Journal on New Biological Reports **3**(2): 115 – 119 (2014) **ISSN 2319 – 1104 (Online)**

New records for two alien Asteraceae species in the United Arab Emirates

Mohammad Shahid

International Center for Biosaline Agriculture, P.O. Box 14660, Dubai, United Arab Emirates.

(Received on: 17 June, 2014; accepted on: 10 July, 2014)

ABSTRACT

Two Asteraceae species viz. *Gamochaeta pensylvanica* and *Verbesina encelioides*, which are native to the Americas, have been found in different parts of the United Arab Emirates. Both of the species are the new records to the flora of the country, while *Gamochaeta pensylvanica* has not been previously reported in any part of the Arabian Peninsula. The reported two taxa are considered to be invasive in nature and may become problems for the local flora and agriculture in future.

Key Words: Americas, Arabian Peninsula, *Gamochaeta pensylvanica,* invasive, United Arab Emirates, *Verbesina encelioides*

INTRODUCTION

The Asteraceae (alt. Compositae) is one of the largest flowering plant families, which has more than 23,500 species representing about 1,620 genera (Stevens, 2001). The members of the family are found in all 6 inhabitable continents where they grow on wide range of environments (Funk et al., 2005). The key trait of the family is the composite inflorescence, which typically has a disc called capitulum containing small flowers surrounded by long ray flowers that look like petals.

Incursion of alien plants is one of the most severe environmental catastrophes, which may devastate the ecosystem of a region (Mooney and Hobbs, 2000). Naturalization is among the primary phases of plant invasion; hence study of naturalized species may provide important information on a potential invader (Wu et al., 2005). Since members of Asteraceae have broad range of adaptability to different environments, they have contributed a large number of naturalized taxa to the world (Wu and Wang 2005).

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

The paper reports the presence of two naturalized Asteraceae species, *Gamochaeta pensylvanica* (common name: Pennsylvania cudweed) and *Verbesina encelioides* (common name: golden crownbeard) who are native to the Americas, in various regions of the United Arab Emirates.

MATERIAL AND METHODS

The United Arab Emirates (UAE), which is located in south east of Arabian Peninsula, has an area of 83, 600 km^2. It lies between 22°30' and 26°10' north latitude and between 51° and 56°25′ east longitude. The country is comprised of 7 emirates (principalities); Abu Dhabi, Ajman, Dubai, Fujairah, Ras al Khaimah, Sharjah and Umm al Quwain. The UAE mainly is desert with huge sand dunes, gullies and oases. Majority of the plants here are either xerophytic (adapted to dry arid habitat) or halophytic (salt-tolerant). In the UAE, more than 755 flowering plant species are found, which belong to 81 various families (Jongbloed 2003).

During floral explorations (2013-14) in the UAE, the author collected the specimens of *Gamochaeta pensylvanica* and *Verbesina encelioides*. The identification and authentication has been done with different relevant literature (Nesom, 2004a; Parker, 1972). Study of the pertinent literature revealed that these species have not been reported from the UAE so far (Western 1993, Jongbloed 2003).

RESULTS AND DISCUSSION

***Gamochaeta pensylvanica* (Willd.) Cabrera.** Willdenow, C.L., *Enumeratio Plantarum Horti Regii Botanici Berolinensis* 1: 867. 1809. & Cabrera, A.L. *Boletín de la Sociedad Argentina de Botánica* 9: 375. 1961 (**Figs. 1&2).**

Annual herb, 10-20 cm tall, generally branched at base. Stems procumbent to erect. Basal leaves usually absent at flowering occasionally present and withered. Leaves obovate to spathulate, 2.5–8 cm long, 4–18 mm wide, apex round to obtuse, base slender, upper surface green and hairless, lower surface covered with white hairs. Upper leaves similar to lower leaves but smaller, narrower and broader based, sometimes folded. Flower-heads 1.5–3 mm diam, in dense or loose clusters, in leaf axils and at the end of stems. Involucral bracts oblong, obtuse to apiculate, 2.5-3 mm long, green to pale-yellow; stereome green; lamina pale brown, gap and margins clear; outer bracts almost covered by hairs. Achenes slightly papillate, 0.3–0.5 mm long, pale-yellow to light brown.

Flowering: January to April, fruiting February to May.

It is native to South America, but is naturalized in North America, Australia, Europe and other places (Nesom, 2006).

Gamochaeta pensylvanica was found at two different areas in Dubai emirate. In Deira about 20 plants on a grass strip along a road (25˚15′ 949″N, 055˚18′630″ E) were observed, while only a single plant was recorded in a lawn at the International Center for Biosaline Agriculture (25˚05′686″ N, 055˚23′397″ E). The study of relevant literature revealed that this plant species has not been reported in other countries of the Arabian Peninsula (Chaudhary 1999; Wood 1997; Ghazanfar 2003; Norton et al., 2009; Omar 2000). Hence it is the first time that *Gamochaeta pensylvanica* specimens have been collected from this part of the world.

Studies indicate that the species has been found as a weed in different regions of the world (Nesom 2004b). Though at present in the UAE it has been found in a few places, in future it may become a potential weed threat to farms and lawns of the country.

***Verbesina encelioides* (Cav.) Benth. & Hook.f. ex A.Gray.** W. H. Brewer, S. Watson & A. Gray, Bot. Calif. 1: 350. 1876 (**Figs. 3&4).**

Annual herb, 25-100 cm tall. Stems grayish-green covered with short stiff hairs. Leaves alternate, green, lanceolate to triangular-ovate, bases broadly cuneate to truncate, dark green, roughly serrated edge, lower surface covered with white hairs. Peduncle subtended by leaf-like bracts. Inflorescence has 1-10 heads with 1-2 phyllary series, 6-10 mm, and linear-lanceolate to linear. Chaff scales 6 to 8 mm and abruptly acuminate. Ray flowers yellow to orange and disk flowers yellow to light brown. Seeds grayish-brown, flat, winged, covered with fine hairs, 5-7 cm long and 3-4 cm wide.

Flowering: February-May, fruiting March to June.

Though the native range of *Verbesina encelioides* is generally considered to be North and South America (Hansen, 1976), it has become naturalized in parts of Europe, Australia, Africa, South Asia and the Middle East (Feenstra and Clements, 2008).

This Asteraceae species was found at two places along the roadside in Ras al-Khaimah during a botanical expedition. Both places are located in Umm Urge area of the emirate. At one locale (25˚30′455″ N, 055˚59′328″ E), there were about 70 plants, while the second place (25˚30′572″ N, 055˚39′405″ E) had 8 of them.

Verbesina encelioides is an invasive plant species, which aggressively spread in sandy soils that results into decline in biodiversity of the region as well as yield decrease of the crops grown there (Sade et al., 2007). The species has become weed threat to the local flora and crops in Morocco (Taleb et al., 2011) and Israel (Sade et al., 2007) and has infested large areas in the countries. Most of the UAE is covered with desert and *Verbesina encelioides* thrives on sandy soils, hence there is a possibility that the species may compete with the local flora resulting in decline of the plant biodiversity in the country. The plant may also pose a weed threat to the agriculture farms which may lead to the fall in crop yields.

Fig. 1. ***Gamochaeta pensylvanica*** plant growing in Dubai, UAE.

Fig. 2. Flower of *Gamochaeta pensylvanica*.

Fig. 3. ***Verbesina encelioides*** plant growing in Ras al Khaimah, UAE.

Fig. 4. Flower of *Verbesina encelioides*.

The plant species contains a compound called galegine, which is toxic to the animals who feed on it (Keeler et al., 1992). Therefore, the weed has a potential hazard for browsing livestock as well as wild animals.

CONCLUSIONS

Both *Gamochaeta pensylvanica* and *Verbesina encelioides* are alien to the UAE and currently their populations are smaller, but in future their number may grow making them invasive in nature. Being invasive, the plant species, especially *Verbesina encelioides*, can pose threat to the local flora, farms and grazing animals. At the moment, the manual control techniques can be applied to eradicate them before they become a potential threat.

REFERENCES

Chaudhary SA. 1999. Flora of the Kingdom of Saudi Arabia illustrated. National Agriculture and Water Research Center, Riyadh, Saudi Arabia.

Feenstra KR and Clements DR. 2008. Biology and impacts of Pacific Island invasive species. 4. *Verbesina encelioides*, golden crownbeard (Magnoliopsida: Asteraceae). Pac Sci 62:161-176.

Funk VA, Bayer RJ, Keeley S, Chan R, Watson L, Gemeinholzer B, Schilling E, Panero JL, Baldwin BG, Garcia- Jacas N, Susanna A and Jansen RK. 2005. Everywhere but Antarctica: using a super tree to understand the diversity and distribution of the Compositae. Biol Skr 55: 343–374.

Ghazanfar SA. 2003. Flora of Oman. National Botanical Garden, Belgium.

Hansen A. 1976. *Verbesina* L. In: Tutin et al. (ed.), Flora Europaea, vol. 4. Cambridge University Press, Cambridge, UK.

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

Keeler RF, Baker DC and Panter KE. 1992. Concentration of galegine in *Verbesina encelioides* and *Galega oficinalis* and the toxic and pathologic effects induced by the plants. J Environ Pathol Toxicol Oncol 11:11-17.

Mooney HA and Hobbs R J (eds). 2000. Invasive species in a changing world. Island Press, Washington, D.C., USA.

Nesom GL. 2004a. New distribution records for *Gamochaeta* (Asteraceae: Gamochaeta) in the United States. Sida 20: 1175-1185.

Nesom GL. 2004b. New species of *Gamochaeta* (Asteraceae: Gnaphalieae) from the eastern United States and comments on similar species. Sida 21: 717–741.

Nesom GL. 2006. *Gamochaeta* (Gnaphalieae). In: Flora of North America Editorial Committee, eds. 1993+. Flora of North America North of Mexico. Vol. 19. Oxford University Press, New York, USA, pp 431–438.

Norton J, Majid SA, Allan D, Al Safran M, Böer B and Richer R. 2009. An illustrated checklist of the flora of Qatar. Browndown Publications, Gosport, UK.

Omar SAS. 2001. Vegetation of Kuwait: A comprehensive illustrative guide to the flora and ecology of the desert of Kuwait. Kuwait Institute for Scientific Research, Kuwait.

Parker KF. 1972. An illustrated guide to Arizona weeds. University of Arizona Press. Arizona, USA.

Sade R, Yaacoby T and Rubin B. 2007. Crownbeard (*Verbesina encelioides*), physiology, geographical distribution and response to herbicides. Proceedings of the International Conference on 'Novel and sustainable weed management in arid and semi-arid ecosystems', Rehovot, IL, USA, pp 41.

Stevens PF. 2001 onwards. Angiosperm Phylogeny Website. Version 8, June 2007 [and more or less continuously updated since]. http://www.mobot.org/MOBOT/research/APweb/. (Accessed June15, 2014).

Taleb A, Bouhache M and El Mfadi B. 2011. New species threatening the biodiversity in Morocco: *Verbesina encelioides* (Asteraceae). Proceedings of the 2nd International Workshop on Invasive Plants in the Mediterranean Type Regions of the World, Trabzon,Turkey, pp. 156-167.

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.

Wu SH, Rejmánek M, Grotkopp E and Ditomaso JM. 2005. Herbarium records, actual distribution, and critical attributes of invasive plants: genus *Crotalaria* in Taiwan. Taxon 55: 133-138.

Wu SH and Wang HH. 2005. Potential Asteraceae invaders in Taiwan: Insights from flora and herbarium records of casual and naturalized alien species. Taiwania 50: 62-70.