

The Impact of Climatic Factors on the Dune Vegetation in the region of Tlemcen (Oranie- Algeria)

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Abstract

*This study is devoted to the analysis of psammophile of coastal dunes and semi-continental region of Tlemcen. A lot of results are retained on the psammophile which secure the dunes including *Ammophila arenaria*. By comparing the two climatic periods with two indices (seasonal regime, the index of continentality), the species inventoried are classified according to their biological type. Using the bioclimatic data, we were able to understand the evolution of this vegetation, and its diversity.*

Keywords: *Psammophile - Tlemcen -Algeria -bioclimat - coastline - continental semi- dune.*

Introduction

The vegetation psammophile of the region of Tlemcen is rich in its diversity. It is distributed in various environments from the shoreline up to the plains steppe. The methods used, have allowed us to proceed, in a first time, and the individualization of groups of species as a function of states of climatic factors (precipitation, temperature).

The ecosystems Mediterranean coastlines are characterized by climatic constraints and strong soil: salinity, erosion, wind, drought, shallow soils or mobile. Depending on these variables, we observed a rapid succession of plant associations on narrow surfaces.

In the immediate proximity to the shore, are the factors of coastal dynamics (tides, salinity, storms) that determine homogenous vegetation. As it is moving away from the coast, the local conditions (climate, soil) to resume the above and that is why the plant groupings of the rear dune are more diversified **Favennec (2002)**.

Materials and Methods

In the framework of our study on the facies of dune vegetation of the region of Tlemcen, we have paid particular attention to the effects of the climate (precipitation, temperature and other) on the evolution of this vegetation.

To better understand the dynamics of the vegetation but also to better understand the ecological factors, we chose 0 areas of study:

* 03 areas representing the coastal dunes (Ghazaouet, Beni-Saf and Rachgoune). These areas differ from each other by: the geographical position, climate, topography, Soil Conditions and anthropogenic factors and plant diversity.

Each of these stations has several situations fundamentally different.

The 03 stations are located in the western part of the North West Algeria. They are located between 1°27' and 1 ° 51' west longitude and 34°27' and 35 ° 18' north latitude. It is geographically limited:

- * to the North by the Mediterranean Sea»
- * To the south by the wilaya of Naima
- * To the west by the moroccan-algerian border
- * To the east by the wilaya of Temouchent

Taking into account the data available to us, we have been able to cover, for the main reference stations, the former period (1913-1938), obtained from the compendium of meteorological **Seltzer (1946)** and the new period (1980-2008) obtained from the O. N. M.

Results and Interpretation

These stations which are those of Ghazaouet, Beni-Saf Rachgoune and close to the sea (coastal areas) have a significant amount of rain; it varied between 371 mm to Beni-Saf and 433.91mm to Ghazaouet. The latitude and the altitude of the stations have a direct connection with the importance and the frequency of the rains. This has been confirmed by **Chaïbane (1993)**.



Figure 1 Map of Geographical Situation

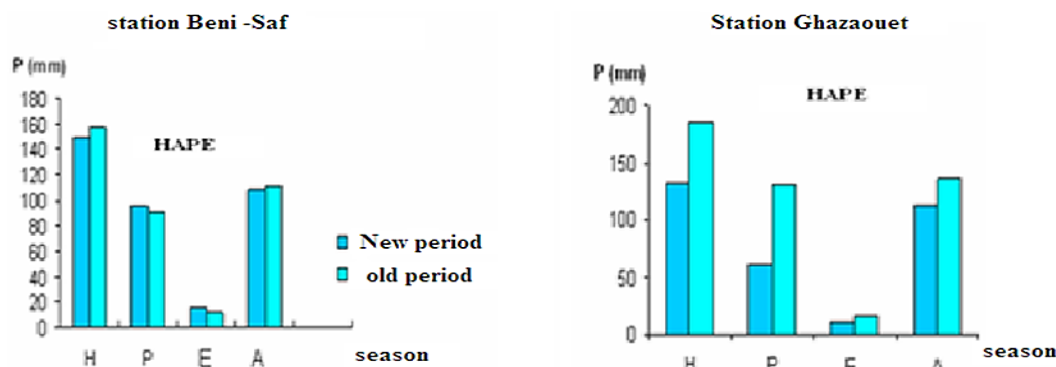


Figure 2 Seasonal regime of station study

The month the wettest is that of November for Beni Saf, and Ghazaouet.

* For all the stations, the month of July is the more sec. summer rainfall does not exceed 30mm throughout the summer for the two periods considered.

In the region of Tlemcen, there is a seasonal regime essential, of the type Hape decision. This regime characterized the stations of Beni-Saf and Ghazaouet with an abundance rainfed and drought associated with a second maximum of precipitation in the fall and a second minimum in the spring. This distribution of acid allows the recovery of the biological activity of the dune plant (Beni-Saf and Ghazaouet) and the development of systems of adaptations of these species.

The study of the two periods shows that temperatures higher than are saved to the months of August to all of the stations.

July and August coincide with the lack of rainfall. **Djebaïli (1984), Djellouli (1981) and Emberger (1952)**

confirmed that during the month of July, the cloudiness reaches its minimum the more net; the imagesetter y is the longest and the sirocco reaches its maximum. Environmentally this month remains the most critical for vegetation Therophytique of dunes.

Table 1: Average of the maxima of the warmest month

Station	"M" (°C)		month	
	O P	NP	OP	NP
Beni-Saf	29.3	30.6	August	August
Ghazaouet	29	30.7	August	August

OP: old period, NP: new period

This index has enabled us to reach the stations to climate coastline:

* Beni-Saf with 20.2 - 21.05 for the old and the new period.

* Ghazaouet with 22 for the former period.

Table 2: Index of continentality (OP: Old periods; NP: New periods).

Station	Period	Thermal Amplitude	Type of climate
Beni-Saf	1913-1938	20.2	coastline
	1970-2002	21.5	coastline
Ghazaouet	1913-1938	22	coastline
	1970-2002	26.75	continental Semi

This climate of the coastal type promotes the installation of species Therophytique dune area thus forming a rear dune with:

Ammophila arenaria, *Teucrium pollium*, *Cakile maritima*, *Pancratium maritimum*, *Calystegia soldanella*, *Medicago marina*, *Senecio leucanthemifolius* and *Echinophora spinosa*

The station of Ghazaouet has two types of climate:

- * a climate coastline for the old period
- * a climate semi continental for the new period

This semi continentality causes the installation of species chamaephytiques and phanerophytiques thus fixing the arrears dunes to give birth to a dune more advanced characterized by the following species:

Ziziphus lotus, *Myrtus communis*, *Asparagus acutifolius*, *Juniperus phoenicea* *Lavatera maritima*, and *Asparagus stipularis*.

The wind is one of the major factors governing the shape of the dunes and the distribution of vegetation cover in uprooting the annual plants, amending the morphology of the plants and influencing the distribution of seeds during their dissemination.

- *Linaria thymifolia*

In the procession of the plants which accompanies the *Ammophila arenaria* in its stabilizing role, two species of the family Apiacees dominate:

- *Echinophora spinosa*
- *Eryngium maritimum*

Conclusion

The bioclimatic study of the region of study allows us to move forward the following remarks: The five stations are located in the floor semi-arid and characterized by rainy seasons from November to March and a summer drought is spreading up to 8 months on the coast and 6 months on the inside.

A trend toward aridity is certain and a semi-continentality accentuated is well defined. The classification of bioclimatic moods depending on the average annual temperature and "m" shows that all stations belong to the floor thermo-Mediterranean

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