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SHORT COMMUNICATION

SPERGULARIA IRAQENSIS (CARYOPHYLLACEAE), A NEW SPECIES FROM IRAQ

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ABSTRACT

Spergularia iraqensis sp. nov. is described as a new species from Iraq. This species has been collected from Diyala Province in the central east of Iraq; it is closely related to *Spergularia rubra* (L.) J. Presl & C. Presl, 1819 and *Spergularia bocconei* (Scheele) Graebn., 1919.

The distinguishing of the morphological characteristics of the new species alongside the two similar species are discussed with photographs, and an identification key is given for *Spergularia iraqensis* and other closely related species.

Keywords: Caryophyllaceae, Diyala, Endemic, Iraq, *Spergularia*.

INTRODUCTION

Spergularia (Pers.) J.Presl & C.Presl, 1819 is a cosmopolitan genus with about 40 species; some of these species are halophytes and distributed worldwide (Ghazanfar and Nasir, 1986; Townsend *et al.*, 2016). The first revision of the genus *Spergularia* in Iraq was done by Handle-Mazzetti (1910); he recognized two species which are *Spergularia salina* J. Presl & C. Presl, 1819 and *Spergularia diandra* (Guss.) Heldr., 1851; later Guest (1933) reports that there are two species of the genus *Spergularia*, *S. diandra* and *S. marina* (L.) Besser, 1822 in Iraq. In 1935, Anthony pointed out that there are three species of the genus *Spergularia* in Iraq: *S. rubra*, *S. media* (L.) C. Presl, 1826 and *S. diandra*, then in 1948, Blacklock listed two species *S. diandra* and *S. marginata* (DC.) Kitt., 1844; Zohary (1950) listed only two species *S. salina* and *S. diandra* grow in Iraq, while Al-Rawi (1964) who collected the data of all

previous studies, and mentioned five species of *Spergularia* distribute in Iraq: *S. diandra*, *S. marginata*, *S. media*, *S. rubra* and *S. salina*, Rechinger (1964) in the flora of lowland Iraq reported only two species *S. salina* and *S. diandra*, Ratter (1980) in flora Iranica mentioned only two species of *Spergularia* collected from Iraq which are *S. marina* and *S. diandra*, however, Townsend *et al.* (2016) in the flora of Iraq which is the newest study for *Spergularia* in Iraq described four species: *S. media*, *S. marina*, *S. bocconei* and *S. diandra*.

During a plant field survey in 2019 to upper plains and foothills region in Diyala province central east of Iraq, two unusual specimens of *Spergularia* was collected from two different places and homed in the National Herbarium of Iraq (BAG), the specimens could not be identified by using the key provided in the flora of Iraq (Townsend *et al.*, 2016), or by cross-checked with *Spergularia* accounts of the relevant literature, like flora Orientalis (Boissier, 1876), flora of Syria, Palestine, and Sinai (Post, 1933), Flora of the USSR (Gorshkova, 1936), Flora Europaea (Monnier and Ratter, 1964), flora of Turkey (Ratter, 1967), Flora of Saudi Arabia (Migahid, 1978), Flora Iranica (Ratter, 1980), Flora of Egypt (Boulos, 1999), Flora of China (Dequan and Rabeler, 2001) *Spergularia* in Australia (Adams *et al.*, 2008), and also cross-checked with the specimens at BAG and the University of Baghdad herbarium, College of Science (BUH). Therefore, this paper aims to describe the *Spergularia iraqensis* as new species for science.

Taxonomic treatment

Spergularia iraqensis sp. nov., type: Iraq, 12 km W of Mandali, clay soil with *Tamarix* L., 1753 and *Lycium barbarum* L., 1753 community, 33°44'47.30" N; 45°24'59.80" E, 21/iv/2019, A. Haloob (Holotype 60268 BAG!; Isotype 44859 BUH!).

Annual plant, 85-200 mm long; root tap, 17–40 × 0.6–1 mm. Stem ascending or decumbent, 65–180 × 0.5–1.3 mm, light green or purple in lower quarter and above green tinged with purple, internodes length 12-28 mm, glabrous with dense short glandular hairs on last internode below inflorescence. Stipule 2, scarious white, deltate, 3–4 × 1.2–2.5 mm, apex long acuminate, connate of 0.1-0.5 mm. Leaves 2-4, fleshy, linear, 6–32 × 0.5–2 mm, apex mucronate, green almost with purple apex, glabrous. Inflorescence cymose, 15–60 mm long, dense short glandular hair; stipules in inflorescence broadly ovate-deltate, 1–2.5 × 0.8–2 mm. Bracts in first node in inflorescence linear, 6–10 × 0.7–1 mm, entire ciliate or not with short glandular hair, other bracts narrowly lanceolate or subulate, 0.8–2.5 × 0.07–0.8 mm, green with reddish-purple apex, margin entire with scarious margin sometimes ciliate with short glandular hair, apex long mucronate. Pedicel erect, 2–5 mm, dense glandular hair. Flower pentamerous, 4–5 mm diameter; calyx 5 unequal-slightly unequal sepals, two sepals slightly shorter than other three longer sepals, lanceolate or ovate, shorter sepals 1.8–2.2 × 0.8–0.9 mm, longer 2–2.3 × 0.65–0.8 mm, sepals join from base about 0.1–0.15 mm, apex cucullate obtuse or acute, outer surface green with separated glandular hair, inner surface green or green turn to purple in upper part and glabrous, scarious margin white color, 0.1–0.3 mm wide, corolla with 5 equal petals, petals equal or slightly shorter than sepals, lanceolate-oblong, 1.6–2.2 × 0.8–1 mm, apex rounded, light purple- mauve, rarely with white near base. Stamens 10, arrange in 5 dimorphic pairs, each pair with one long and one short stamen,

stamens included not projected beyond corolla, filament glabrous, filaments of short stamens 0.7- 0.9 mm long, filaments of long stamens 0.95-1.1 mm, anthers yellow, in short stamens ovate-narrowly ovate, 0.15- 0.2 × 0.1- 0.15 mm, while in long stamens oblong 0.24-0.3 × 0.15-0.23 mm. Gynoecium superior, 3-carpels, 1.3-1.4 mm long, carpopodium 0.1- 0.15 mm long, ovary ovoid-narrowly ovoid, yellow-greenish yellow, glabrous, 0.9-1 × 0.6 - 0.7 mm with 30–55 ovules, styles 0.1- 0.15 mm long, stigma yellow-greenish to yellow, 0.2-0.25 mm long, recurved, glabrous. Pedicel reaches 3-8 mm long and pendent in fruiting except first flower in inflorescence that remains erect, fruiting calyx sepals yellow-yellowish green, 2.1-2.4 × 0.6-0.9 mm, carpopodium length 0.2- 0.4 mm in fruiting. Capsule ovoid, pale yellow almost tinged with purple, 2-2.5 × 1.2-1.5 mm, as long as fruiting calyx or slightly shorter (when fruit opening recurved apex of valves slightly longer than fruiting calyx), valves 0.7-1.1 mm wide. Seeds many, brown, ovate-broadly ovate, long 0.4-0.55 × 0.3-0.4 mm, dense long tubercles (Pls 1, 2).

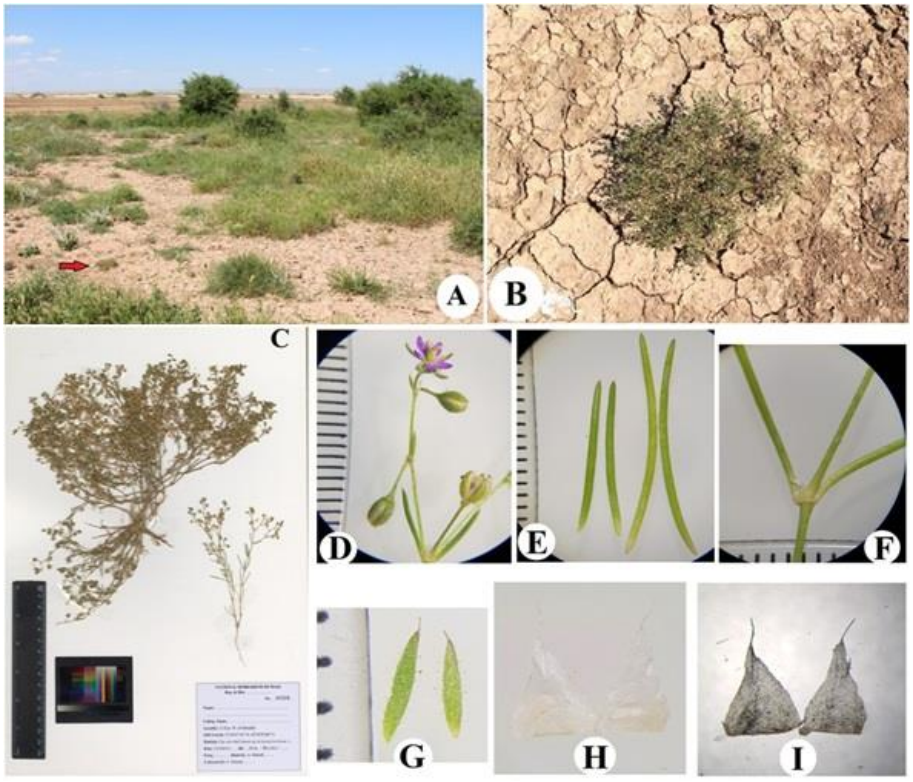

Plate (1): *Spergularia iraqensis*; (A) Habitat, (B) Plant habit (in nature), (C) Plant habit (holotype 60268 BAG), (D) Inflorescence, (E) Leaves, (F) Stem node with stipules and leaves,(G) Bracts, (H) Show the stipules color (the microscope light from the upper side), (I) Show the stipules shape (the microscope light from the lower side so the upper stipules face shaded and look dark).

Recognition

S. iraqensis similar to *S. rubra* and *S. bocconei*, but differs from *S. rubra* by having deltate white stipules, not fasciculate leaves, upper bracts much shorter than leaves, shorter sepals, petals, and capsules, petals light purple-mauve and from *S. bocconei* by its stipules which have long acuminate apexes, stamens 10, and seeds brown (Tab. 1).

Table (1): Comparison of *Spergularia iraqensis* and its closely related species (Gorshkova, 1936; Monnier and Ratter, 1964; Ratter, 1967; Ratter, 1980; Dequan and Rabeler, 2001; Townsend *et al.*, 2016).

Species characters	*S. iraqensis*	*S. rubra*	*S. bocconei*
Stem length (mm)	65–180	50-250	50-250
Stipules shape	deltate	lanceolate	deltate
Stipules color	white	silver	white
Stipules apex	long acuminate	acuminate	acute
Leaves habit	fleshy	not fleshy	fleshy
Leaves number in each node	2–4	almost more than 4	2–4
Leaves length (mm)	6–32	5-20 mm	12-30
Relation of upper bracts to leaf length	much shorter	almost equal	much shorter
Sepal length (mm)	1.8–2.3	3-5	2-3.5
Petal length (mm)	1.6–2.2	3-5	2-2.8
Petal color	light purple-mauve rarely with white near base	Pink	Pink with white base
Stamens number	10	5-10	(0)2-5(8)
Capsule length (mm)	2–2.5	4-5	2-3.5
Capsule valves color	pale yellow almost tinged with purple	pale	pale
Relation capsule to sepals	equal or slightly shorter	equal	equal or shorter
Seed color	brown	dark brown	light grey-brown

Phenology: Flowering March-April-(May), Fruiting April-May.

Other specimens examined: (Paratype) SW Hamrin Lake, clay soil in grass open area near the lake shore, 34°05'48.35" N; 45°04'06.28" E, 19/iv/2019, A. Haloob, G. Al-Taie & R. Hamshkan (60269 BAG!).

Distribution and habitat: This species endemic to Iraq, it was collected from two separate sites in the east of Diyala Province within the same habitat extension, which is located between the eastern foothills and the alluvial lower Mesopotamia in Iraq, and it was found

growing in clay soil with *Tamarix* sp. and *Lycium barbarum* L. community and also grows in clay soil in the grass open area near the Hamrin Lake bank.

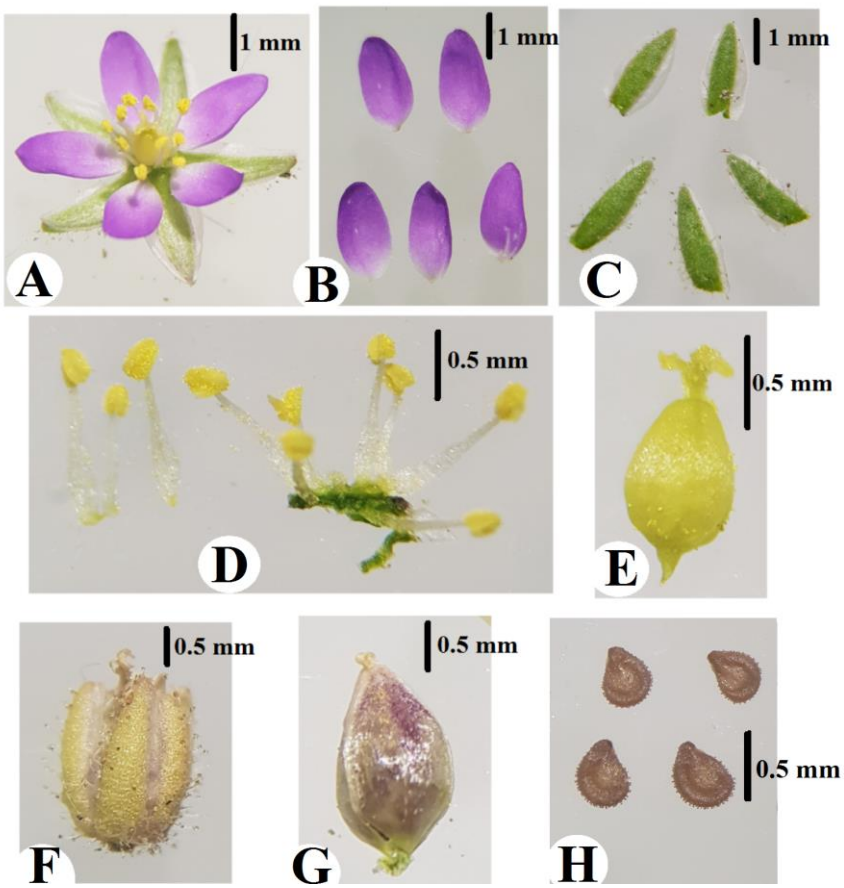

Plate (2): *Spergularia iraqensis*; (A) Flower, (B) Petals, (C) Sepals, (D) Stamens, (E) Gynoecium, (F) Fruiting calyx with capsule, (G) Capsule, (H) Seeds.

Etymology: The species is named after Iraq country where the plant grows and is recorded for the first time.

Conservation status

There are numbers of threats in the areas where the species grows, the most important of which are grazing, agriculture, tourism, and urban activities, as well as, the geographical range of *S. iraqensis* restrict to a narrow region estimated to about 2,000 km^2. So, based on the measurement of the species' extent of occurrence (EOO), which is less than 5,000 km^2, and the number of locations where plant growth is less than 5, as well as the quality of its

habitat, which is estimated to be declining due to human activities, the assessment of the species according to IUCN Red List categories (IUCN, 2012): Endangered, EnB1ab (iii).

Key for identification *S. iraqensis* and other related species

1- Capsules 7-9 mm long ……..…….... *S. media*
- Capsules less than 6 mm long ……..... 2

2- Stipules silver, leaves strongly fasciculate ……...…….……... *S. rubra*
- Stipules white, 2-leaves in each node or little fascicled ...…….…….……... 3

3- Stipules on young shoots connate more than half their length, capsule more than 4 mm long……...……..... *S. marina*
- Stipules on young shoots connate less than half their length, capsule less than 3.5 mm long…….……..……...……..…….... 4

4- Stipules long acuminate, Stamens 10……..……..……..… *S. iraqensis*
- Stipules acute, Stamens less than 8 ……..... 5

5- Petals ovate-broadly oblong, Inflorescence with bracts and with dense short glandular hair, seeds light grey-light brown, broadly ovate, with dense long tubercles….....……...…….……..…….. *S. bocconei*
- Petals lanceolate-narrowly elliptic or oblong, Inflorescence without bracts above and with separate short glandular hair, seeds brown-black, compressed ovoid-narrowly ovoid, glabrous or dense tubercles…….……..…...…..... *S. diandra*

Discussion

The new species is annual herbs, its stipules deltate, white and long acuminate, shortly connate for base. Bracts (except for the bracts in the first inflorescence node) much shorter than leaves, with sepals less than 2.3 mm and 10 stamens. Capsule as long as fruiting calyx or slightly shorter; seed brown, unwinged; these are the most distinguishing characteristics of the new species, and these characters are not found in any other species of the genus. Interestingly, only *S. media* in Iraq has 10 stamens, also *S. rubra* which grows in Turkey has 10 stamens, however, the capsule of *S. media* longer than 7 mm, as well as, *S. rubra* has capsules longer than 4 mm which differ from the shorter capsule of *S. iraqensis*, *S. dinandra* and *S. bocconei* which could reach less than 2.5 mm but *S. dinandra* and *S. bocconei* have androecium with less than 8 stamens and the stipules of these species are not acuminate which differ from *S. iraqensis* androecium and stipules (Gorshkova, 1936; Monnier and Ratter, 1964; Ratter, 1967; Ratter, 1980; Dequan and Rabeler, 2001; Townsend *et al.*, 2016).

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Spergularia iraqensis (العائلة القرنفلية)، نوع جديد من العراق

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الخلاصة

وصف خلال الدراسة النوع *Spergularia iraqensis* sp. nov. على انه نوع جديد من العراق؛ جمعت العينات من محافظة ديالى في وسط- شرق العراق؛ وهو مقارب للنوعين *Spergularia rubra* (L.) J. Presl & C. Presl, 1819 و *S. bocconei* (Scheele) Graebn., 1919.

نوقشت الخصائص المظهرية المميزة للنوع الجديد والنوعين المشابهين له، مع صور توضيحية وايضا تم وضع مفتاح تشخيصي للنوع الجديد مع الانواع الاخرى القريبة منه.