



ECOLOGY AND GEOGRAPHICAL DISTRIBUTION OF *ARABIS* L. SPP. (CRUCIFERAE) IN IRAQ

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Abstract

The study included the ecology and geographical distribution of the *Arabis* L. species, which are grown wildly in Iraq. The species varied in their ecology growth, altitude and distribution on Iraqi phytogeography districts. *A.nova* Vill. has wide distribution, which was spread in five districts: Sulaimanyia (MSU), Rawanduz (MRO), Amadiya (MAM), JabalSingar (MJS), and Nineveh (FIN). *A.aucheri* was found in three districts, MRO, MAM and MGS, but *A.caucasica* Willd. distributed in Mountain Region (MR) districts MSU, MRO, MAM and MJS. *A.sagittata* (Bertol.) DC. distributed in MSU, MRO, MAM and FNI. The study showed the variations in ecology, altitude and geographical distribution with taxonomic value in isolation of species.

Key words : Ecology, geographical distribution, *Arabis*, Cruciferae.

Introduction

Can was the first scientist used Aerography, which dealing with the distribution of plants in the world (Majeed, 2016). Ecology evidence was very important in understanding the distribution of taxa (AL-Dalawi, 2011). Many aspects of ecology and geography of plants are clearly of much relevance to plant taxonomy because each taxon exhibits a certain pattern of distribution, which is one aspect of it is a definition (AL-Dosky, 2014). The distribution of plants reflects the overall survival response of the plant to all the ecological factors (Sardar, 2013). The environment conditions were commonly divided into two factors:

1. Climate factors included light, temperature, water, CO₂, wind.
2. Soil and biotic factors (Meran, 2009).

The ecological factors and geographical variations were related directly to the morphology, anatomy and chemical contents of plants (AL-Rawi, 1964). Geographical distribution of Iraqi plants has important value due to its variation in the environment as a result of its geographical location (Townsend and Guest, 1980), the geographical distribution of Iraqi plants has an important value due to its geographic location between

the desert region and the snowy mountainous regions. Iraqis divided into 4 main physical regions, each region has been subdivided according to their physiography features as given in table 1 (AL-Rawi, 1964). There are 4 species belonging to *Arabis* in flora of Iraq (Townsend and Guest, 1980) Willd. *A. caucasica* and *A. sagittata* (Bertol.) DC. *syn.* (*A. hirsuta* L.) *A. nova* Vill. *syn.* (*A. auriculata* Lam.), (*A. montbretiana* Boiss.) *A. aucheri* Boiss.

The study has been conducted on some environmental aspects and geographical distribution of the *Arabis* spp. Growing wild in Iraq and there is no previous study of the genus in this field only some lists that mentioned their distribution including (Handel-Mazzetti, 1910; Nabelek, 1922; Rechinger, 1964; Zohary, 1964; Ridda and Daoud, 1982)

Arabis called locally Rocky or Wall Cress (Quest, 1966).

The aims of this study are :

1. Studying the ecology of species in Iraq.
2. Geographical distribution of species in Iraq's natural geographical districts.

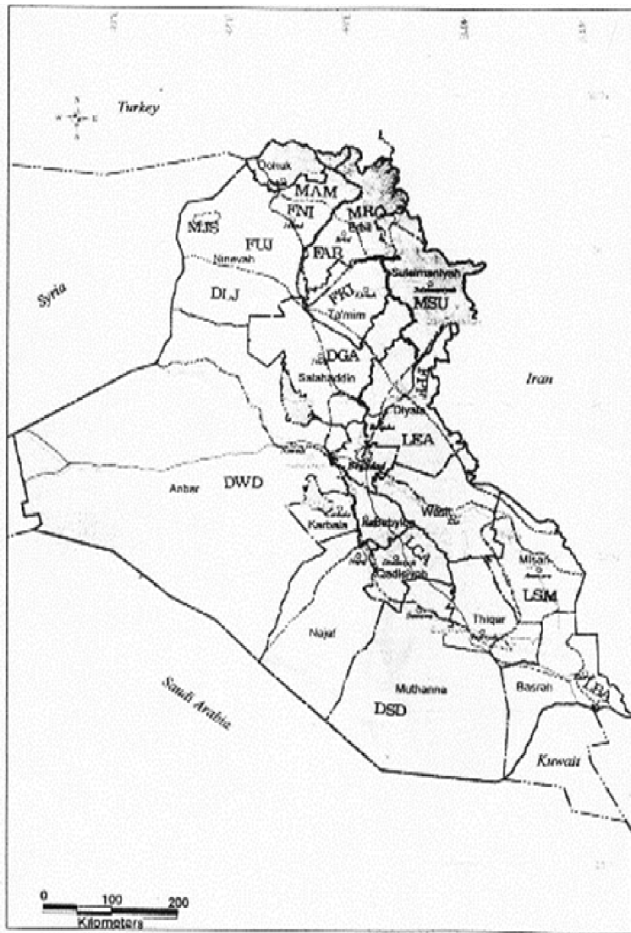


Fig. 1 : Map of regions and phytodistricts of Iraq (Guest, 1966).

Materials and Methods

This study depended on specimens, which were collected from some Iraqi districts (MSU, MRO, MAM, MJS, FAR, FKI) and herbaria specimens (The University Herbarium (BUH), National Herbarium of Iraq (BAG), College of Agriculture Herbarium (BUA), National History Research Center & Museum (BUNH), College of Science (SUH), College of Education (ESUH). Data recorded on label included scientific name, collector, date, locality, altitude, soil, habitat, abundance. It was the use of the list of Iraqi plants published by Handle-Mazzetti (1910), Nabelek (1922), Zohary (1946), Al-Rawi (1964) and Ridda & Daoud (1982).

The study also based on Iraqi international borders of the organization of Guest (1966) and natural phytodistricts of Iraqi in the flora of Iraq.

Results and Discussion

Ecology study

Species of the genus *Arabis* dispersal in the mountain region and sometimes in Nineveh district in Upper plain

Table 1 : Regions and phytodistricts of Iraq (Guest, 1966).

M	Mountain region
MAM	Amadiya District
MRO	Rowanduz District
MSU	Sulaimanyia District
MJS	Jabal Sinjar District
F	Upper plains and foothills region
FUJ	Upper jazira District
FNI	Nineveh District
FAR	Arabil District
FKI	Kirkuk District
FPF	Persian foothills District
D	Desert plateau region
DLJ	Lower Jazira District
DGA	Ghurfa-Adhaim District
DWD	Western Desert District
DSD	Southern Desert District
L	Lower mesopotamian region
LEA	Eastern Alluvial plain District
LCA	Central Alluvial plain District
LSM	Southern Marsh District

Table 2 : Distribution of species on natural phytodistricts of Iraqi.

Species \ District	MSU	MRO	MAM	MJS	FNI
<i>A. aucheri</i>	+	+		+	
<i>A. caucasica</i>	+	+	+	+	
<i>A. nova</i>	+	+	+	+	+
<i>A. sagittata</i>	+	+	+		+

and foothills region were collected few specimens of *A. nova* and *A. sagittata*, *A. nova* has wide dispersal, which is founded in all districts of mountain region (MSU, MRO, MAM, MJS) and FNI, while *A. sagittata* distributed in mountain region only (MSU, MRO, MAM, MJS). *A. caucasica* distributed in four districts (MSU, MRO, MAM, MJS) but *A. aucheri* dispersal in three districts (MRO, MSU, MJS). *A. caucasica* and *A. nova* were found as medium –few populations but *A. aucheri* and *A. sagittata* dispersal as few individuals.

Plants of all species dispersal in mountain region, which were grown in apex of mountains, alpine apex, marineclefts, limestone rocks and limestone crevices, rocky slopes, lifts and mountain forests specially grassy mountain slopes, *Oak* forest, *Aegilops*, *Pine* forest, occasional in the lower forest zone of Iraq, among the walnut trees under their shadow, forest slopes often under damp shady rocks. Species distributed in different soils

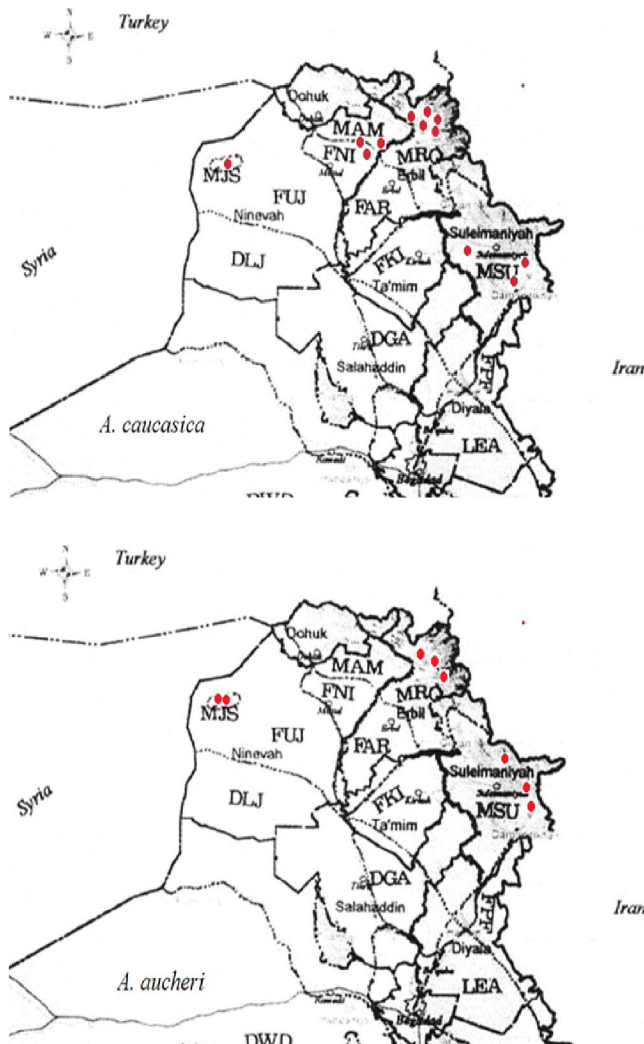


Fig. 2 : Distribution map of *A. aucheri* and *A. caucasica*.

like clay mountain soil, sandy gravelly soils, wet mountainous lands, pasture field, roadsides and road edges.

Species founded at different altitudes ranged between 500-3600 m above sea level. *A. aucheri* was found at 600-1500 m which was the lowest height, while *A. nova* distributed between 500-1750 m *A. caucasica* dispersal between 1100-3600m, which was the highest and *A. sigattata* was found between 650-2650 m.

Geographical study

The results showed the species of the genus grown in the mountain region of Iraq (MSU, MRO, MAM, MJS) and FNI in Upper plains and foothills region. Species varied in their distribution, *A. nova* distributed in 5 districts (MSU, MRO, MAM, MJS and FKU), which was the wide dispersal while *A. caucasica* was distributed in 4 districts of mountain region (MSU, MRO, MAM and MJS), but *A. sigattata* was distributed in 4 districts (MSU, MRO,

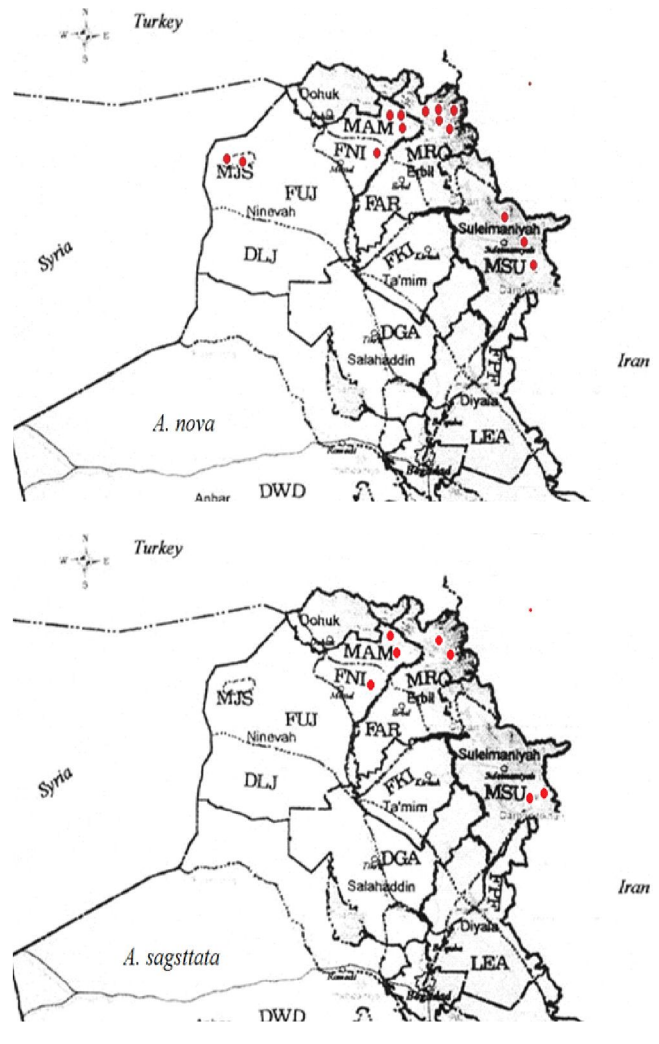


Fig. 3 : Distribution map of *A. nova* and *A. sigattata*.

MAM and FNI), while *A. aucheri* was found in 3 districts of mountain region (MSU, MRO, MJS), which was the lowest.

A. aucheri dispersal in MSU from DaraTui on the road between Halabja-Tawaila and in Penjwin valley then moves to Gweija Dagh foresty opposite Al-Sulymania, also it was found in MRO in Bustura Chia village before Salah Al-Din resort then in MJS west of Al-Mosul on and surrounded SinjarMountain and it was found above Kizil Kan in MJS.

A. caucasica was distriutedia all districts of mountain region beginning from MSU in the east where it is founded in Avroman mountain spur north Biyara near Persian borders and founded in Kopi Garadagh and Garadagh then extebded to PiraMagrun mountain, which is founded in PirOmer, Zawiya village, east slopes, then transfer to MRO; in Shaqlawa, Handren mountain opposite Rownduz city, north of Rost, Hisar-I Rost, Helgord mountain, range the mountain and its peak, above Sarcal, south mountains

of HajiUmran, Sakri Sakran, Hassar-I SAkran, Kuda north Haji Umran, north of Qandil, Qandil range, between Perrish and Bardanas, north of Pushtashan, southern Spur of Karoukh.

MAM : Amadiya, Zawita mountain north of Sharanish, Khanturmountain in Zakho.

MJS : Sinjar Mountain, north slopes.

A.nova distributed in MSU; Jarmo, Palegawra, PiraMagrun, above Garachitan, Malakawa, north Penjwin, Darbandi Khan, Avroman mountain Twila, east slopes of Biran, north Garaghitan.

MRO : KuhiSefin, Bastura, Salah Al-din, Shaqlawa, Hadac 5 km north of Shaqlawa, Baradost, north Shani Dar, Sarcal, Gali Warta, north-west of Rania.

MAM : Khantur mountain, north Sharanish, Dohuk, Aqra, Zakh.

MJS : JabalSingar, north slopes, on the road between Sinjar-Karsi, west of the mountain, in Oak forest near Jeddala village, near Sinjar Gypsum.

FNI : in Maqlub mountain north Al-Mosul.

A. saggittata distributed in MSU; mountain area near Dokanlake, the range of lake, 5 km from Dokan lake to the north-east of Dokan lake.

MRO : Tawska north of Erbil, Rawnduz.

MAM : Swara-Tuka near Zawita, Dohuk region pine forest, Zakho.

FNI : Maqlubmountain in Al-Mosul.

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