

**A NEW RECORD FOR THE FLORA OF IRAQ: *LOTUS GARCINII* DC.  
(PAPILIONACEAE)**

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**ABSTRACT**

*Lotus garcinii* is a new additional plant species to papilionaceae family in flora of Iraq for the first time found at Al-Imsad Dam region (South of Rutba) of Western Desert District (DWD) from Iraq. The species was collected in spring season of 2017 and 2018, preserved in National Herbarium of Iraq(BAG) with the numbers 59780, 59781 and 59782. The identification of the species was confirmed by using some Flora of the neighboring countries for Iraq, taxonomic treatment was done, and some distinguishing characters are given.

**Key words:** wild plant, taxonomic treatment, western desert, Iraq.

موسى

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تسجيل جديد للموسوعة النباتية العراقية: النوع *Lotus garcinii* DC. من العائلة الفراشية (papilionaceae)

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المستخلص

تمت إضافة النوع *Lotus garcinii* DC. من العائلة الفراشية papilionaceae الى الموسوعة النباتية العراقية كنوع جديد ولأول مرة، حيث وجد في منطقة سد المساد (جنوب الرطبة) ضمن منطقة الصحراء الغربية من العراق. وجمع النوع خلال فصل الربيع من العامين 2017 و 2018، وأودعت، العينات في المعشب الوطني العراقي (BAG) بالأرقام 59780 و 59781 و 59782. وشخص النوع اعتماداً على بعض الموسوعات النباتية للبلدان المجاورة للعراق، وعومل النوع تصنيفياً مع بعض الصفات والخصائص المميزة له.

كلمات مفتاحية: نبات بري، معاملة تصنيفية، الصحراء الغربية، العراق.

## INTRODUCTION

The genus *Lotus* L. belongs to papilionaceae family, and contains about 100 species distributed through all parts of the world, North Temperate Regions especially the Mediterranean Region and West Asia (9). The Flora of Lowland Iraq (22) involves 3 species, while the Flora of Iraq is including 5 species were distributed through all Districts of Iraq (26). In the Flora of Saudi Arabia (2, 5, 20) indicated 7 species of the genus *Lotus*, one of them is *Lotus garcinii* DC. In United Arab Emirates (17) stated 3 species of the genus *Lotus*, also found that including *Lotus garcinii*. In Iran (24) mentioned 8 species, Four of them in Pakistan (21). A modern study of the genus *Lotus* was indicated to distribution of 130 species native to Europe, Asia, Africa, Australia and some islands of Atlantic Ocean (18). The leaves extract of the species (*L. garcinii*) was very important for the biosynthesis (19). This study assured the occurrence of *Lotus garcinii* in Iraq based on recent collection, as well as morphological characters through the taxonomic treatment.

## MATERIALS AND METHODS

In spring seasons of 2017 and 2018, during a field survey carried by Center of desert studies staff to study the desert plants in west of Iraq. A large number of fleshy plant samples were collected and identified based on the Flora of Iraq. Unusual *Lotus* specimen was collected and homed in Anbar University Herbarium (AUH) could not be identified by using Flora of Iraq, the new species *Lotus garcinii* has been identified based on Flora of neighboring countries such as Saudi Arabia (2), Iran (15) and the United Arab Emirates (17), as well as, the Illustrated dictionary of plants of Eastern Saudi Arabia region (1). The morphological characteristics of vegetative and flora parts were studied by using dissecting microscope with the use of the world plant glossary (8). The taxonomic treatment of the new species has been completed with some drawings and pictures of plant organs, as well as a map. Figure 1 shows the location of the species distribution in the Al- Imsad dam region south of Rutba, at 675 meters' altitude above sea level (13). The study was based on compound microscope (Olympus) and dissecting microscope, as well as the Japanese camera (Canon).



Figure1. A map of Iraq shows the regions and districts depending on Guest (1966) *L. garcinii*

**RESULTES AND DISCUSSION****Taxonomic treatment**

*Lotus garcinii* DC. Prodder. 2:212 (1825) Boiss., Fl. Or. 2:174 (1872); Baker in Hook. f., Fl. Brit. Ind. 2:91 (1879); Gillet in Kew Bull. 13 (13): 379 (1959); Chrtkova- Zerova in Folia Geobot. Phytotax 3:109 (1968); Migahid and Hammouda, Fl. Saudi Arab. 1:59 (1978); Karim & Fawzi, Fl. Uni. Arab Emira. 1; 217(2007).

**Syn.:** *Aspalathus persica* Burm. f.

*Lotus shariffi* Rech. F. et Esfand

*Lotus stocksii* Boiss

*Ononis aucheri* Jaub. & Spach

Perennial, small subshrub, woody at the base (Plate 1), branches many, 20-45cm, stems ascending, silky- pubescent, grey-green, 5-12 x 0.1-0.3cm (Plate 2). Leaves alternate, palmately compound, subsessile, leaflets 3, terminal ones the largest, obovate, margin, entire, apex retuse, base acute, grey-pubescent, green, lower cauline leaves 2.9-3.8 x 3.6-4.5mm, leaflets 2.0-2.8 x 1.2-1.7mm, upper cauline leaves 1.9-2.6 x 2.8-3.4 mm, leaflets 1.6-2.0 x 1.0-1.3 mm, stipules absent (Plate 3). Bracts conspicuous, trifoliolate, leaflets narrowly obovate, margin entire, apex obtuse, base acute, glabrous above, pilose below, green, 2.0-2.9 x 1.1-1.4mm (Figure 2). Flowers in racemose inflorescences, racemes, 8-9 x 4-5mm, pedicel teret, pilose- pubescent, green-cinnamon, 0.9-1.2 x 0.7-0.9mm. Calyx of 5 sepals, base-united, unequal sometimes, narrowly lanceolate or lorate, margin entire, apex acuminate or acute- acuminate, base truncate, pilose- pubescent, dull greenish yellow, 5.0-5.5 x 0.8-1.0mm. Corolla papilionaceous (Plate 4), standard obovate, margin entire, apex retuse, base attenuate, pink, 4.2- 4.4 x 2.1- 2.6 mm , wings 2, oblong with lateral claw, apex rounded, base truncate, 4.3- 4.4 x 1.2 -1.3 mm, keel partely united of 2 petals, broadly lanceolate, apex obtus, base attenuate, 4.8- 5.4 x 1.9- 2.1 mm. Stamenens diadelphous, nine of them united in lower half, cylindrical, 2.3 x1.9 mm, filaments filiform, white- cream, 1.6 x0.1mm, and the tenth stamen is free single, 3.9 x0.1mm, anthers ovoid, yellow, basal attachment with the filaments, 0.22- 0.25 x0.12- 0.15mm. Pollen grains yellowish white, single, tricolporate, rounded triangular in polar view, broadly

ellipsoid in equatorial view, small size according to (10), polar axis 15- 16  $\mu$ m, equatorial axis 12- 13  $\mu$ m (Plate 5). Pistil simple, unicarpous, ovary superior, narrowly ellipsoid- narrowly, glabrous, white- yellow, 2.2- 2.4 x 0.5- 0.6 mm, style terminal, filiform, white, 1.1-1.3 x 0.08- 0.09mm, stigma capitate, 0.22-0.24 x 0.25 -0.27mm, Fruit legume, lorate- very narrowly ellipsoid, reticulate, brown, 6.5- 8.5 x 1.4-1.6mm. Seeds 3-5 in each fruit, globose, yellowish brown, glabrous, 1.20- 1.30 x 1.25- 1.35mm.

**Type:** Described from Persia.

**Selected samples from the studied specimens**

**DWD:** Al-Imsad dam region (25km. south of Rutba), 675m. alt., 17 /5 /2017, Mohammed O. Mousa, 59780 (BAG) ;2 km. Above Al-Imsad dam. (22 km. south of Rutba), 670 m. alt., 12 /5/ 2018, Center of desert studies staff, 59782 (BAG).

**Enviornment and Geographical Distribution**

Found as individuals in the region, in gravel-sandy soils; altitude: 660-680m.; flowering: May-July. Found in Rutba region within Western desert district (DWD). This study confirms the recording of the *Lotus garcinii* for the first time in Iraq because it is not mentioned in the geographical distribution list of wild plants of Iraq (4) or within Flora of Iraq (26) or any other scientific reference as well as the absence of plant sample of the species in all Iraqi Herbariums. By reviewing the geographical distribution of this species in neighboring and nearby countries, it has been found in Saudi Arabia (2), United Arab Emirates (17), Yemen (3), Qeshm Island- Iran (6) and India (16). It was first recorded in Africa and Southwest Asia as a new species of region (25) .Ghazanfar *et al.* reported that the species *Lotus garcinii* is one of the species that spread in the salt, sandy and arid regions of Southwest Asia within 728 plant species (12) . It is not difficult to migrate species and the dispersal of seeds by the strong winds of our region and neighboring areas, as well as rainwater torrents sometimes occur, especially as some of the valleys in Western desert from Iraq arise from within the Saudi Arabian territories such as Houran Valley near Anaza Mountain. Severe dust storms also uproot

some small dry shrubs and then move them away to other new areas, causing fall and widespread of seeds, according to some researchers on plant migration (7). Through the global distribution of *Lotus garcinii*, it has been shown that it can grow in coastal

wetlands (23) and dry areas of desert nature (11) and at a height of more than 500 meters above sea level (14). *L. garcinii* has some characters different from *L. gebelia* Vent. found in Iraq (Table 1).



Plate 1. plant samples shows the woody stems of *L.garcinii*

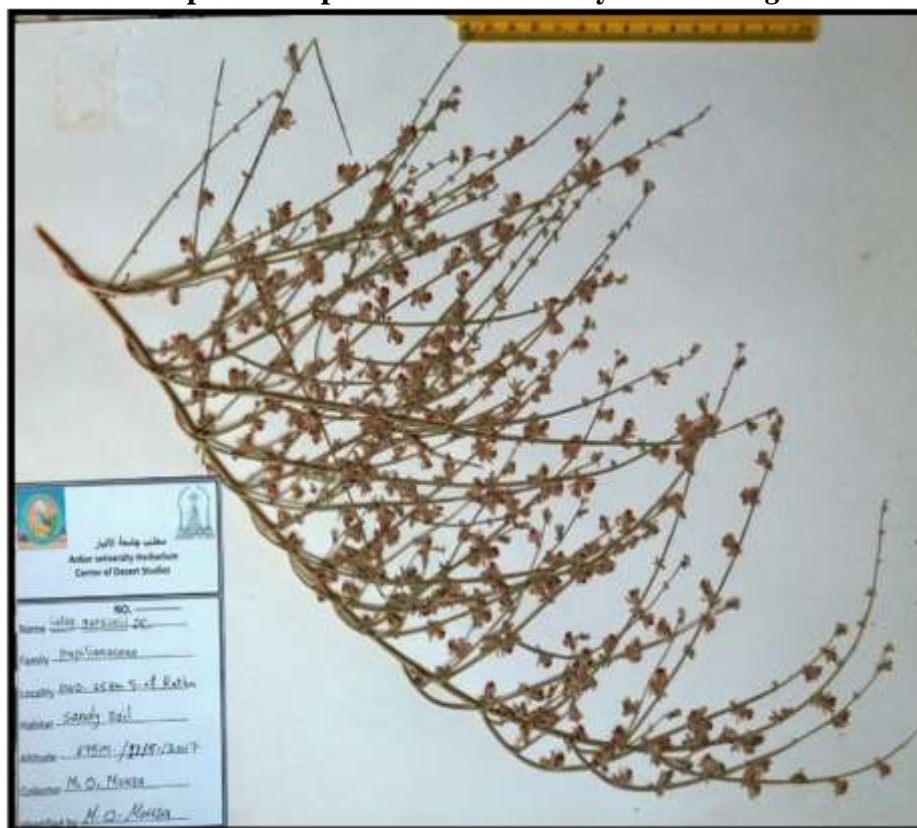


Plate 2. Herbarium plant samples of *L.garcinii*



Plate 3. Part of Herbarium plant samples of *L.garcinii*

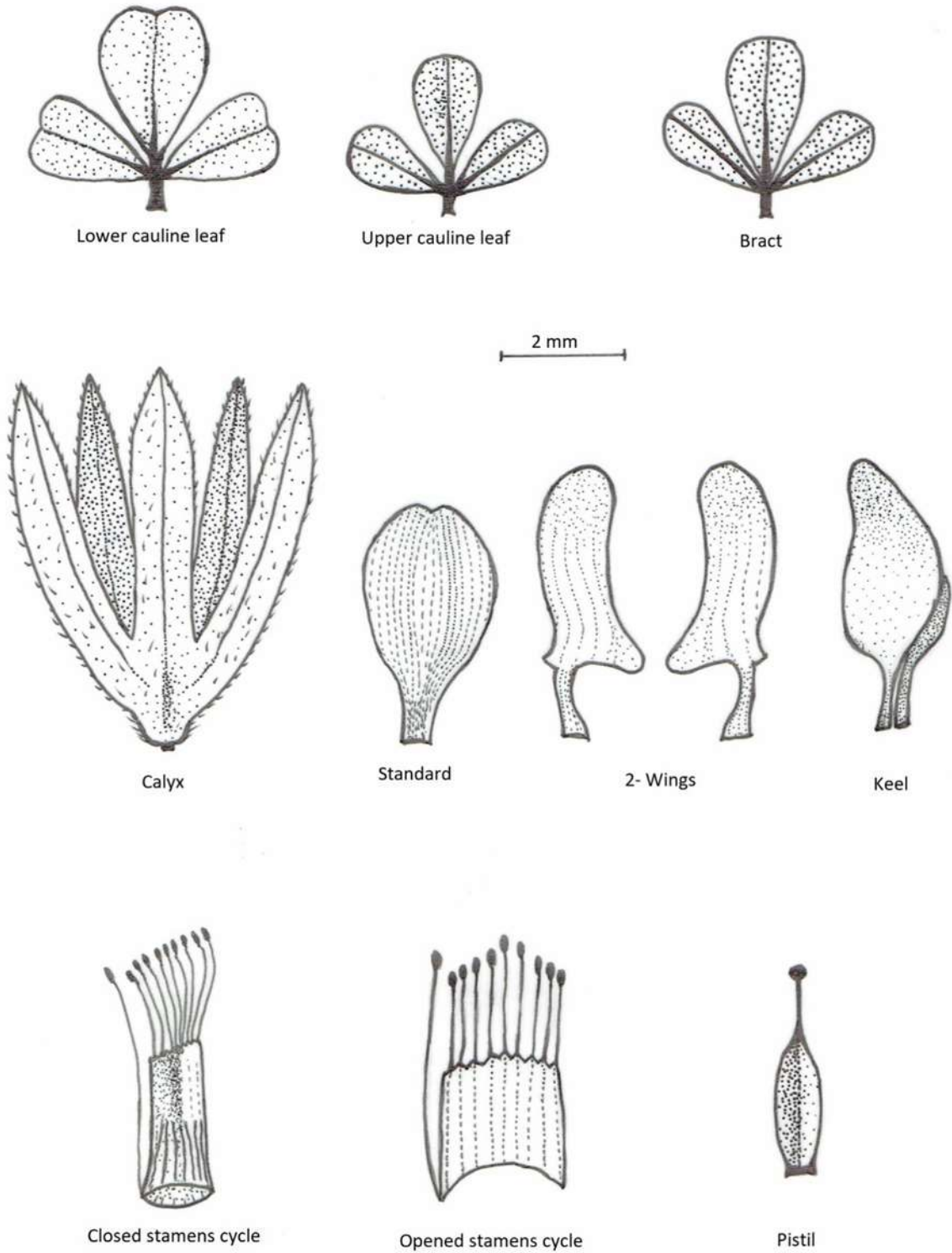


Figure 2. some of vegetative and reproductive parts of *L. garcinii*



standard

left wing

right wing

keel



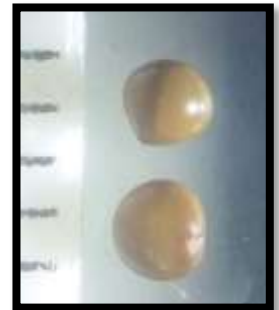
calyx



fruit

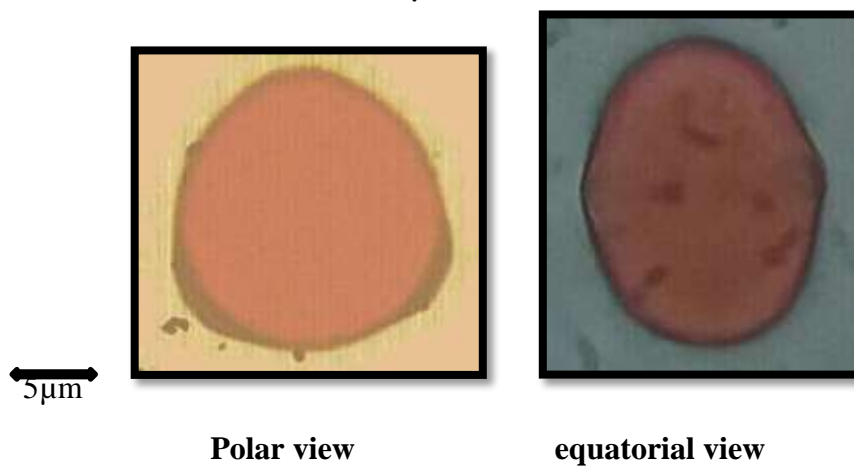


fruit



seeds

Plate 4. Reproductive organs of *Lotus garcinii*  
5µm



Polar view

equatorial view

Plate 5. Pollen grains of *Lotus garcinii* (x1000).

**Table 1. Some different characters between the two species**

	<i>L. garcinii</i>	<i>L. gebelia</i>
1	Leaflets obovate	Leaflets ovate
2	Calyx pilose- pubescent 5.0-5.5mm.	Calyx glabrous 7-10mm.
3	Standard obovate 4.2-4.4 x 1.2-1.3mm.	Standard ovate to sub- orbicular 14-15 x 8-10mm.
4	Keel broadly lanceolate	Keel broadly oblong
5	Fruit lorate-very narrowly ellipsoid 6.5-8.5 x 1.4-1.6mm.	Fruit linear 25-30 x 4-5mm.
6	Seeds 1.1-1.3mm.	Seeds 1.5-2.0mm.

From the results of this, it can be concluded:

1-The *Lotus garcinii* is first recorded and has been described in Western Desert of Iraq in this study

2- The plant species are in constant migration that are not stopped by boundaries may succeed or may fail in their new environment

3- The desert region is still in need of continuous field studies because of the variation in the spring level from year to another

4- There is no comprehensive study of all plant species over the last 50 years according to our information

5- The *L. garcinii* has succeeded in migration to the new environment and this is evident through the collection of two consecutive years 2017 and 2018

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