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Three New Species of *Convolvulus* L. Records to The Flora of Western Desert, Iraq

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Abstract. Three species belong to the genus *Convolvulus* L. from the Convolvulaceae family, new to Flora of Western Desert District were recorded. These species were *Convolvulus cantabrica* L., *Convolvulus reticulatus* Choisy and *Convolvulus stachydifolius* Choisy. Species were photographed, their taxonomical and ecological characters, as well as their geographical distribution in the Western Desert were demonstrated. Plant samples were collected, precisely identified, dried and herbarium specimens were prepared and deposited at Anbar University Herbarium (AUH). Some notes on habitat, flowering and fruiting periods were provided. The means and reasons that helped these species to be distributed in new places within the Western Desert District of Iraq were realistically discussed, it was found that there was no sample of the three mentioned species that were collected from the Western Desert District at all.

1. Introduction

Nature and distribution of the wild plant species in the desert region were irregular during successive years for several reasons, in some places of dry nature and solid soils that are surrounded by scattered rocks, the vegetation is usually poor, while we find it dense in other places such as valleys and flat lands, which is covered by rain water and torrents necessary for germination and growth. From here it becomes clear that some environmental role in the distribution of natural vegetation, such as the quality of the soil, the topography of the region, its climate and most importantly, the amounts of rain that vary between years [1].

Based on vegetation characteristics and topography, Iraq lands were divided into four physiographic regions and seventeen districts (Figure 1). The western desert is the largest district of the desert region, the height of the land above sea level within this district varies widely, greatly, ranging from 25 meters at Razzazah lake in the east to 885meters at Jabal Aniaza in the west, this district equal about 30% of the total area of Iraq [2]. Modern studies on vegetation, plant biodiversity and species distribution for this district are very few or rare. Convolvulaceae is one of the plant families found in Iraq, which includes about 1600 species belonging to 56 genera over the world [3].

Convolvulus L. the second largest genus of Convolvulaceae family, has more than 250 species distributed in the temperate and tropical regions of the world [4], in Europe [5] there are 23 species of the genus *Convolvulus*, while present about 57 species of the genus in Iran [6]. According to [7], the probable center of diversity for *Convolvulus* is in South-Eastern Asia (Iraq, Iran and Turkey) owing to the presence of the largest number of species. In the Flora of Turkey and East Aegean Islands, there were 32 species [8].



In Iraq, Zohary [9] mentioned 11 species, while Rechinger [10] indicated that there are 10 species distributed in the Lowland of Iraq, as for Al-Rawi's bulletin [11], it included 15 species distributed in all Iraqi district, this was followed by the Bulletin of Ridda and Daood [12], which depended on the herbarium specimens in the Iraqi National Herbarium and included 18 species belonging to the genus *Convolvulus*. There is no real number of the species belonging to the mentioned genus, because the seventh volume of Iraqi Flora of the Convolvulaceae family has not been published. As for the last study [13] of this family more than two decades ago, it indicated that there were 18 species belonging to *Convolvulus* in Iraq. Objective of this study was to know the new distribution of some plant species in this district, in order to give a clear idea of plant biodiversity and identify new species in the region.

2. Materials and Methods

More than eight field trips were carried out to different zones in the Western Desert District in Iraq during the spring of 2019, such as Al-Rutba region and its surroundings, the highway between Iraq, Syria and Jordan, Al-Nikhaib road to Saudi Arabia and the 160 km. west of Ramadi area, Haditha, Heet, Fallujah and Habbaniyah areas, for collecting and counting the new plant species in this district. Plant samples were collected and then dried and preserved in the Herbarium of Anbar University.

Species were field photographed, focusing on the distinguishing organs of each species. The nature of the habitat and the location of the species were determined, as well as environmental notes were recorded in the field. A Map of the species distribution was also drawn (Figure 2). Specimens were identified based on [6]and[8,13,14].

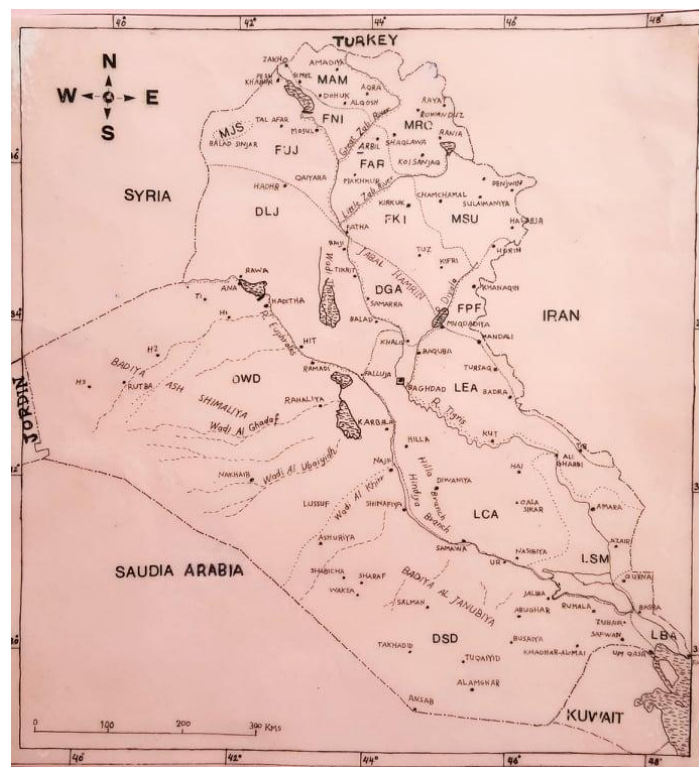


Figure 1. Regions and districts of Iraq according to Guest (1966)

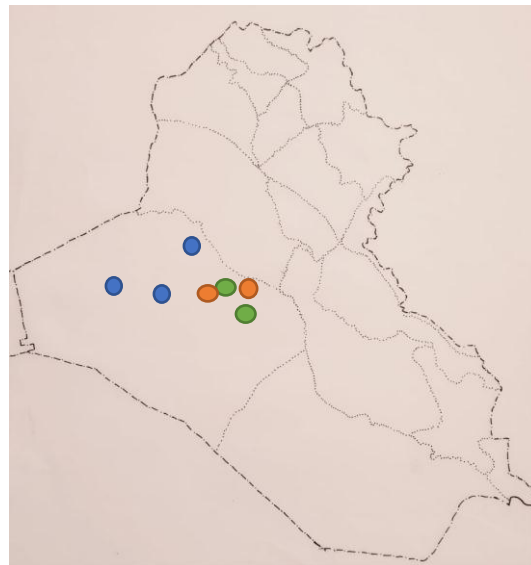


Figure 2. A new distribution of the species in the western Desert:

- *Convolvulus cantabrica*
- *Convolvulus reticulatus*
- *Convolvulus stachydifolius*

3. Results and Discussion

Three plant species of *Convolvulus* were recorded in Western Desert. The following is an account of their distinguishing characters, habitat and geographical distribution.

3.1. *Convolvulus cantabrica* L. , Sp. Pl. 1: 158. 1753.

Synonyms:

Convolvulus cardiosepalus Boiss. Flo. Orient. (Boiss.) 4(1): 96. (1875).

Convolvulus dorycnioides De Not., Repertm Fl. Ligust. :283 (1844).

Lectotype: [Italy, Sicily, Narbonne & Verona] (Hb. Linn. 218/ 48, photo !).

3.1.1. *Distinguishing characters.* Perennial caespitose plant reaching on average 45-85 cm. in height, stems and leaves pilose. Leaves attenuate at the base, narrowly lanceolate- linear. Inflorescences dichasium with 3 flowers, peduncle 10-15 cm. length. Outer sepals caudate or acuminate, Corolla wide funnel- shaped, 15-22 mm. long, pale pink. Fruits globose and pubescent capsules. Seeds brownish, 2-3 in each fruit.

3.1.2. *Habitat.* Calcareous soils, desert agricultural fields, roadside sometimes, often with *Triticum aestivum*.

Alt. 45-75m. , Flowering between mid - April and late May, fruiting between early June and mid - July.

3.1.3. *Distribution in Western Desert.* DWD: 38 km. West of Ramadi to Rutba, M.O. Mousa & S. S. Shahatha, 2013 AUH; after the Heet road junction, in limestone soil topped with sand, M.O.Mousa & S. S. Shahatha, 2019 AUH; Anbar University local in Ramadi, M. O. Mousa, 2020 AUH. (Figure 3).

3.2. *Convolvulus reticulatus* Choisy, Prodr. (A.P.De Candolle) 9: 399. 1845. (Choisy 1845: 399).

Type: IRAQ, Aucher-Eloy 1408 (Lectotype G-DC, designated by Saad 1967: 165).

3.2.1. Distinguishing characters. Perennial herb, woody-based, densely tomentose, greyish. Stems ascending, 3-5mm. thick. Leaves oblong- elliptic or broadly ovate at a lower base, 50-65 x 13-20 mm. . Sepals concolor, outer sepals 10-15 x 2-3 mm. . Corolla 13 -17 mm. long, white, unlobed slightly. Ovary and style glabrous. Fruit capsule, glabrous. Seeds obovate, 2.5-3.5 x 1.5-2.2 mm. , black or brown, pubescent.

3.2.2. Habitat. Limestone and sandy slopes, fallow fields, steppe, roadside. Alt. 150-250 m. . Flowering between early March and late April, Fruiting between mid - April and late May.

3.2.3. Distribution in Western Desert. DWD: Near the junction of Haditha road with the Wadi Houran, M.O.Mousa & some researchers of Center of Desert Studiesm 2018 AUH; 145km. West of Ramadi to Rutba on the side of highway, sandy soils, M.O.Mousa & S. S. Shahatha, 2019 AUH; West of Rutba about 30km. on old road to Syria and Jordan, limestone soil with sand, M.O.Mousa & S. S. Shahatha, 2019 AUH. (Figure 4).

3.3. Convolvulus stachydifolius choisy, Prodr. (A. P. De Candolle) 9: 408. 1845.

Synonyms: *Convolvulus quadriflorus* Hochst., Wanderungen (Lorent.) 332(1845). *Convolvulus venulosus* Ehrenb. Ex Boiss. (Fl. Orient. 4: 107 (1875).

Lectotype: In Syria ex. Alep and Mossul, Olivier (G-DC.).

3.3.1. Distinguishing characters. Perennial. Stems up to 80 cm. long, prostrate, with spreading hairs. Basal and lower cauline leaves on a petiole 3-4 times as long as the blade, the blade ovate-cordate, 25-50 mm. long, crenate- lobed or dentate. Inflorescence cymose, simple monochasium or dichasium, pedicels three times as long as the calyx, at length refacted. Corolla 18-23 mm. long, four times longer than the calyx, purple (Figure 5).

3.3.2. Habitat. Clay soils, agricultural fields, river banks, small canals in small canals in date palm orchards and under trees and under trees, sometimes it grows with fields of *Hordeum vulgare*. Altitude: 30-100m. . Flowering between late April and early June, fruiting between late May and mid - July.

3.3.3. Distribution in Western Desert. DWD: Between Heet and Kubaisa, Agricultural fields, M.O.Mousa & S. S. Shahatha, 2012 AUH; 5 km. W. of Heet to Haditha, palm groves, clay soils, M.O.Mousa, 2013 AUH; 3km. from Fallujah to Habbaniyah, irrigation canals on the roads, clay soil, M.O.Mousa & S. S. Shahatha, 2019 AUH.

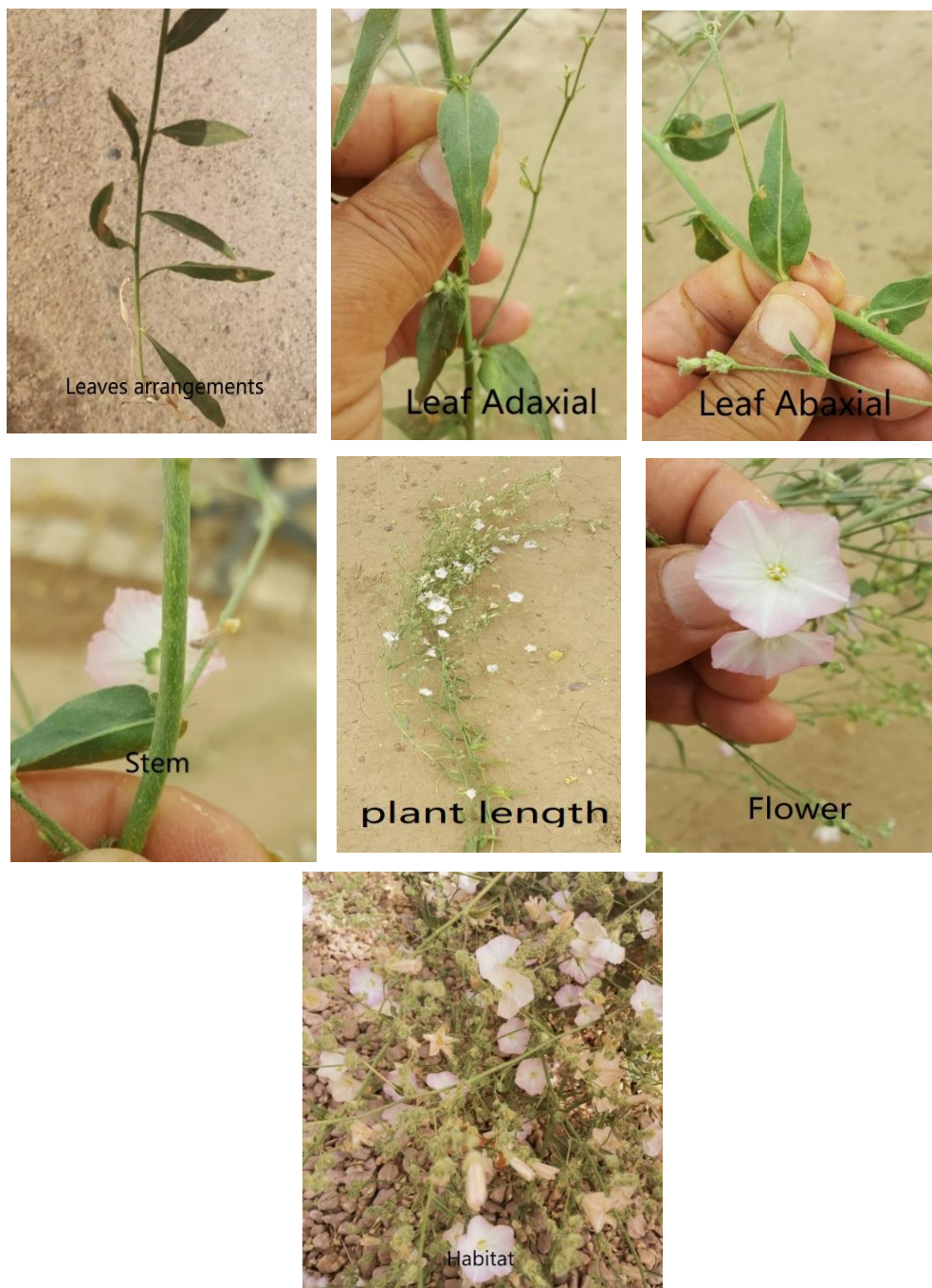


Figure 3. Some of vegetative and floral parts of *Convolvulus cantabrica*

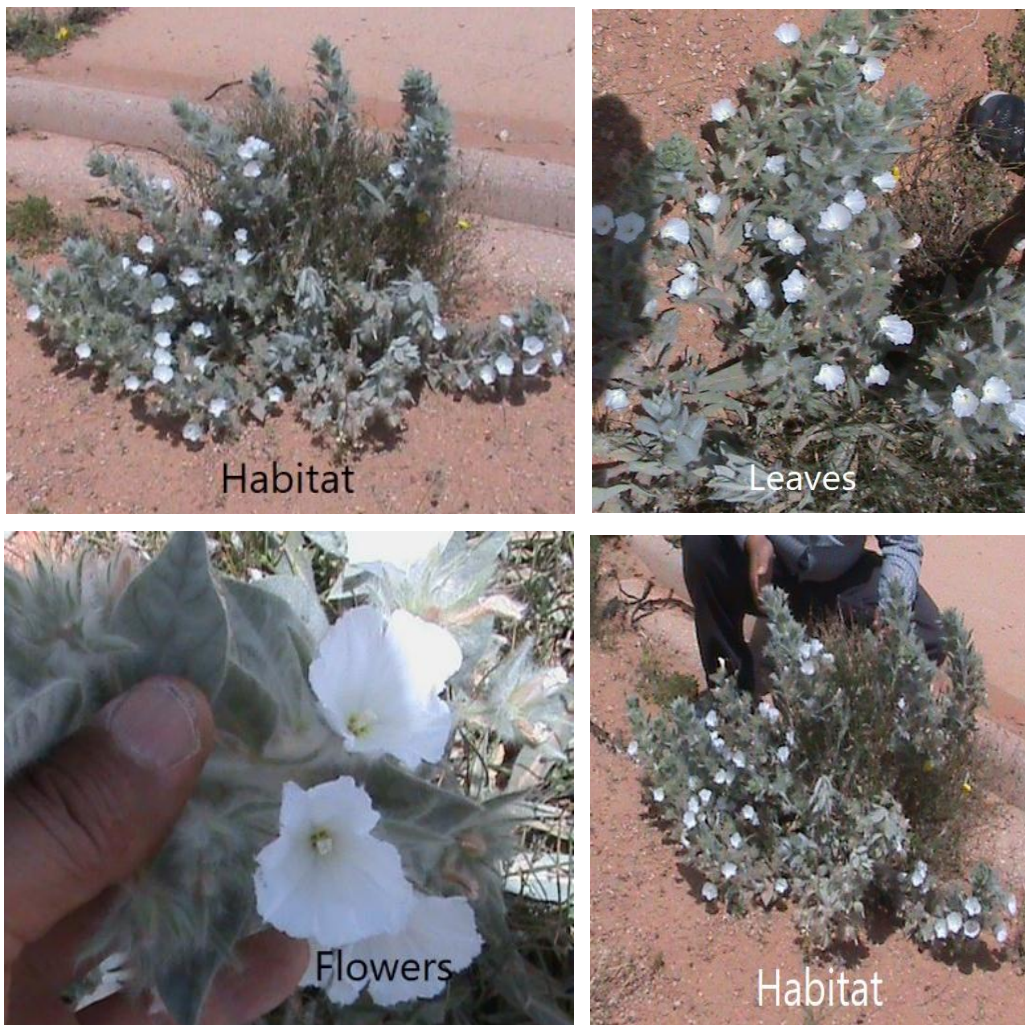


Figure 4. Some of the vegetative and floral parts of *Convolvulus reticulatus*

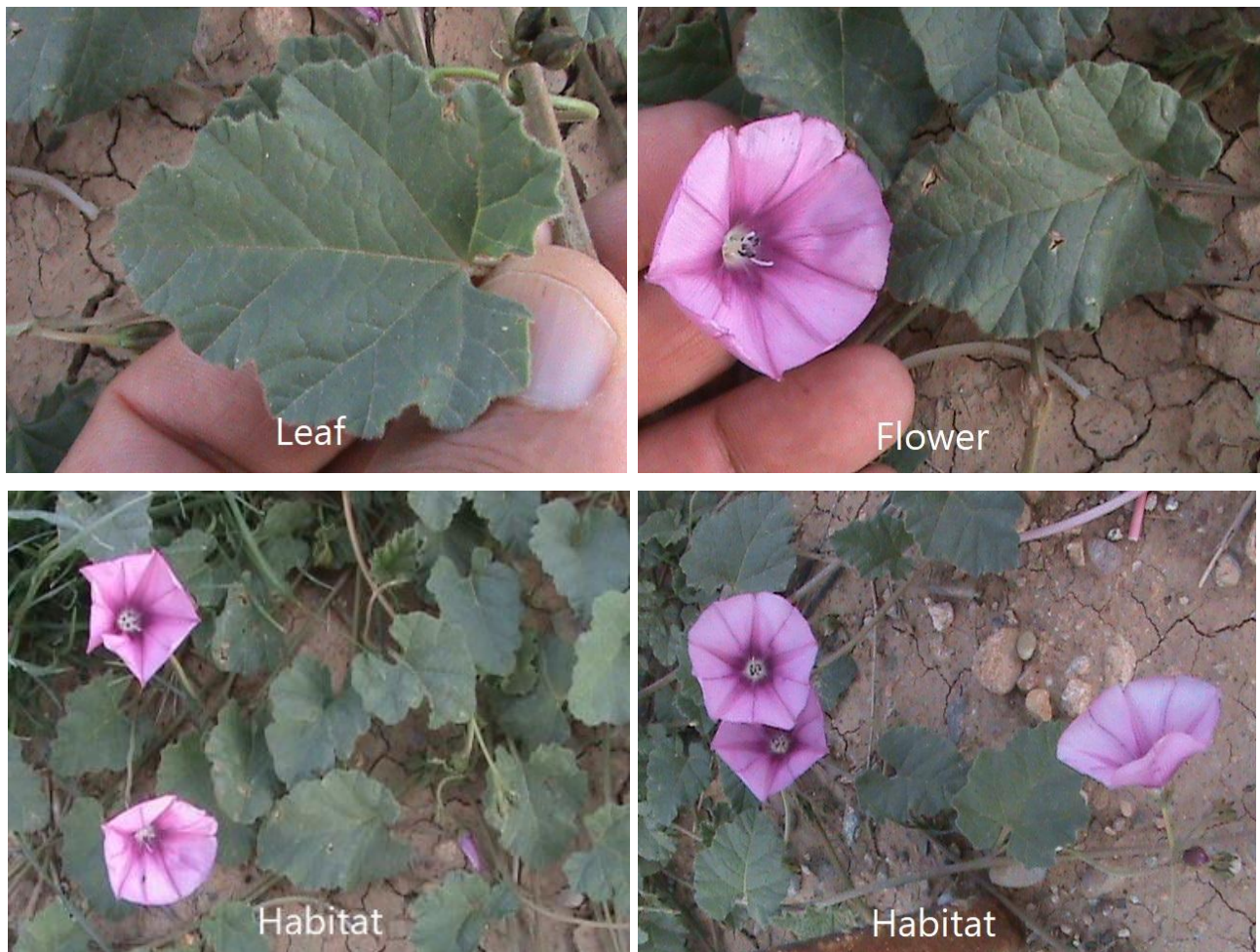


Figure 5. Some of the vegetative and floral parts of *Convolvulus stachydifolius*

After reviewing the plant samples of the genus *Convolvulus* preserved at the Herbaria of Iraqi Universities as well as the Iraqi National Herbarium, it was found that there was no sample of the three mentioned species that were collected from the Western Desert District at all. This work was preceded by a review of all scientific references related to the species, foremost of which is the Al-Aidani study [13] of the genus *Convolvulus* in Iraq in 1998, as well as the Ridda and Daoud Bulletin [12] issued in 1982, and the previous references such as the Al-Rawi Bulletin [11] in 1964 and the Zohary Bulletin [9] in 1950 and others, none of them indicated the presence of the three species in this district. In addition, recent studies that have been concerned with this province were reviewed, including the study [15] of plant biodiversity for the Al-Rutba Dam area in western desert of Iraq in 2018, and the study [16] of Al-Feadah conservation on the Al-Emsad Valley, south of Al-Rutba region, as they did not mention the existence of these species.

It had been doubted that *Convolvulus cantabrica* was recorded in Iraq [10], as for the species *Convolvulus reticulatus*, it was mentioned in the southeast of Mandali region within the Persian Foothills District, and in the Tikrit region within the Lower Jazira District, as well as presence in Tuz Khurmatu region within Kirkuk District, he did not mention anything about the Western Desert. As for the last species *Convolvulus stachydifolius*, it was mentioned in Jabal Hamrin within Ghurfah-Adhaim District, and Mandali region to Naft Khaneh, as well as the Badra region within the Eastern Alluvial Plain District. Moreover, it was mentioned that same species were thrived on the banks of the Tigris river within Upper Jazera District, south of Al-Qayara region. It is derived from geographical

distribution map of the species under study in Iraq that it is not surprising that they exist in the Western Desert and for several reasons, including the seeds with *Triticum* grains, and this is supported by the farmers who brought *Triticum* and *Hordeum* grains from different regions such as Diyala, Kirkuk, Mosul and Tikrit.

Furthermore, environmental factors such as winds and dust storms play a role in the migration of species to new environments that may succeed or fail depending on the new conditions, according to field studies and scientific references [17] and [18,19]. Al-Katib [20] mentioned that the prevalence of plants occurs continuously, at any moment there is a real migration in very large numbers, and these migrations represent a new extension of new lands. Among the similar studies that confirmed the continuous spreading process is the recording of six new plant species in Basra district [21]. As well as recording new species in the country, such as *Salvia sclareopsis*, which belongs to the Lamiaceae family [22], and the species *Tephrosia nubica* of Papilionaceae family [23].

4. Conclusion

Wild plant species suffer from environmental instability as a result of new climatic changes. In addition to human intervention in the nature of the geographical distribution of species by unintentionally transferring seeds to new places. These three species have succeeded through their presence in several places in the Western Desert Province. Field studies and surveys remain very important and necessary over time. Appearance of these new species will contribute in increase plant biodiversity in this vital region.

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