

New Flowering Plant Species Records for the United Arab Emirates

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Abstract

Six wild plant species not previously documented in the United Arab Emirates are presented. *Iphiona mucronata* (Asteraceae) was observed at Dibba, on the UAE East Coast. *Arenaria deflexa*, which belongs to the family Caryophyllaceae was found in Wadi Ghailah (Ra's al-Khaimah). *Chenopodium carinatum* (Chenopodiaceae) was found in Al Ain. One of the Fabaceae species, *Medicago lupulina*, was identified at the International Centre for Biosaline Agriculture (ICBA) in Dubai. The Cyperaceae species *Cyperus longus* was spotted at Ruwayya, Dubai, while *Eleusine indica*, a species of the Poaceae family, was also found in Wadi Ghailah. Five of the reported species are native, while *C. carinatum* has been introduced.



Fig. 1 An *Arenaria deflexa* flower

Introduction

The United Arab Emirates (UAE) has a diverse wild flora, inhabiting a range of different habitats. Work by many researchers had described a total of around 810 by the end of 2015 (Shahid and Rao, 2015). In 2016, researchers have reported more previously undocumented wild species from the UAE (El-Keblawy *et al.*, 2016; Mahmoud, *et al.*, 2016; Shahid and Rao, 2016) bringing the number of described plant taxa from the UAE to about 820.

That part of the Hajar mountain which lies in the UAE is rich in wild plant species (Western, 1989; Jongbloed, 2013), but, due to the nature of the terrain, it is difficult to explore thoroughly, particularly at higher altitudes. Further undocumented species may be present here, as well as in other parts of the country. Continued research to identify introduced species is also of importance.

The Plant Genetics Resources laboratory of International Center for Biosaline Agriculture (ICBA) has been working to document the wild flora of the UAE since 2012 with over 20 previously unrecorded species being identified (Shahid, 2014; Shahid and

Rao, 2014; Shahid and Rao, 2014a; Shahid and Rao, 2015; Shahid and Rao, 2015a; Shahid and Rao, 2015b; Shahid and Rao, 2016).

Materials and Methods

During 2014-16, many botanical expeditions were undertaken in various parts of the UAE to document the local wild flora. A Garmin GPS 72H was used to record the geographical co-ordinates of the plants while data on the habitats and plant populations were also recorded. For species identification, pertinent literature (Chaudhary, 1989; Chaudhary, 1999; Chaudhary, 2000; Chaudhary, 2001; Chaudhary, 2001a) was used.

Results and Discussions

1. *Arenaria deflexa* Decne, Ann. Sci. Nat., Bot. II, 3: 277. 1834 (Figs. 1, 2, 3)

A perennial herb; stems tufted, hairy, slight, prostrate to semi-erect, 15-30 cm long, form mats



Fig. 2 *Arenaria deflexa* plants growing in a farm at Wadi Ghalilah, Ra's al-Khaimah



Fig. 3 An *Arenaria deflexa* plant

frequently. Leaves ovate-elliptic, sessile or 1-3 mm petiole, glandular-hirsute, acute, 0.3-1.5 x 0.2-.6 cm. Flowers in lax dichasial cymes, pedicel 2-7 mm long. Bracts petite, linear lanceolate. Sepals 2-5 mm, narrowly lanceolate, acuminate, scarious-margined. Petals white, 3-5 mm long, entire or retuse, oblong-linear. Capsules 3-4 mm, conical or flask-shaped. Seeds 0.5-0.7 mm long, covered with tubercles. Flowering February to May.

The natural range of *Arenaria deflexa* is the eastern Mediterranean countries, including Greece, Turkey, Lebanon, Syria, Israel, Jordan and Egypt. It has also been reported from Saudi Arabia (Chaudhary, 1999).

From the UAE, the species was recorded for the first time in Wadi Ghalilah (25°58.919 N, 056°08.658 E), a mountainous area in the emirate of Ra's al-Khaimah, where it was found at three different locations. This Caryophyllaceae has also been reported from Saudi Arabia. *A. serpyllifolia* is another species of the genus *Arenaria* found in the UAE.

2. ***Chenopodium carinatum* R.Br.**, Prodr. Fl. Nov. Holl. 407. 1810 (Figs. 4, 5)

Annual herb. Stems prostrate to erect, much branched near base, aromatic, pubescent, 20-50 cm, glandular, glands sessile or stalked. Leaves alternate, ovate to elliptic, 0.25-3 x 0.2-2 cm, somewhat smaller in inflorescence, slightly lobbed to coarsely serrated, glandular on both surfaces, upper surface pubescent, hairs along veins on lower surface. Inflorescence few to many flowered, lateral cymes or glomerules, 1.0-2.5 mm diam., bracts leaf like, 3-5 mm, elliptic, apex blunt, margins crenate-dentate; perianth 5, greenish, erect, hirsute, glandular, 0.5-0.75 x 0.2.0.3 mm, sessile or sub-sessile; stamens 0-1, stigma 2. Fruit ovoid, somewhat ridged. Seeds reddish brown to black, often keeled, ovoid, smooth surface, glossy, 0.5-7 x 0.5-6 mm. Flowering March-May.

Chenopodium carinatum is native to Australia, elsewhere it has been introduced as a weed. In the



Fig. 4 *Chenopodium carinatum* plants on a roadside in Al Ain



Fig. 5 Leaves and inflorescences of *Chenopodium carinatum*

Arabian Peninsula, it has also been recorded in Saudi Arabia (Chaudhary, 1999).

In the UAE, the species was noted by the authors at a single place in the city of Al Ain (24°13.096 N, 055°45.551E). It was found on an irrigated sandy soil along a roadside, where around 5 plants were growing close to one another. Apart from *C. carinatum*, *C. album* and *C. Murale* are other members of the genus *Chenopodium* to have been recorded from the UAE.

3. *Cyperus longus* L., Sp. Pl. 41. 1753 (Figs. 6, 7)

Perennial sedge, erect, 60-100 cm tall. Rhizome ligneous having short stolons. Culms 50-100 cm long, flat, triangular. Leaves shorter than culms, lamina smooth, 35-45 x 0.5-0.7 cm, keeled. Inflorescence relatively lax composite anthelidium; bracts flat, leaf like, 3-6, different in length, longer surpassing the inflorescence. Primary pedunculate rays many, dissimilar, all with cluster of 5-15 spikelets at their tips. Spikelets slender, with several flowers, 10-20 mm long, 1-1.5 mm wide. Glumes 2-3 mm long, boat shaped, obtuse, pale brown with wide yellow margin, keeled. Stamens 3; stigma 3. Fruit trigonal, 0.8-1 mm long, oblong.

Cyperus longus is native to the Old World where it is found in various parts of Africa, Asia and Europe. In Arabia, it has been documented from Oman (Ghazanfar, 1992), Saudi Arabia (Chaudhary, 2001a) and Yemen (1997).

The species was observed at Ruwayya (25°05.346 N, 055°23.412 E), an area of Dubai. Around 15 plants were growing in two tree pits that were regularly provided with irrigation water. Six taxa of the genus *Cyperus* have already been documented from the UAE, *C. longus* being the seventh.



Fig. 6 *Cyperus longus* plants in a tree pit at Ruwayya, Dubai

4. *Eleusine indica* L. Sp. Pl. 41. 1753 (Figs. 8, 9, 10)

Annual, caespitose, much branched at base, tufted, 25-70 cm tall, culms ascending or prostrate, slender, smooth, green, glabrous and rather flattened, mostly covered by sheaths. Most leaves at the base of culms; leaf sheaths loosely cover culms, relatively flattened, largely hairless, light to medium green, veined; leaf blades 20-25 cm long, 5-8 mm wide, medium to dark green, mostly glabrous, margins with infrequent curved hairs, keeled. Ligules white, membranous. Inflorescence comprised of 1-10 racemes, which are digital, 3-15 cm long, 2.5-3.5 mm wide; rachis depressed, wingless. Spikelets solitary, sessile, compressed, elliptic, 3-5 mm long; each spikelet has 3-9 fertile florets. Glumes persistent; higher glumes elliptic, 1.5-3.0 x .5-1.0 mm; lower glumes lanceolate, 1-2.5 x 0.5-0.8 mm, veined, keeled, keel with wing. Lemma lanceolate, somewhat acute, 2-3.5 mm long, 3-veined, apex acute. Palea 2-veined. Pericarp persistent, loose, membranous, surrounding the seeds. Fruits trigonal, ellipsoid, 1-1.5 mm long, black, covered by encircled florets. Flowering February to May.

The natural distribution of *Eleusine indica* includes much of Africa and Asia as well as parts of southern



Fig. 7 Inflorescences of *Cyperus longus*



Fig. 8 *Eleusine indica* plants in a fenced fallow farm at Wadi Ghalilah, Ra's al-Khaimah



Fig. 9 Young *Eleusine indica* plants



Fig. 10 Inflorescence of *Eleusine indica*



Fig. 11 An *Iphiona mucronata* plant in gravel soil at Dibba, Fujairah

Europe. It has been introduced in North America and elsewhere. In the Arabian Peninsula, it has been documented from Oman (Ghazanfar, 1992, Qatar (Flora of Qatar online), Saudi Arabia (Chaudhary, 1989) and Yemen (Wood, 1997).

In the UAE, the species was found in two fenced and fallow farms in Wadi Ghalilah (25°58.631 N, 056°09.061 E), Ra's al-Khaimah. More than 50 plants of the grass were present. Two other species (*E. compressa* and *E. coracana*) of the genus *Eleusine* have been previously documented in the country (Jongbloed 2003; Karim and Fawzi, 2007).

5. *Iphiona mucronata* (Forssk.) Asch. & Schweinf., Mém. Inst. Egypt. 2: 86. 1887 (Figs. 11, 12)

An annual herb. Stems sulcate, intricately branched, rigid, 25-50 cm long, glabrous, young shoots glandular, glands sessile. Leaves subulate, stiff, sessile, with spines, entire or with 1-5 spinescent lobes on both sides in basal half. Capitulas light yellow, solitary, with long peduncles, terminal, arranged in loose cymes. Involucral conical or cylindrical. Involucral bracts mucronate, hairless, obtuse, narrowly thin-margined. Fruit (achene) ridged, heavily pubescent, 2-2.5 mm long, with many pappi of various sizes, usually twice the length of achene. Flowering February to April.

Iphiona mucronata has been reported from areas in and around the Sinai Peninsula (Egypt) including Palestine, Israel, Jordan and north-western Saudi Arabia.

The species was observed growing on gravel soil at Dibba (25°35.801 N, 056°15.075 E), on the East Coast of the UAE, far from what is considered to be its natural range.

6. *Medicago lupulina* L. Sp. Pl. 41. 1753 (Figs. 13, 14, 15)

Annual to short lived perennial herb. Stems ascending to prostrate, 10-25 cm long, hirsute. Leaves alternate, composed (trifoliate), petiolate; petiole 2-2.5 cm long; stipules ovate-lanceolate, entire or dentate,



Fig. 12 *Iphiona mucronata* flower



Fig. 13 A *Medicago lupulina* plant



Fig. 14 Flowers of *Medicago lupulina*



Fig. 15 Pods and inflorescences of *Medicago lupulina*

Table-1. Information on the six previously undocumented plant species found in different parts of the United Arab Emirates

S.N.	Species	Family	Place	Emirate	GPS Coordinates	
					N	E
1	<i>Arenaria deflexa</i> Decne	Caryophyllaceae	Wadi Ghalilah	Ra's al-Khaimah	25°58.919	056°08.658
2	<i>Chenopodium carinatum</i>	Chenopodiaceae	Al Ain	Abu Dhabi	24°13.096	055°45.551
3	<i>Cyperus longus</i>	Cyperaceae	Ruwayya	Dubai	25°05.346	055°23.412
4	<i>Eleusine indica</i>	Graminae	Wadi Ghalilah	Ra's al-Khaimah	25°58.631	056°09.061
5	<i>Iphiona mucronata</i>	Asteraceae	Dibba	Fujairah	25°35.801	056°15.075
6	<i>Medicago lupulina</i>	Leguminosae	ICBA	Dubai	25°05.798	055°23.413

pointed. Leaflets obovate to elliptic, 3-18 mm long, 3-9 mm wide, pubescent, upper half serrate, apiculate. Inflorescence axillary, racemes pedunculate, peduncle 2-4 cm long, compact, 10-50 flowers. Bracts 0.3-0.5 mm long. Pedicels 0.5-1 mm long. Calyx hirsute, 1-1.5 mm, serrate, teeth equal or longer than tube. Corolla yellow, 2-4 mm long. Pods kidney shaped, reticulate, hairy to glabrous, black at maturity, 2-3 mm long, 1-seeded. Seeds brown or yellow, 1-2 mm long. Flowering February to April.

The range of *Medicago lupulina* covers Europe, North Africa and West and South Asia. It has been recorded from Saudi Arabia (Chaudhary, 2001) and Yemen (Wood, 1997).

The species was located at the International Centre for Biosaline Agriculture, ICBA (25°05.798 N, 055°23.413 E) Dubai, where about five plants were growing on sandy soil in an irrigated field. Three other *Medicago* species have already been described from

different parts of the country (Jongbloed, 2003; Karim and Fawzi, 2007), making *M. lupulina* the fourth species of the genus to be found in the UAE.

Conclusions

Four of the six newly-recorded plant species (Table-1) were found only at a single location, making them rare in the UAE. With the exception of *Chenopodium carinatum*, all the other reported taxa may occur naturally, while *C. carinatum* may have been accidentally introduced.

Arenaria deflexa and *Eleusine indica* were both observed in Wadi Ghalilah, Ra's al-Khaimah. Both were growing inside farms surrounded by fences, thus protected by grazing from goats (*Capra hircus*), which were common outside the fences. *A. deflexa* was found at 3 various three farms, while *E. indica* was seen at two different locations. The two species and

other palatable wild flora were not seen growing outside the fenced farms probably due to the presence of goats, where another species, *Tephrosia apollinea*, was growing extensively. *T. apollinea* is toxic to goats (Suliman *et al.*, 1982) and other grazing animals..

The authors noted more than 30 wild plant species in the enclosed farms, which were not present around or near the farmhouses, outside the fences. Another previously unreported species, *Sida spinose*, had earlier been recorded within the fenced areas (Shahid and Rao, 2016).

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