RESEARCH OF THE ECO-FLORISTIC DATA INTO THE CONTRIBUTION OF GROUPS TO HALOPHYTE, HAMMAM BOUGHRARA AREA WEST ALGERIA

Benabdelmoumene Fatna
Benabadji Noury
Benchenafi Souhila
Benmensour Djamel
Laboratory of Ecology and Management of the Natural Ecosystems, Department of Ecology and Environment, University Abou Bakr Belkaid, Tlemcen, Algeria

Abstract

This article presents the results of a phytosociological study bearing on the floristic diversity of a few stations in the North West of Algeria. The latter is carried out on the basis of statistical analysis of 90 identifies a particular attention is paid to climatic and soil conditions.The results show that the osmotic pressure of the soil solution where a specific ion toxicity can lead to the formation of particular landscapes.

Keywords: Phytosociology. Salinity. Climatic factor. Edaphic factor. ACP

Introduction

The Mediterranean basin has experienced an extension irrigated crops due to the mobilization of water resources. This has contributed well to intensify on some crops but also to accentuate land degradation by salinization and alkalinization because of the high salt content of the water used.

North Africa the salinisation affects irrigated areas and the lower parts subject to significant evaporation rate. In thèse areas there is a significant risk of salinisation of groundwater (**Conacher *and al.*, 1998**). In Algeria of sebkhas and Chotts cover several thousand hectares, Where there is less than 100 years were still cultured the pistachios Atlas (**Anonyme, 1992).**

Salinity is a process for enriching a soil in soluble salts which results in the formation of a saline soil, these are often young, whose profile remains

poorly differentiated **(Duchauffour, 1984).** They usually result from the accumulation of salts in the surface horizons **(Churchman *and others*., 1993 ; Naidu and Rengasamy, 1993 ; Sumner, 1993 ; Keren, 2000 ; Levy, 2000 ; Brady and Weil, 2002 and Essington, 2004).**

These soils are characterized by the presence of a shallow groundwater saline which is subjected, since then their form atting up to conditions of salinity and important hydrodromorphie and variable intensity **(Hanotiaux *and others*., 1976).**

This salinity is a constraint for the development of plants, especially in arid and semi arid regions **(Lauchli and Epstein, 1990)** whose plant physiology is affected followed by the disappearance of some wild species and the same for all species in the many other **(Ungar, 1987).** By against some plants manifested of coping mechanisms **(Batanouny, 1993)** from thereof, we sought through this study explain certain relationships linking plant communities to environmental factors in particular soil parameters, climate and biological types, these constitute a reference element that is involved in the definition and typology groups. it is worth recalling a number of work performed on the relationship between soil and vegetation **(Pouget, 1980, Trachaud 1994**, **Mathieu *and others*., 2003, Merzouk *and others*., 2011).**

It should be recalled that these biological forms are defined according to a classification system, purely descriptive, based on the observation of the ability of a plant to flower and bear fruit one or more successive years. The most commonly used classification is of morphological nature.

This classification helps to identify, regarding the "vascular plants", the top five biological types (phanérophyte, chaméphyte, hemicryptophyte, geophyte and therophyte).

Geographical Status of the study area (Fig.1)

The stations in the region of Hammam Boughrara belong to the wilaya of Tlemcen, they moving away from 10 km from the city of Maghnia. They are limited to the North by the city of Nédroma, to the West by the city of Maghnia, to the East by the towns Zenata and Hennaya, to the South by Béni Méster.

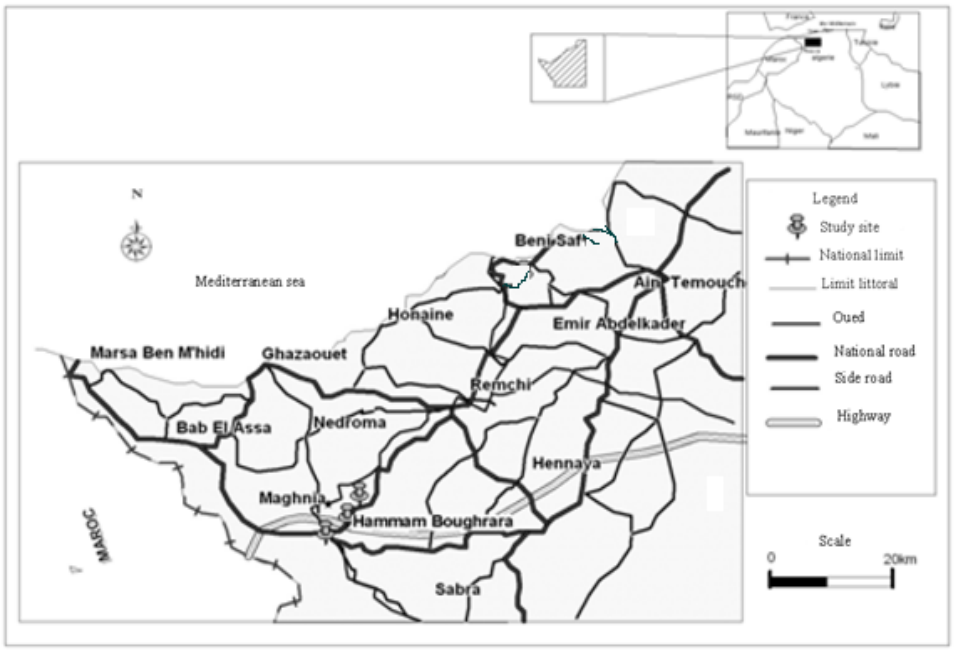

Fig.1: Map of location of study sitesI-1. Station of Hammam Boughrara I:

This station is within a 15 kilometers from the town of the same name.

The shrub layer is developed on catchment of low slope, it presents low density generally dominated by *Olea europea* and *Pistacia atlantica*. The herbaceous layer is more or less rich, it is composed of *Convolvulus altheoides*, *Daucus carota*, *Anagalis arvensis*.

Station of Hammam Boughrara II

This station is located a little further of the previous, always to a slope (10%), bearing the mark a pasture, expression of human impact, latter is characterized by low covering (30%) and rocky outcrops with a diversity of species where mingle the perennials and the annuals: *Asphodelus microcarpus*, *Atriplex halimus* and *Olea europea*.

Station exclosure

This station has been selected, it can offer a lot of interesting information because it is in a state of protection (exclosure). It occupies the other side of the water dam.

The vegetation of this station is dominated by *Atriplex halimus* and other halophytes species.

Construction Dam seem to have caused the increase in soil salinity and thus allow the installation of halophytic plant populations, at least that is what was reported to us (oral communication). This area is more or less protected, the floristic diversity is important and we note the presence of forest species : *Olea europea* and *Pinus halepensis*, many annual species exist such as : *Bromus madritensis*, *Echinops spinosus*, *Rumex pulcher* and *Sinapis arvensis*

Bioclimate

Among the environmental factors affecting plant ecology, climate represents one of the most important factors. Its importance is manifested by the distribution of biomes across the planet **(Braque, 1988)**.

The bioclimatic analysis showed that the seasonal distribution is marked by the predominance of autumn and spring rains, Thus, pluviothermic climagramme Emberger site weather station. Thus, the pluviothermic climagramme of Emberger place weather station in semi-arid bioclimatic lower to higher arid.

We can say that on climate plan, three main characteristic factors defining the stations: Summer drought, low humidity and thermal amplitude.

This has been demonstrated by **(Le Houerou, 1995)** that arid ecosystems are characterized by specific conditions of climate which is manifested by a long dry season (9-10 months), a évaporation intense, low rainfall with high variability in their spatio-temporal partition.

Part I: Edaphic study

Methodology

We chose the location of the profile to realize, which is substantially conditioned, one hand, the floristic composition of the plant community that one intends to consider from the viewpoint edaphic and secondly, by the nature of the substrate on which is formed the soil **(Aubert, 1986).**

The soil samples were carried out at the horizon explored by the roots of the plant communities, these are analyzed by the method **Aubert (1978).**

Results, interpretations and discussion (Fig.2)

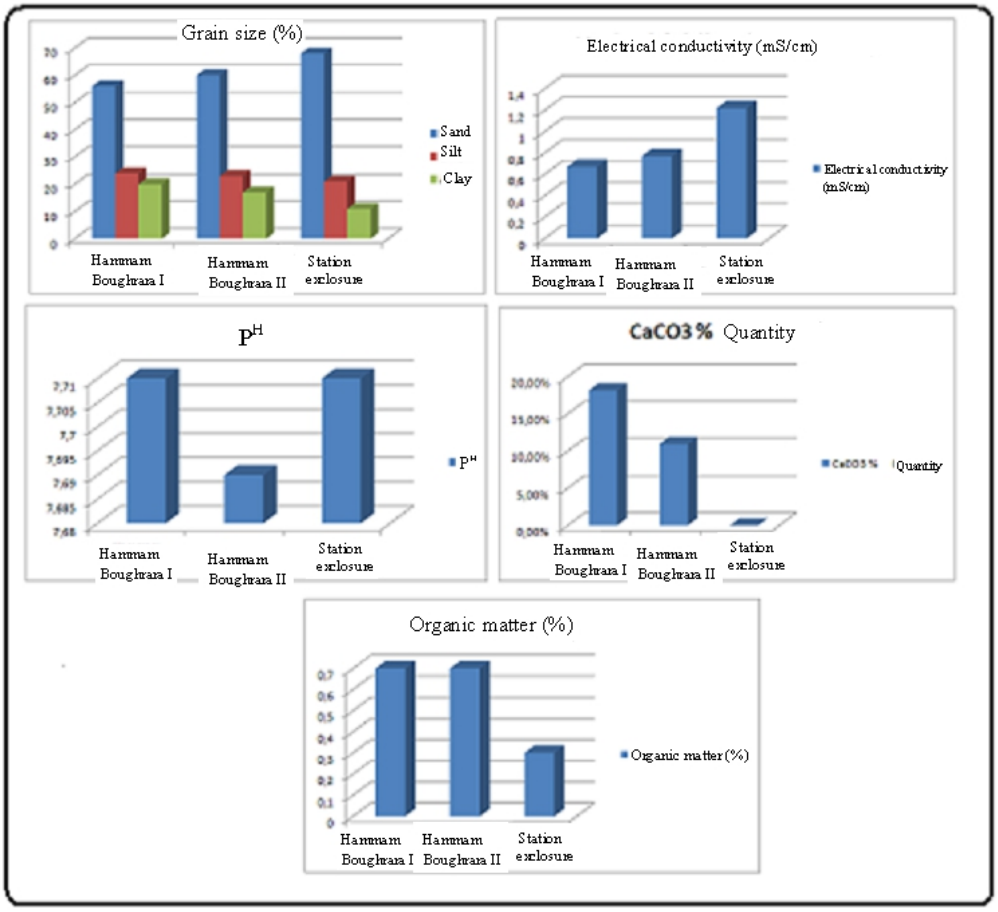

Fig.2: Results of physico-chemical analysis of the soil

The soil of these formations dominated by halophytes is characterized by a sandy texture silty well as by content particularly low of organic matter this results in a low alkalinity but also a high salinity this translates membership the study area in an arid or semi arid climate where evaporation seems to impose its action. These edaphic conditions are likely to explain and largely the presence of halophytes particularly *Atriplex halimus* and other Salsolaceae (*Lygeum spartum*, *Tamarix galica*) and the low abundances of the accompanying vegetation which salts can significantly slow and even slow the growth of seedlings. This effect is proportional to the salt concentration.

Djili (2000) showed that in the context of soil of Northern Algeria, a increase limestone rates between 0 and 2.5% causean increase of the pH to a maximum value of 7.82%. Beyond the threshold of 2.5% CaCO3, the calcium carbonate particles have essentially a steric effect on the soil

properties. According **Allison (1964)**, as soil solution contains significant quantities of soluble salts, soil abode impermeable, and its pH is less than 8.5 well as aeration is insufficient **(Bohn *and others*., 1979, Szabolcs, 1979, Rhoades, 1989, Rhoades and Loveday, 1990, Brady and Nyle, 1996**) have proved that saline soils have poor physical properties (great dispersion organic colloids and minerals, wrong permeability and low aeration).

In the case of erosion, a correlation has been established between the reduction of the organic material and the development of soil erosion but obviously the texture of the soil also involved.

Part II: Study of vegetation

Methodology

In the Mediterranean region the area of reading ranges from 100 to 300 m^2 in the forest, and 50 to 100 m^2 in the matorrals and a few square meters in the lawns **(Gehu *and others*., 1987)** and for our case**,** The method used is that surveys of transect into plots (100 m^2), this method consists to choose locations also typical as possible noting the environmental conditions **(Gounot, 1969)**, to note the species present and with evaluate the proportion of each species in the test surface by code of abundance - dominance of **(Braun Blanquet, 1951).** furthermore 90 surveys were performed during a period when the whole spring species are represented due with 30 readings per station.

The factors of rupture the balance of the ecosystem are many. already, the climatic conditions, when she degrade significantly relative to the average, can cause regression of vegetation cover, which lies weakened and subject to the influence of other factors of degradation **(Le Houérou, 1995).**

Indeed, it was demonstrated that each ecosystem is characterized by a threshold of degradation from which, even in case of disappearance of the disturbance, return to a previous state can be very slow **(Ferchichi, 1999).**

The Floristic diversity is strongly influenced by the degree of disturbance **(Jauffret, 2001; Tarhouni *and others*,. 2006)**. Latter was quantified by an index of thérophysation **(Loisel Gomilah *and al*. 1993)**.

$$Di = \frac{\text{Chamaephytes} + \text{Therophytes}}{\text{Total species}}$$

Di: Index of disruption

Results, interpretation and discussion (Table 2) :

Biological types	Hammam Boughrara I		Hammam Boughrara II		Station exclosure	
	Number	Index of disruption %	Number	Index of disruption %	Number	Index of disruption %
Chamaephytes (CH)	11	69.81	18	73.13	10	73.17
Therophytes (TH)	26		31		20	
Total	53		67		41	

Table 2: Calculation of the disturbance index

The disturbance index was revealed important in all stations; This confirms that floristic richness is into progressive disruption.

Biological types, morphological types, families and biogeographic types (Fig. 3):

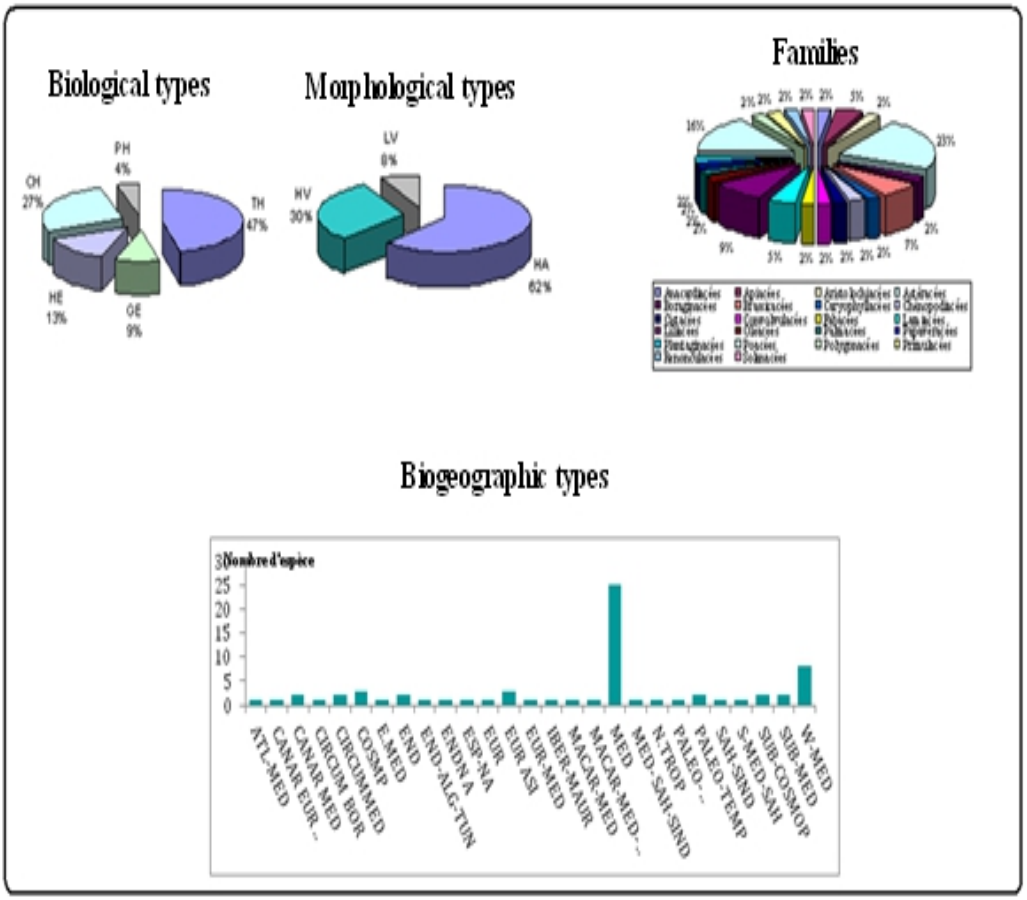

Fig. 3:Biological types, morphological types, families and biogeographic types

The analysis of biological spectrum of the overall flora of study sites indicates that therophytes are overwhelmingly the biological type best represented.

This thérophysation as underlined **(Daget, 1980**) is a characteristic of arid and expresses an adaptation strategy vis-à-vis adverse conditions and a form of resistance to the harsh climate.

Quezel (2000) also stated that the arid climate and in particular the summer water stress favor short-cycle species, therophytes, accelerate the pace of genetic exchange and actually revealed as one of the key factors in the process of forming species.

The second position is occupied by the chamaephytes, according **Benabadji *and others*. (2004)**, grazing promotes in a comprehensive manner the chamaephytes often rejected by the herds.

The hemicyptophytes are less important compared to other biological types and the last position is shared between geophytes and phanerophytes.

For morphological types ; the results showed that the herbaceous stratum is dominant over the woody stratum and annual herbs dominant over perennial herbs.

The species of the families Asteraceae, Poaceae, Fabaceae and Liliaceae are the most dominant, the biogeographic analysis shows the predominance of Mediterranean taxa.

According **Quezel (2000)**, wealth into endemic flora of the Mediterranean, is obviously a direct consequence of seniority of setting it up, but also environmental factors that have succeeded each for several million years.

Biostatistic treatment

Materials and methods

It was the subject of a factor analysis of correspondences ACP which is very often used to summarize the structure of a dataset of species distribution and link the ecological condition of stations with the species that are characteristic **(Zohary, 1971)**, statistical analysis was performed using a computer program called MINITAB 15.

Results, interpretation and discussion (Fig. 4)

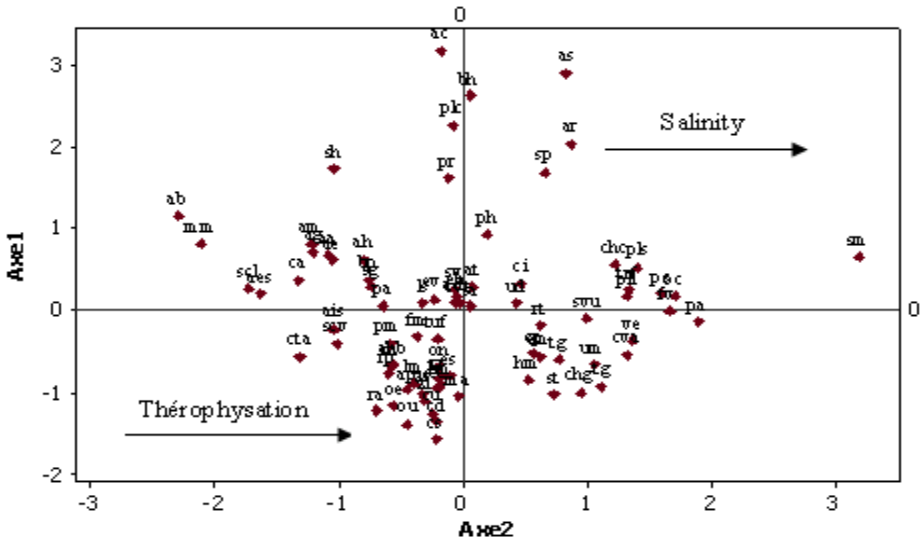

Fig. 4: Factorial design of the species in the region of Hammam Boughrara (Axis 2, Axis 1)

The upside seems to indicate that the soil is well drained and shows a poverty in organic matter, while the negative side is characterized by the presence of salt-tolerant and drought-tolerant species *Atriplex halimus* and *Withania frutescens*, where the soil is degraded and nutrient poor and also indicates a intense grazing that was noticed by the presence of: *Echium vulgare*, *Urginea maritima* and *asphodelus microcarpus*.

Conclusion

The present study is focused on the study of natural vegetation in the stations located in the North-west of Algeria to know its rich flora, knowing that salinization is widespread in this region.

This study shows that climatic factors influential on freshwater inflows, also the possibility of regeneration and the rate of plant growth are conditioned by soil quality especially, the salinity and / or acidity as well as the contribution of organic matter.

The floristic analysis highlights the dominance of therophytes on other biological types, as well as the dominance of annual herbaceous species on herbaceous perennials.

From the perspective of taxonomic Asteraceae and Poaceae contribute with a larger number of species than other families and on biogeographic plan the Mediterranean species take first place of all recorded species.

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