

Study of the Natural Regeneration of the *Juniperus Macrocarpa* (Sm.) in Idlis Area – West of Derna City



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Abstract

This study was conducted with the aim of identifying the *Juniperus Macrocarpa* trees on the natural regeneration, which are found on sand dunes threatened by human activities and changes in environmental conditions caused by wind, drought, erosion and increased soil salinity, and their impact on its reproduction and growth equations for the Adlis area west of Derna city, where the *Juniperus Macrocarpa* exists naturally but unfortunately in poor condition. The area is very small, and we believe it is the only area where this species is found in North Africa .

Two sites 1 and 2 were selected and each was divided into two sectors A and B. The area of each sector was 500 m² and the *Juniperus Macrocarpa* trees and seedlings were counted

within each sector (total number of individuals) Calculate the crown coverage of the *Juniperus Macrocarpa* in %. And calculate the crown coverage of coexisting vegetation in the sector (%). Then we calculated the number of the *Juniperus Macrocarpa* seedlings in four visits (Annual visit) (2019/2022) to the both sites 1 and 2, and in the four visits the number of seedlings was (0) with the most of the trees are in poor condition of total and partial cutting of trees, burning and emergence of roots due to dredging, sand and grazing. The density of trees in site 1 is higher than site 2, but it has no effect on natural regeneration, and all the trees in both sites are old and there are no young individuals, thus limiting the ability of this species to produce new individuals and continue its growth to reach advanced

stages of age, which leads to the extinction of this species at any time in the area.

*** Introduction**

In order for any plant species to survive, it must reproduce, and if any limb or obstacle prevents it from reproducing in a particular area, it will obstruct that area from being a part of its natural distribution area. (Poluni, 1967). One of the most important indicators of the degradation of natural vegetation is the decrease in the ability of the main plant species to reproduce at appropriate rates, and the natural reproduction of forest trees and shrubs is an effective means of ensuring the completion of the life cycle of important species and the continuity of their survival, and climate change affects the microclimate of the soil and its temperature as an indicator of proof after seed germination (Terry et al, 2022).

The *Juniperus Macrocarpa* is called the large-fruited *Juniperus* and it is the *Juniperus* that comes instead of the species of the *Juniperus Oxycedrus*, which is found at height of 1000 meters above the sea level and is found throughout the Mediterranean. The *Juniperus Macrocarpa* is a residential tree to the Mediterranean region and grows on

coastal sand dunes at an altitude of 75 meters above sea level (Adams, 2004)

It is a small evergreen residential tree with a shallowly spreading root system (Keith,1965), found in a very small area 8 kilometers west of Derna in the Adlis area, confined to a small area between the seashore and a small sandy hill to the south. (Zunni,1977)

The *Juniperus Macrocarpa* grows on rocky calcareous soil covered with sand and is exposed to the effect of sea spray that falls on the vegetation and its effect on the salinity of the soil. This species is at risk of extinction due to the destruction of its habitat due to logging and sand removal for construction and consequently the erosion of surface roots (Zunni,2006). For any plant species to persist, it must reproduce, and if there is a circumstance or obstacle that prevents it from reproducing in a certain area, it will block that area from being among its natural distribution areas, and this applies to The *Juniperus Macrocarpa* in Libya (Zunni,2009).

The *Juniperus Macrocarpa* is currently found in a very small area and could become extinct from the region at any time. However, it is noticeable that this species is unable

to expand and spread to other nearby areas. Additionally, research suggests that the presence of this species in this area may not be limited to Libya, but could also extend across North Africa.

*** Materials and Research Methods**

The two study of the sites were selected in the Adlis region, which is located in 8 kilometers west of Derna city, and the area was divided into two sectors (A) and (B). The first is near the sea on a sandy flat land. The second is a rocky land at the top of the slope covered with sand. The area of each sector was a rectangular shape of what I proposed (Bower and zar,1984) and its area is $20 \times 25 = 500 \text{ M}^2$, from which the calculation will be made in hectare.0931063597

Use a geographic positioning system (GPS) to determine the height above sea level, slope, direction of exposure, and estimate the degree of inclination.

Prepare a preliminary description of the terrain, soil and vegetation (trees and shrubs of natural forests in the study's area) in the area, not just the site and sectors.

Counting the number of The Juniperus Macrocarpa Sibth & Sm trees within each sector, measuring the diameter of each tree and counting the seedlings.

Observations on some of the factors and notices affecting natural regeneration such as overgrazing, felling and other negative activities were recorded.

Field visits were repeated to count the seedlings of the studied species (four times during the study period for four years) and each visit to the two sectors was recorded on site (a seedling count visit for each growing season or regeneration)

*** Statistical and clerical work**

1- Provide a simple description of each location in sectors A and B and specify the lines of latitude, longitude, direction of slope, degree of inclination, and elevation above sea level.

2- Create a table for the two sectors in each site where each sector includes the name of the species, the number of individuals in each visit (seedlings), the total number of individuals and the crown coverage of The Juniperus Macrocarpa at the end of the study (Table 1 - Table 2 - Table 3 - Table 4)

3- Prepare a final table containing the name of the species in English and the scientific name, the crown coverage of vegetation for all species within each sector, the total number of individuals of the species, the annual average number of initiators and the average annual visit of

initiators to The Juniperus Macrocarpa pear and in hectares per year (Table 5).

4- At the final table, the reached results were discussed.

* Results and Discussion

Table (1) Location (1) Sector (A) - close to the sea - Idlis area - west of Derna city.

Types	Numbers of individuals	Numbers of Seeding				Coronal Coverage %
		29/5/2019	21/4/2020	28/4/2021	20/5/2022	
The Juniperus Macrocarpa sibth & SM	14	0	0	0	0	50.98
Periplocal Laevigate Ait	3	0	0	0	0	0.18
Phillyrea Media l	2	0	0	0	0	2.87
Total		2	2	2	2	54.03

Latitude: - 32.83206

Longitude: - 022.45145

Direction of the slope is: - North

The degree of inclination: - 5%

Height at sea level: - 4 meters

Description of the terrain and soil of Sector (A): -

The land is semi-flat, close to the sea, sloping towards the north and with three small hills from the south - the soil is sandy interspersed with rocks.

Description of Sector A's vegetation: -

Mainly consists of The Juniperus Macrocarpa sibth & SM, Phillyrea Media l, Periplocal Laevigate Ait, Plstacia Lentiscus L. , Lycium Shawil Roem, et Sch.

Table (2) Location (1) Sector (B) - close to the sea - Idlis area - west of Derna city.

Types	Numbers of individuals	Numbers of Seeding				Coronal Coverage %
		29/5/2019	21/4/2020	28/4/2021	20/5/2022	
The Juniperus Macrocarpa sibth & SM	15	0	0	0	0	53.43
Periplocal Laevigate Ait	1	0	0	0	0	0.35
Plstacia Lentiscus L	3	0	0	0	0	0.26
Lycium Shawil Roem, et Sch.	1	0	0	0	0	0.16
Total		0	0	0	0	54.2

Latitude: - 32.800630

Longitude: - 022.532790

Direction of the slope is: - Northwest

The degree of inclination: - 15%

Height at sea level: - 9 meters

Description of the terrain and soil of Sector (B): -

The land is sloping, approximately 100 meters from the sea - the slope is steep to the north with small hills to the south - the land is rocky and covered by a thin layer of sand.

Description of Sector A's vegetation:-

Mainly consists of The Juniperus Macrocarpa sibth & SM, Phillyrea Media l, Periplocal Laevigate Ait, Plstacia Lentiscus L. Lycium Shawil Roem, et Sch.

Table (3) Location (2) Sector (A) - close to the sea - Idlis area - west of Derna city. (East location 1)

Types	Numbers of individuals	Numbers of Seeding				Coronal Coverage %
		29/5/2019	21/4/2020	28/4/2021	20/5/2022	
The <u>Juniperus Macrocarpa</u> sibth & SM	11	0	0	0	0	36.54
Periplocal Laevigate Ait	2	0	0	0	0	0.32
Total		2	2	2	2	36.86

Latitude: - 32.831432

Longitude: - 022.45265

Direction of the slope is: - North

The degree of inclination: - 6 %

Height at sea level: - 6 meters

Description of the terrain and soil of Sector (B): -

Semi-flat land - sandy soil interspersed with rocks.

Description of Sector A's vegetation:-

Mainly consists of The Juniperus Macrocarpa sibth & SM, Phillyrea Media 1, Periplocal Laevigate Ait , Plstacia Lentiscus L. , Lycium Shawil Roem, et Sch.

Table (4) Location (2) Sector (B) - close to the sea - Idlis area - west of Derna city. (East location 1)

Types	Numbers of individuals	Numbers of Seeding				Coronal Coverage %
		29/5/2019	21/4/2020	28/4/2021	20/5/2022	
The <u>Juniperus Macrocarpa</u> sibth & SM	14	0	0	0	0	38.54
Total		2	2	2	2	38.54

Latitude: - 32.800345

Longitude: - 022.532686

Direction of the slope is: - Northwest

The degree of inclination: - 18 %

Height at sea level: - 10 meters

Description of the terrain and soil of Sector (A): -

Sloping land approximately 110 meters from the sea - sloping towards the north with small hills to the south - the land is rocky and covered by a thin layer of sand.

Description of Sector A's vegetation: -

Mainly consists of The Juniperus Macrocarpa sibth & SM, Periplocal Laevigate Ait, Lycium Shawil Roem, et Sch.

Table (5) Natural regeneration of The Juniperus Macrocarpa sibth & SM.

Site	Sector	Crown coverage of The <u>Juniperus Macrocarpa</u> sibth & SM %	Crown coverage of The vegetation %	Total number of individuals per hectare	Annual average number of seedlings	Estimated number of seedlings per hectare each year	Remark
01	A	50.98	54.03	280	0	0	
	B	53.43	54.2	300	0	0	
	<i>Average sector</i>	<i>52.20</i>	<i>54.11</i>	<i>290</i>	<i>0</i>	<i>0</i>	
02	A	36.54	36.86	220	0	0	
	B	38.54	38.54	280	0	0	
	<i>Average sector</i>	<i>37.54</i>	<i>37.7</i>	<i>250</i>	<i>0</i>	<i>0</i>	

The Juniperus Macrocarpa sibth & SM is found in a very small area in the Adlis area, about 10 kilometres west of the city of Derna - it is one of the species that has become naturally non-renewable, which is reflected in its limited geographical distribution (Al-Zunni ,2006) and this coastal sandy environment is threatened with extinction due to human activities and are vulnerable ecosystems exposed to wind gusts loaded with salinity and drought as a result of the

hot and dry summer season ((Al-Zunni ,2006)...) and (Garcia et at.1999.)

We observe At site 1 and 2 in both sectors A and B (Table 1.2.3.4), there was no natural regeneration of The Juniperus Macrocarpa sibth & SM during the four-year visits, so the number of seedlings per hectare/year was (Zero). This is attributed to the sandy soil that does not retain adequate moisture for seed pods and is consistent with what was reported by (Al-Zunni el at 2009 – Maria Silva El la ,2014 - Hajar, 1991).

There are also signs of cut stems and branches from the The Juniperus Macrocarpa sibth & SM trees, as well as evidence of animal grazing, which weakens the likelihood of seedling presence, as indicated by (Grander and Fisher 1996 - Garcia et at.2000).

At site (1) (Table 1 and 2), the crown coverage of The Juniperus Macrocarpa sibth & SM. in sector (A) (50.98%) was close to the crown coverage of The Juniperus Macrocarpa sibth & SM. in sector (B) (53.43%) with a convergence in the number of individuals for The Juniperus Macrocarpa sibth & SM in both sectors (A and B) (14 and 15 individuals) respectively, and the crown coverage of vegetation in both sectors (A and B) was close (54.03%

- 54.2%) respectively, which is considered a fairly good coverage.

At site (2) (Table 3.4), the crown coverage of The Juniperus Macrocarpa sibth & SM. in sector (A) (36.54%) was close to the crown coverage of The Juniperus Macrocarpa sibth & SM. in sector (B) (38.54%) with a convergence in the number of individuals for The Juniperus Macrocarpa sibth & SM. in both sectors (A) and (B) (11 and 14 individuals), respectively, and the crown coverage of vegetation cover in both sectors (A) and (B) was close (36.86% - 38.54%), respectively. 86% - 38.54%) respectively, noting that Sector B has only The Juniperus Macrocarpa sibth & SM. trees and the coverage at this site is lower than the previous one, representing approximately one third of the site.

In Table (5), site 1 had an average crown coverage of 52.20% and site 2 had an average crown coverage of 37.56%. Also in site 1, the average crown coverage of vegetation was 54.11% more than site 2, which was 37.7%.

At Site 1, the average number of individuals (trees) per hectare was 290 more than at Site 2, where it was 250 trees per hectare, which is a small number– .

This study found that this species has lost its ability for natural

regeneration throughout the region represented by sites 1-2 and has become threatened with extinction due to the massive destruction of its habitat from extensive tree cutting and sand dredging. Additionally, this ecosystem is characterized by a low survival rate (Doussi and Thanos , 2002 – Fenner and Thompson, 2005).

In this study we recommended urgently intervention by government agencies and those concerned with the environment, vegetation cover, and forests to declare this site a protected forest to preserve this rare species from extinction. Furthermore, the research indicates that it is only found in this small area in North Africa.

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