceolate to oblong, base cordate, 4-10 x 1.5-3.5 cm, hirsute on both surfaces. Inflorescence axillary, 1 to many flowers in sessile or short pedunculated cymes; peduncle 5-7 mm long.

Flowers small, regular, bisexual, 5-merous; pedicel 3-5 mm long. Bracts petite, subulate, 3-8 mm long. Sepals linear acuminate, base ovate, upper half greenish white, densely pubescent; inner sepals ovate, 4.5-5 x 1.5-2 mm; outer sepals ovate to lanceolate, 5-6 x 2-2.5 mm. Corolla tubular or bell-shaped, somewhat longer than sepals, 6-7 x 2.5-3 mm, pink, purple or white with dark center, opens morning time, outer side hirsute. Stamens dilated, lower side hairy; anthers acute, sagittate. Ovary pubescent, ovate, 2 celled, 1-1.5 mm long. Capsules hirsute, globose to ovoid, 5-7 mm diameter; sepals persistent at base. Seeds glabrous, trigonal, black, 3-4 x 2-2.5 mm. Flowering: February to April.

Fig. 6. Onion (*Allium cepa*) as host of parasitic *Cuscuta pedicellata*

Fig. 7. Flowers and capsules (fruits) of *Cuscuta pedicellata*.

Fig. 8. *Ipomoea eriocarpa* plant growing at Dhaid, Ras al Khaimah.

Fig. 9. Flower of *Ipomoea eriocarpa*

The natural range of *Ipomoea eriocarpa* is the tropical and subtropical regions of Africa, Asia and Australia. In Arabia, the species has been reported form Oman (Ghazanfar, 1992), Saudi Arabia (Chaudhary, 2001) and Yemen (Wood, 1997). In many parts of India, it is cultivated as a

fodder crop. Its leaves are used as vegetable in India and Africa. The plant is also used in traditional medicines to cure pain, arthritis, Hansen's disease, seizers, sores and fever in various countries of the world.

I. eriocarpa was noted for the first time in the UAE at Dhaid (25°16.376 N, 055°55.831 E), a town in the emirate of Sharjah. About 7 of is plants were growing in the date palm tree pits in a farm, where the soil was loamy sand. From the UAE, 4 species of the genus *Ipomoea* have earlier been reported from its different regions (Jongbloed, 2003; Karim and Fawzi, 2007) and with the documentation of *I. eriocarpa*, the number of its reported species are 5. The species is rare in the country as it was found only at one place.

CONCLUSIONS

- In past, 16 of the Convolvulaceae species have been documented from the UAE. With the report of the 3 more species, there is more than 15% increase in their number, which now stands at 19.
- All the three species have some medicinal properties, while *Ipomoea eriocarpa* can also be used as food and feed.
- These species are rare in the UAE and based on their importance they need to be protected.

REFERENCES

Abdel-Bary EM. 2012. The flora of Qatar. Vol. 1. Environment Studies Center, Qatar University, Doha, Qatar.

Ali A, Haider MA, Hanif S, and Akhtar, N. 2014. Assessment of the antibacterial activity of *Cuscuta pedicellata* Ledeb. African J Biotech. 13(3): 430-433

Ali M, Qadir MI, Saleem M, Janbaz KH, Gul H, Hussain L and Ahmad B. 2013. Hepatoprotective potential of *Convolvulus arvensis* against paracetamol-induced hepatotoxicity. Bangladesh J Pharmacol. 8: 300-304.

Atta AH, Mohamed NH, Naser SM and Mouneir SM. 2007. Phytochemical andpharmacological studies on *Convolvulus fatmensis* Ktze. J Natural Rem. 7: 109-119.

Awaad AS, El-Meligy RM, Kenawy SA, Atta AH and Sloiman GA. 2011. Anti-inflammatory, antinociceptive and antipyretic effects of some desert plants. J. S. Chem. Soc. 15: 367–373

Carine MA and Robba L. 2010. Taxonomy and evolution of the *Convolvulus sabatius* complex (Convolvulaceae). Phytotaxa 14: 1-21

Chaudhary SA. 2001. Flora of the Kingdom of Saudi Arabia illustrated. Vol. 2 (2). NationalAgriculture and Water Research Center, Riyadh, Saudi Arabia.

Ghazanfar SA. 1992. An annotated catalogue of the vascular plants of Oman and theirvernacular names. Vol. 2. National Botanic Garden of Belgium, Meise, Belgium.

Jongbloed M. 2003. The comprehensive guide to the wild flowers of the United ArabEmirates. Environmental Research and Wildlife Development Agency, Abu Dhabi, UAE.

Karim FM and Fawzi NM. 2007. Flora of the United Arab Emirates. Vol. 1. United Arab Emirates University, Al Ain, UAE.

Mukhtar I, Khokhar I and Mushtaq S. 2012. *Cuscuta pedicellata* (Convolvulaceae) A new parasitic weed recoded from Pakistan. Sci. Res. 18(4): 485-493

Parkes J, Henzell R and Pickles G .1999. Managing Vertebrate Pests: Feral Goats. AustralianGovernment Publishing Service, Canberra, Australia.

Sa'ad F. 1967. The Convolvulus Species of the Canary Islands, the Meditteranean Regionand the Near and Middle East. Bronder-Offset. Rotterdam, Netherlands.

Stefanovic' S. and Olmstead RG. 2004. Testing the phylogenetic position of a parasitic plant (*Cuscuta*, Convolvulaceae, Asteridae): Bayesian inference and the parametric bootstrap on data drawn from three genomes. Syst Biol 53(3): 384–399 doi:10.1080/10635150490445896

Western AR. 1989. The flora of the United Arab Emirates: An introduction. United Arab Emirates University, Al Ain, UAE.

Wood, JRI. 1997. A handbook of the Yemen flora. Royal Botanic Gardens, Kew, UK.

Wood JRI, Williams BRM, Mitchell TC, Carine MA, Harris DJ and Scotland RW. 2015. A foundation monograph of *Convolvulus* L. (Convolvulaceae). PhytoKeys 51: 1-278 doi: 10.3897/phytokeys.51.7104

Zekry SH., Abo-elmatty, DM, Zayed, RA, Radwan, MM, ElSohly, MA, Hassanean, HA and Ahmed SA. 2015. Effect of metabolites isolated from *Cuscuta pedicellata* on high fat diet-fed rats. Medicinal Chemistry Research 24(5): 1964-1973.