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The Contribution of Biostatistics Knowledge of Psammophile Mountains of Tlemcen (Western Algeria)

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ABSTRACT

This study is devoted to the analysis of psammo phytes the mountains of tlemcen. These courses are well represented and are mainly related to the significance of sanddepos its and the presence of gypsum and salt. This study was conducted on the basis of phytosocio logical surveys to determine the close affinity of different plant groups. Second, the knowledge of this richflora can make proposals leading to the preservation and improvement of these fragile environments, in order to limit damage and to promote their development in a rational way. To value psammo phytes species we have achieved 24-50 per station surveys; and each measurement was conducted in a floristically homogeneous surface. This is a set of 71 phytosocio logical releves and 181 species in the monts de tlemcen zarifet station; ouled- mimoun; nedroma and sid djilali for this analysis we will focus on ecological determination of the floristic diversity and syntaxonomic analysis which will be devoted to the description of phytosocio logical units encountered. Analysis of the a.f.c showed 02 plant groups represented by: a very diverse vegetation settles to fixthese dunes giving birth to live dunes more or less related to the fixeddes. Therobrac hypodietea class. The sidi djilali station is characterized by a dunexeric environments nebkhas kind determined by the species ziziphus lotus. Using phytosocio logical and phyto dynamiques data, we could understand the evolution of this vegetation, and diversity.

Keywords: phytosociology - psammophile- dune - tlemcen - algeria - diversity

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INTRODUCTION

The mediterranean coastal systems are characterized by strong climatic and soil constraints, salinity, wind, drought and shallow soil or mobile. The work presented here concerns the valuation of psammophiles in the Tlemcen region. This is linked to a high percentage of sand, always above 60%. Although they are located in the northern part; south, these formations are well represented and are mainly related to the significance of sand deposits and the presence of gypsum and salt.

South of the Tell Atlas, we meet on the high plateaus of grassland formations (Djebaili 1984) as part of the arid Mediterranean floor, which represent a transitional step towards the Saharan floor. These steppes consist of a mosaic of three plant communities dominated by Poaceae respectively *Stipa tenacissima*, *Lygeum spartum* and Asteraceae *Artemisia herba-alba* Bouazza (1990; 1995) and Bouazza et al (1998).

Quezel 2000 states that the continental dunes, located mostly in the Sahara, appear in the highlands, in the Mediterranean climate situation. Their flora is close to that of the Saharan dunes, with in particular:

- *Aristida pungens*
- *Retama retam*
- *Scrofularia bypericiflora*.

The Algerian coast, like Tunisia, is a whole subject to significant human pressure more intense than in the rest of the country. This pressure acts for decades on vegetation and is ongoing. This study was conducted on the basis of phytosociological surveys to determine the close affinity of different plant groups. Second, the knowledge of this rich flora helps make proposals leading to the preservation and improvement of these fragile environments, to limit damage and to promote their development in a rational way.

MATERIAL AND METHODS

The study area is characterized by great floristic diversity that is linked to a combination of environmental factors that are also very varied (variation bioclimatic action anthropozoogene).

This study was conducted on the basis of phytosociological surveys to determine the close affinity of different plant groups. Second, the knowledge of this rich flora can make proposals leading to the preservation and improvement of these fragile environments, in order to limit damage and to promote their development in a rational way.

For this study was elected 04 study stations located in the western part of the north-west Algeria (figure 1). These are located between 1° 27' and 1° 51' west longitude and 34° 27' and 35° 18' north latitude. They are limited geographically:

- the north by the Mediterranean Sea
- the south by the province of Naama
- to the west by the Algerian-Moroccan border
- to the east by the province of Tlemcen
- southeast by the wilaya of Sidi Bel Abbès

The latter help us to better understand the dynamics of vegetation but also to better understand the ecological factors. For this we chose 04 areas in the mountains of Tlemcen which are: Zarifet; Ouled Mimoun; Nedroma and Sidi Djilali.

These 04 different areas differ from each other by the geographical position, climate, topography, soil conditions, anthropogenic factors and plant diversity.

The mountains of Tlemcen are composed of rugged terrain; the mountains of Tlemcen have slopes of 20% on average, or more. These are covered by a dense plant cover thus limiting

The phenomenon of erosion, with the exception of a few lands such as the area of el khemis where be drock outcrops. These are clay and marl formations. The mountains of tlemcen consist of mesozoic and cenozoic land. The sedimentary rocks assigned to the upper jurassic and cretaceous carbonates are mainly formed. According benest (1985), the mountains of tlemcen have the following stratigraphic series:

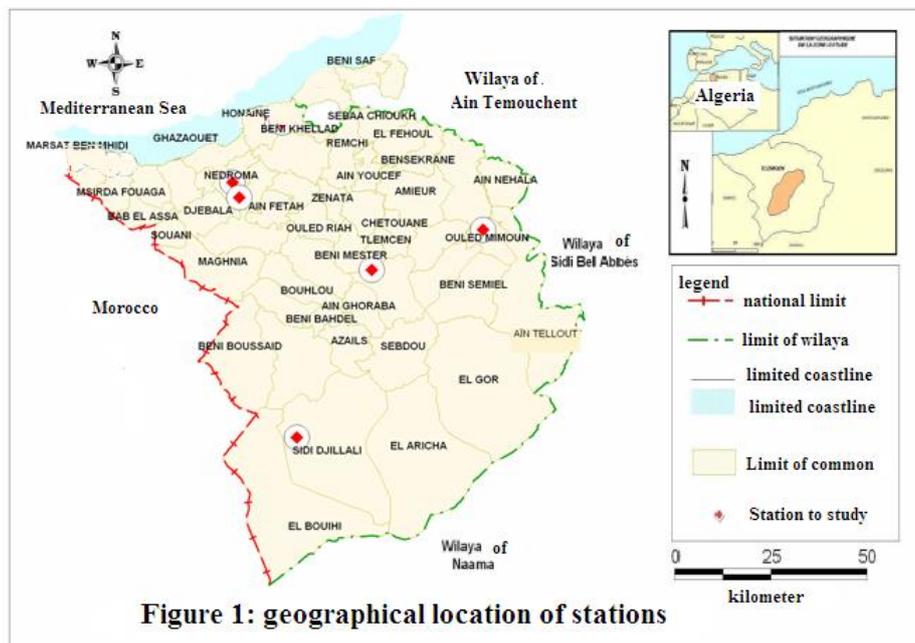
The sandstone boumediene

- The lime stone zarifet
- Dolomites of tlemcen
- Terni dolomites
- The marno-lime stone raouraï
- lime stone lato
- The calcareous marl of hariga
- Sand stone merchiche

The high steppe plains:

The high steppe plains of tlemcen region form a unity geo morphological feature of the atlas area. They are a tabular zone average of 1100m altitude. The quaternary field which constitutes the vast tabular extent is represented by two distinct formations: the old quaternary alluvium and quaternary.

The soils are shallow, everywhere, with a foundation of lime stone layers sensitive to water and wind erosion (calcareous crust). Chaabane (1993) confirms that the quaternary substrate is of three types: continental, the other marine shoreline and sandy and the last lagoon, rich in evaporates.



To value psammophytes species we have achieved 24-50 per station surveys; and each measurement was conducted in a floristically homo generous surface. The surface of the statement must be at least equal to the minimum area, containing virtually all of the species present. Execution of statements accompanied by the raising of stationnels character. (Location, altitude, exposure, recovery rates, substrate, slopeetc.); then, each species is assigned two indices; the first concerns the abundance- dominance, the second sociability. The abundance - dominance expresses the space occupied by the projection on the ground of all individuals of each species. This coefficient admits the following scale (Braun Blanquet 1952).

+ Species present in low abundance and cover up the number 5

75 recoveries higher with any abundance sociability express the mode of distribution of individuals of the same species by contributing to each other.

It is evaluated according to the scale proposed by (Braun Blanquet 1952)

1 individual of the species are isolated.

5 individuals of the species are in continuous stands.

Once the surveys conducted, they were sorted by correspondence analysis (A.F.C) and a hierarchical clustering (C.A.H). For this an analysis we will focus on ecological determination of the floristic diversity and syntaxonomic analysis will be devoted to the description of phytosociological units encountered.

RESULTS AND DISCUSSION

Contribution of the A.F.C and C.A.H the mountains of Tlemcen (Stambouli et al 2015):

| Blueprint | 1 | 2 | 3 |
|--------------|--------|-------|-------|
| Rate inertia | 11,643 | 6,774 | 4,041 |
| Own values | 0,169 | 0,095 | 0,057 |

This is a set of 71 phytosociological readings and 181 species in the mounts of tlemcen Zarifet station; Ouled Mimoun; Nedroma and Sidi Djilali. The Eigen values of the first axes are 0.165 and 0.057 respectively; the clouds are really structured on the main level. On this level opposes sets.

Plan:

Negative side:

Anagallis arvensis
Bromus rubens
Calycotome spinosa
Chamaerops humilis
Cistus monspeliensis
Cistus villosus
Convolvulus althaeoides
Dactylis glomerata
Eryngium maritimum
Erodium moschatum
Lavandula stoechas
Lavatera maritima
Olea europaea
Pinus halepensis
Ulex parviflorus

Positive side:

Velezia rigida

Ziziphora capitata
Thymelea passerina
Senecio cineraria
Echinaria capitata
Briza minor

The positive side is dominated by species such as xeric therophytic: *Velezia rigida*; *Briza minor*; *Ziziphora Capitata*; *Echinaria capitata*.

The negative side is the chamaephytic species; phanerophytic most frequently observed in the scrub on siliceous substrates and which are represented by:

Lavandula stoechas ; *Cistus monspeliensis* ; *Cistus villosus* ; *Pinus halepensis*

2/1 the plan reflects a gradual evolution of species in the direction of the axis. This evolution is reflected in substrate binding.

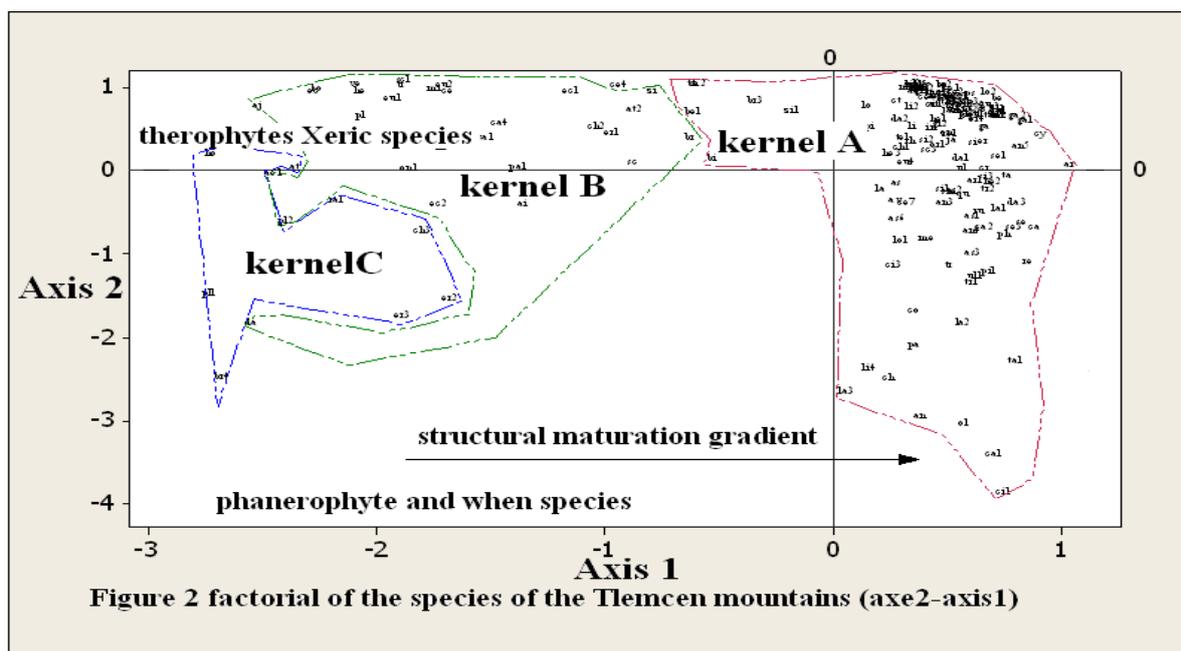
Plan:

Negative side:

Aegilops triuncialis
Althaea hirsuta
Asteriscus maritimus
Ctenopsis pectinella
Daucus carota subsp *gummifer*
Gladiolus segetum
Lolium perenne
Thymelea passerina
Ziziphus lotus

Positive side:

Sedum tenuifolium
Paronychia argentea
Galium verum



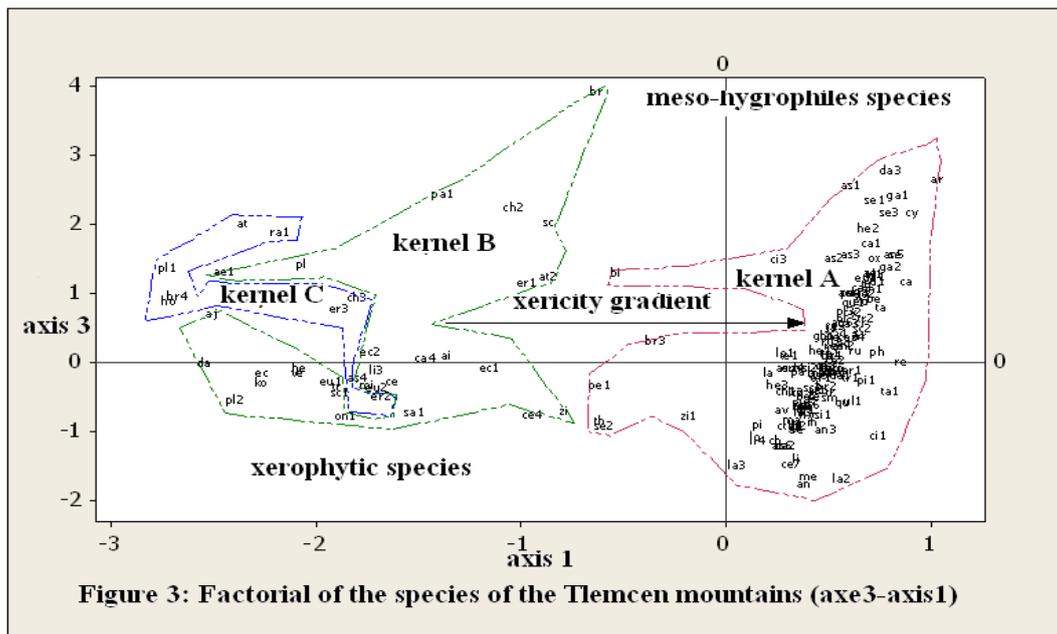
Daucus carota
Chrysanthemum coronarium
Asparagus albus
Arbutus unedo

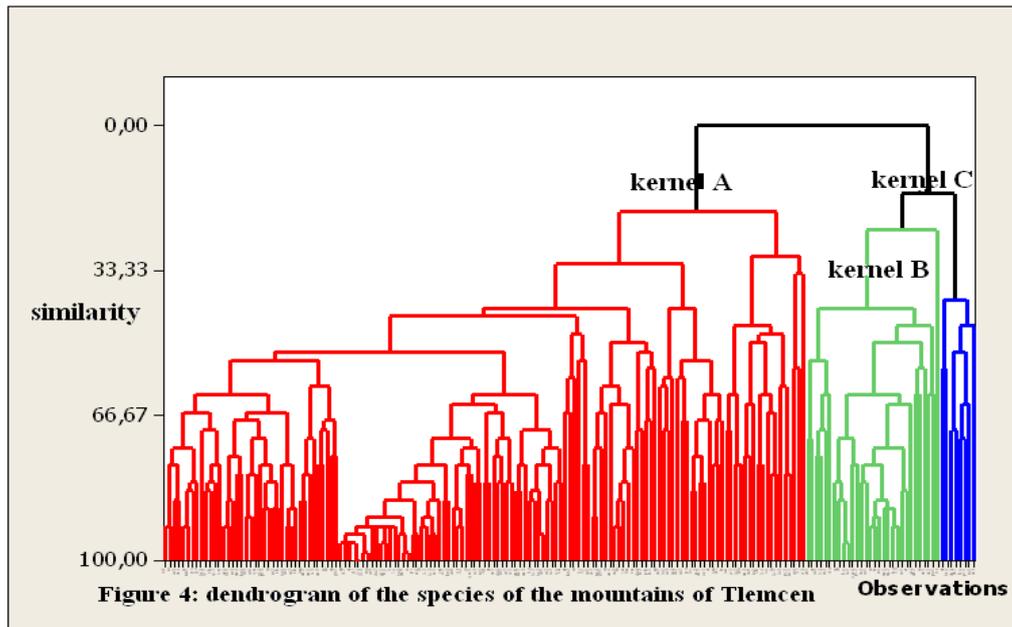
The negative side gathers therophytic xeric species settling sue the mobile sand inside it expresses a very degraded environment. The bright side, shows therophytic relatively hygrophilous species by the presence of *Sedum tenuifolium*; *Galium verum*.

Plan 3/1 corresponds to a xericity gradient in the direction of the axis:

Echinops spinosus; *Centaurea incana*; *Carthamus coeruleus* and *Astragalus armatus* are considered companion for inside psammophytes species.

This plan shows a gradual evolution of aridity. The Sidi Djilali station is characterized by the predominance of species *Therobrachypodietaea* a dune xeric environments nebkha skin determined by the species *Ziziphus lotus*. What is certain, in this area we find accepting cash and / or seeking rich soils sands. Changes in the humidity factor are wider. Therophytic these species are well represented and their presence is constant. Their particularity reflects a certain level of specificity to soil factors.





CONCLUSION

The analysis of the **A. F.C** highlighted 02 vegetal groups that organize themselves on the map 2/1 and 3/1 in a pattern corresponding to the analysis of adaptive strategies Mac- Arthur 1957. This segregation is a variation of soil moisture and texture land structural elements. Further more, nitrophilous therophytiques species with a high potential biotic and reciprocal growth settled more easily, there will be designated the selection, the form's own selection.

The two groupings sets are represented by:

Very diverse vegetation moved to fix the dunes giving birth to more or less fixed bright dunes. This vegetation refers to the class of *Therobrachypodietaea*. (Stambouli and al 2015)

These bright dunes are fixed by installation of forest and forestry such as prespecies *Geniperus phoenicea*; *Asparagus acutifolius*; *Myrtus communis* and *Asparagus stipularis*; these species are weakly psammophilous and/or plastic even in the matorral and forest and finally, Sidi Djilali station which remains a tampon between Tlemcen mountains and the steppe zone is formed by dunes semi continental type nebkhas and/or *Ziziphus lotus* finds its perfect ecological amplitude. It can be argued that the capsuled of dune vegetation is very diverse.

They develop increasingly dense vegetation which will then allow vocation sylvatic species permanently fix and mobile ground. (Stambouli and al 2015)

The process of colonization of the dunes by the forest begins with the appearance of the chamaephytes such as:

Erica multiflora and *Cistus salvifolius* then will follow basic shrubs of: *Juniperus phoenicea* and *pistacia lentiscus*.

The mainland dune is characteristic of desert landscapes; its flora is close to that of the Saharan dunes containing the floors dry and Saharan Psammophilous species.

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