

## Phytogeographical Study of the Family Orobanchaceae in Kurdistan Region-Iraq

Sirwan Hassan Salih

Biology Department, College of Education, University of Garmian, Kalar, Kurdistan Region, Iraq

Email: [herash1966@yahoo.com](mailto:herash1966@yahoo.com)

### Abstract

This study included a comprehensive survey of the north and northeast districts of Iraq, the ecology and geographical distribution of the Orobanchaceae species available in Iraqi Kurdistan regions in Duhok, Arbil and Sulaimani governorates were investigated, based on data collected from different sources, geographical distribution was made by the aid of prepared maps, ecological notes were pointed out regarding the different environmental types, species distribution of two genera (*Orobanche* L. and *Phelypaea* L.) of the family and two endemic species (*O. ovata* and *O. singarensis*) has been recorded, as well it was noted that the *O. aegyptiaca* Pers. is the most widely distributed specie (common species) and *Phelypaea coccinea* was the rare species.

**Keywords:** Phytogeography, Orobanchaceae, Kurdistan region-Iraq.

### 1. Introduction

Orobanchaceae (Broomrape family) widely distributed in warm and temperate area, about 90% of their species are old world natives and only about 10% of the species occur in the cold or hot regions (Thieret, 1971). It is obviously known that the plant spreading influenced by geographical and environmental conditions therefore the Orobanchaceae species show a high variation in their distribution in different environmental conditions. Ecological and geographical distribution of plants are clearly much relevance to plant taxonomy because each species or groups of plants are with a certain pattern of distribution which is one aspect of its definition. The aims of plant

geography are to ascertain the essential features and recurrent patterns of the special distribution of plants and to discover their fundamental causes, which lie partly in their ecology. The data on geographical distribution of this study was obtained from some herbarial specimens that have been previously reported, literatures and personal field trip.

## 2. Materials and Methods:

The materials that were used as a data source are herbarial specimens (table 1), labels of major Iraqi herbaria (table 1), personal field trips in districts of MAM, MRO, MSU, FAR, FKI and FPF (figure 1,2), literatures and Iraqi plants lists that published by: Handle Mazzetti (1910); Zohary (1946); Blackelock (1949); Al-Rawi (1964); Khalaf (1980); Ridda and Daoud (1982); Faris (1983) and some Floras such as: Flora of Syria. Pal., Sin. (Post, 1933); Flora Iranica (Parsa, 1949); Flora Lowland of Iraq (Rechinger, 1964); Flora Iranica (Rechinger, 1964); Flora of Turkey (Davis and et al, 1982). The altitudes were measured by altimeter while the taxonomic terminology were derived from Lawrence (1951); Guest, 1966; Al-Mussawi (1987); Al-Katib (1988). Geographical distribution was made by aid of prepared maps (figure 3, 4, 5) and it is focused on Iraqi Kurdistan regions (figure 2),

## 3. Results and Discussion:

### 3.1. Ecology and Geographical Distribution:

The results of this study showed that the species of two genera (*Orobanche* L. and *Phelypaea* L.) of the family Orobanchaceae in Iraq are distributed in Kurdistan region, three species of *Orobanche* are newly recorded for Iraq and species *Orobanche mutelii* is newly recorded for Kurdistan, so there are 12 species belongs to two genera distributed in Kurdistan region, species with large population as *O. aegyptiaca* due to it is grow on both wild and cultivated plants, while some species of *O. crenata*, *O. kurdica* and *O. ovata* are sparsely distributed, species *Phelypaea coccinea* and *O. arenaria* are rare in their distribution.

The Orobanchaceae species are obligatory parasite plants therefore the geographical distribution depended directly on the distribution of their hosts (wild and cultivated plants), *O. aegyptiaca* {figure 3, table 2} is the most widely distributed species extended in different environments and laces from Kifri (FKI), south of surveyed regions to Kany Massy near Zakho (MAM) north of included surveying regions, so the *O. aegyptiaca* was found in all districts which included in this investigation, it's altitude range 200-1700m; *O. anatolica* {figure 4, table 2} was dominated among examined species in Piramagrun and Azmer mountain (MSU), it's altitude range 900-1800m in rocky mountain; *O. arenaria* was newly recorded {figure 4, table 2} scarcely distributed in Piramagrun mountain (MSU), 1250-1550m altitude, it parasite on wild plants; *O. coelestis* (figure 5, table 2) spread in Piramagrun mountain (MSU) and Arbil (MRO), 750-1650 m alt., in rocky mountain; *O. crenata* (fig. 4, tab. 2) distributed in Duhok (MAM) and Piramagrun mountain (MSU), 900-1800m, parasites on wild plants; *O. kurdica* {figure 5, table 2} distribute with high density in Zakho and Duhok (MAM), Chuwarta and Piramagrun mountain (MSU), 900-1800m alt.; *O. minor* (new record) (figure 4, table 2) scattered in Duhok (MAM) and Sartaky Bamou mountain (FPF), 1100-1750 m alt., it is only parasites on wild plants in rocky mountain; *O. mutelii* (newly recorded for Kurdistan) (figure 4, table 2) distributes in Kalar (FPF) in semi desert habitat, 200-450m, parasites on wild plants; *O. ovata* (endemic species) {figure 4, table 2} distributed in Piramagrun mountain (MSU) and Sere Hassan Beg (MRO), 1500-2000m, in rocky mountain, parasites on wild plants; *O. ramosa* (newly recorded) (figure 5, table 2) distributed in Zakho (MAM) and Erbil (MRO), 600-850 m, in hill, plateaus and Rocky Mountains, parasite on both wild and cultivated plants; *O. singarensis* (endemic species) (figure 5, table 2) distribute in Chuwarta and Piramagrun mountain (MSU) and Kalar (FPF) in addition to Sinjar mountain (FJS), 200-900m, it's habitats are plains and rocky mountains; *P. coccinea* (rare species) (figure 5, table 2) distribute only in a specific small area in Piramagrun mountain (MSU) 1500-2000m, parasite on wild plants, on the other hand the species *O. aegyptiaca*, *O. coelestis* and *O. mutelii* are

distributes in another regions in mid and south of Iraq (according to the labels of herbarial specimens and of Iraqi plants lists) which are entirely different from their habitats with the habitats of Kurdistan in (climate, altitude, soil type and hosts). As well the results of (figure 6, 7) showed that the MSU district are the most districts where the species are spread (9 species) and the FKI is the less districts (1 species) and the most common species *O. aegyptiaca* are distributed in all six included districts and species of *P. coccinea*, *O. mutelii*, *O. crenata* and *O. anatolica* are less distributed species (1 district). The density of populations of studied species depended on densities of their hosts populations and somewhat on germination conditions and environments.

some of these species parasite on cultivated plants and others on wild plants while some species on both of them, likewise these species may be disappeared in their original places when their hosts are absent, consequently may cause to change the geographical distribution of these species from time to time,

Table (1) Herbaria which used their specimens during the study abbreviation follow Holmgren & Keuken 1989

BAG	Baghdad Iraq. College of Agriculture
BAH	Baghdad Iraq. National herbarium of Iraq
BUH	Baghdad, the university herbarium, college of Science, dept. of Biology
BUNH	Baghdad, Iraq. Natural history research center of Education University of Baghdad
BUE	Baghdad, Iraq. Dep. of biology, college of Education, University of Baghdad
SUH (ASUH)	Arbil, Iraq. College of Science, University of Salahaddin
ESUH	Erbil, Iraq. College of Education university of Salahaddin
MSUH	Mosul, Iraq. College of Science, University of Mosul

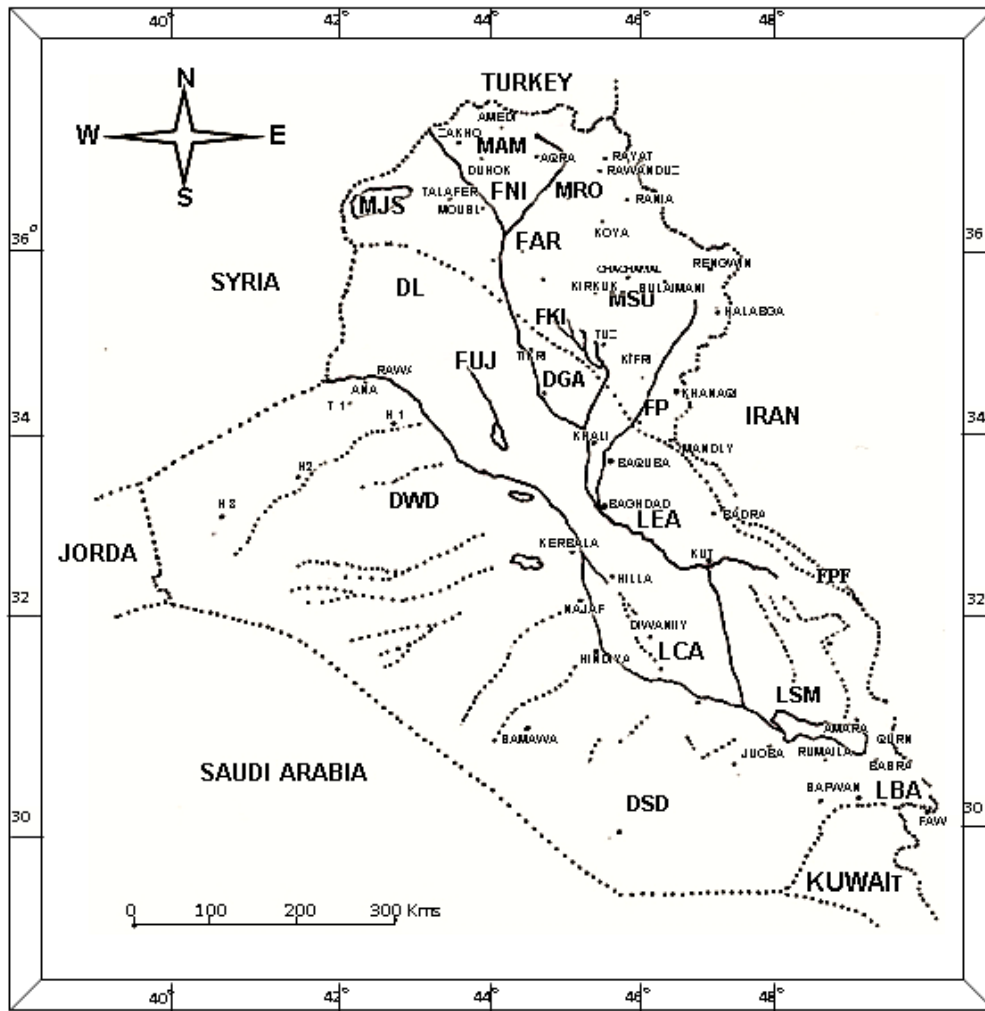


Figure (1) Physiographic regions and Districts map of Iraq

M - MOUNTAIN  
REGION

F - UPPER PLAINS AND  
FOOTHILLS REGION

MAM - Amadiya District

FUJ- Upper Jaziera District

MRO - Rowanduz District

FNI- Nieneveh District

MSU - Sulaimani District

FAR- Arbil District

MJS - Jabal Singar District

FKI- Kirkuk District

FPF- Persian District

- |                               |                                      |
|-------------------------------|--------------------------------------|
| D - LOWER PLATEAU REGION      | L - LOWER MESOPOTAMIAN REGIO         |
| DLJ - Lower Jaziera District  | LEA- Eastern Alluvial Plain District |
| DGA- Ghurfa - Adhaim District | LCA- Central Alluvial Plain District |
| DWD - Western Desert District | LSM- Southern Marsh District         |
| DSD- Southern Desert District | LBA- Basra Estuarine District        |

Physiographic regions and districts of Iraq.

(Physiographic is the abbreviation and details of Iraqi geographical districts)

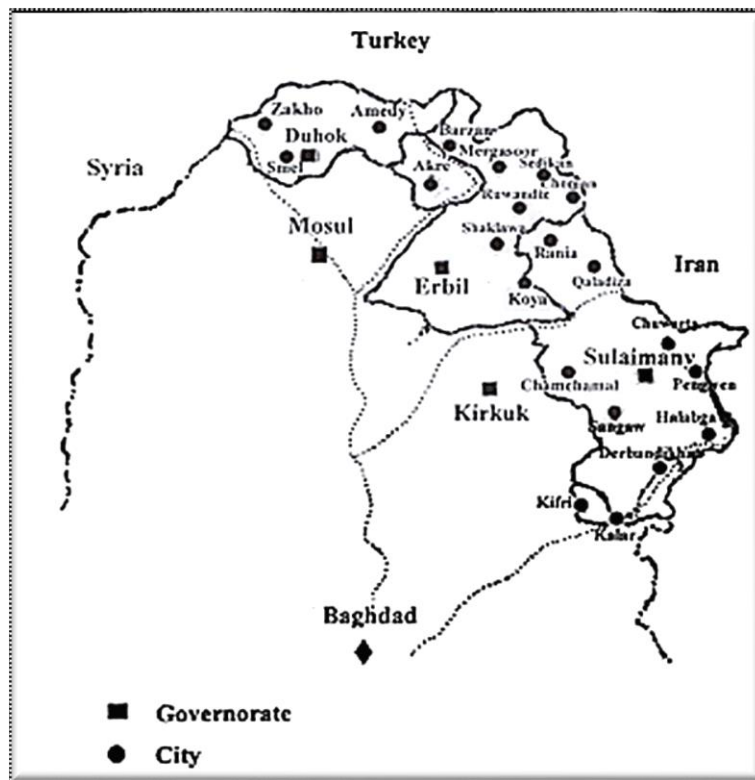


Figure (2), surveyed regions map

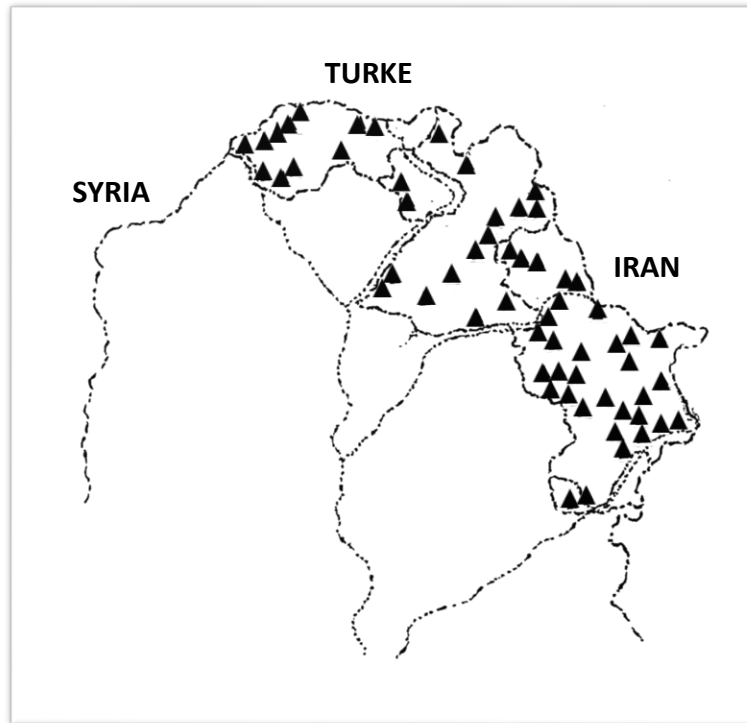


Figure (3) Distribution map of: *O. aegyptiaca*

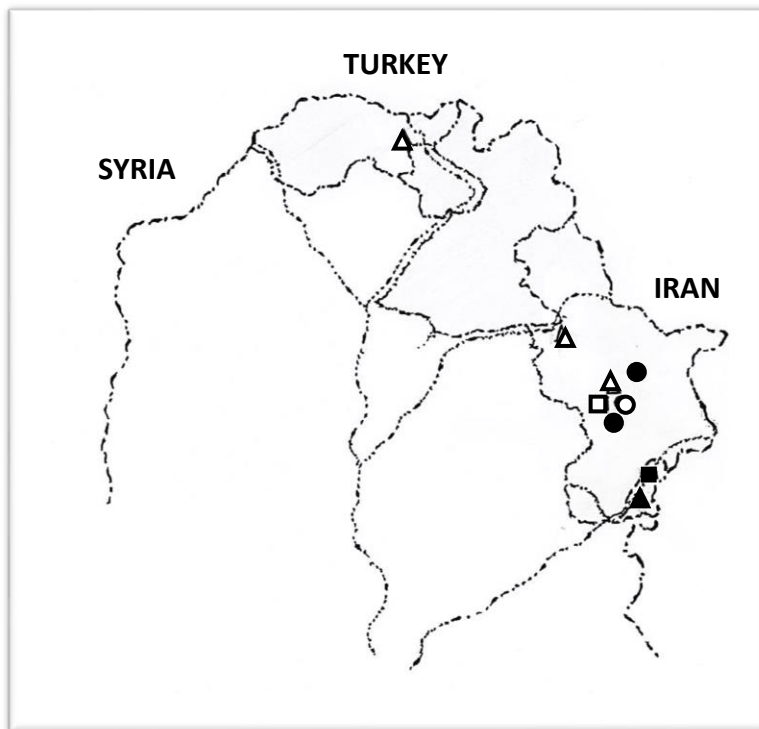


Figure (4) Distribution map of:

- |   |                 |   |                   |   |                     |
|---|-----------------|---|-------------------|---|---------------------|
| □ | <i>O. ovata</i> | ▲ | <i>O. mutelii</i> | ○ | <i>O. arenaria</i>  |
| ■ | <i>O. minor</i> | △ | <i>O. crenata</i> | ● | <i>O. anatolica</i> |

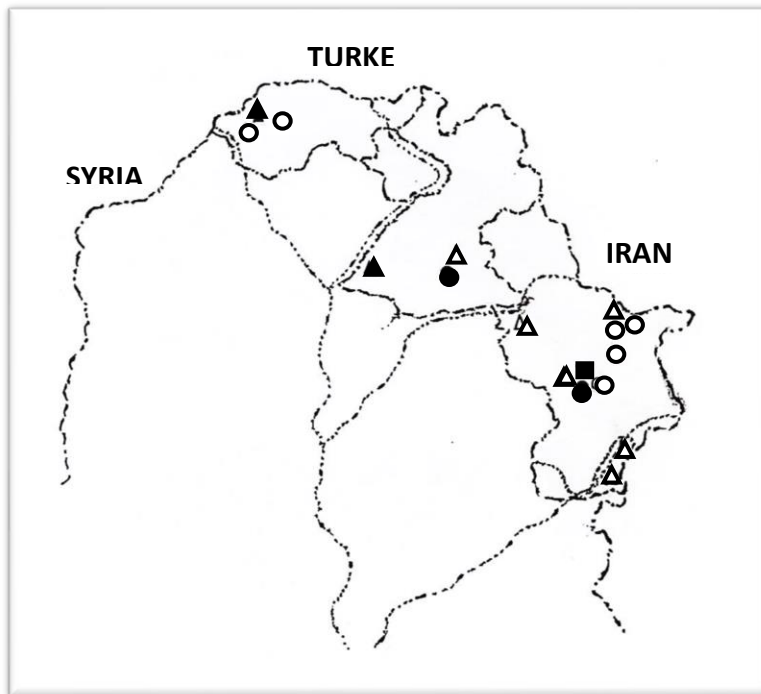


Figure (5) Distribution map of:

- |   |                       |   |                     |   |                   |
|---|-----------------------|---|---------------------|---|-------------------|
| △ | <i>O. singarensis</i> | ■ | <i>P. coccinea</i>  | ○ | <i>O. kurdica</i> |
| ▲ | <i>O. ramosa</i>      | ● | <i>O. coelestis</i> |   |                   |



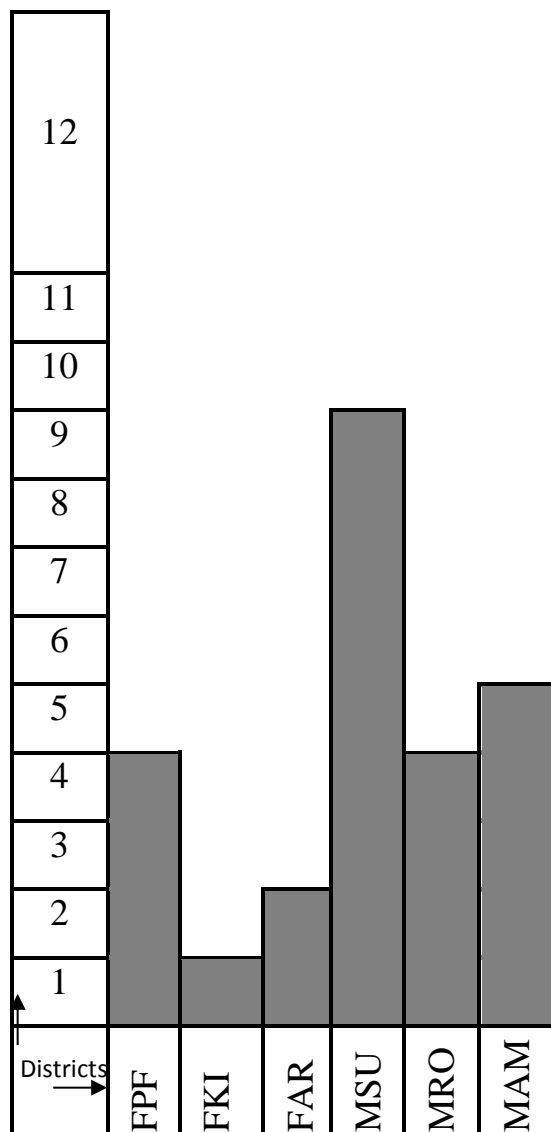


Figure (6) Number of species deployed in each district.

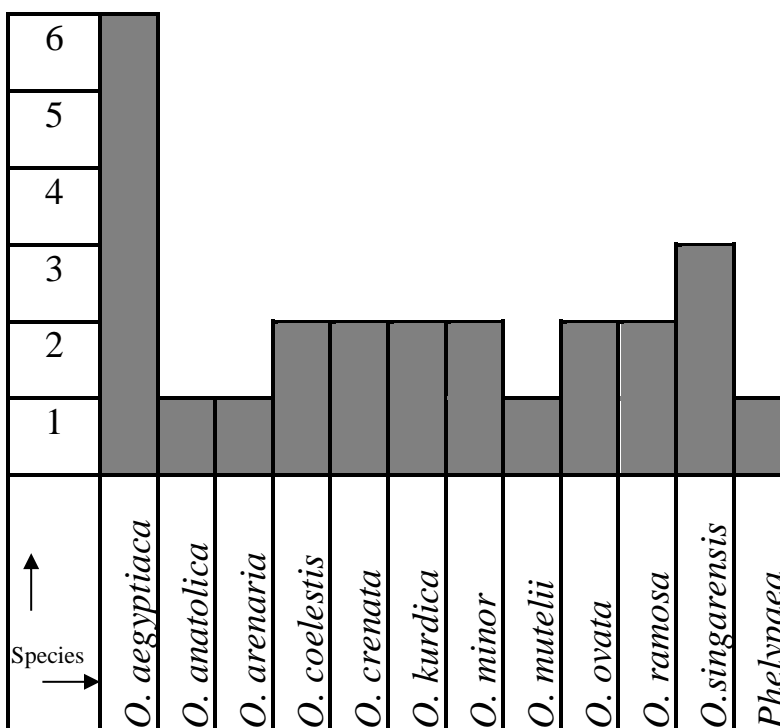


Figure (7) Districts occupied by studied species.  
 (Districts = FPF, FKI, FAR, MSU, MRO, MAM)

• Table (2) Geographical distribution, altitudes and host of examined

Spp.	Geographical districts								Hosts		Alt. ( m )
	MAM	MRO	MSU	FNI	FAR	FKI	FPF	Wild plants	Cultivate plants		
<i>O . aegyptiaca</i>	*	*	*	*	*	*	*	*	*	*	200 - 1500
<i>O . anatolica</i>			*					*			1300 - 1750
<i>O . arenaria</i>			*					*			1500 - 1750
<i>O . coelestis</i>			*					*	*	*	750 - 1750
<i>O . crenata</i>			*					*			1500 - 2000
<i>O . kurdica</i>	*		*					*			900 - 1800
<i>O . minor</i>								*			1100 - 1400
<i>O . mutelii</i>								*			200 - 400
<i>O . ovata</i>			*						*		1500 - 2000
<i>O . ramosa</i>	*				*			*	*	*	600 - 850
<i>O . singarensis</i>								*	*	*	200 - 1500
<i>P . coccinea</i>			*						*	*	1600 - 2000

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