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## Evolution of psammophiles in the coastline of the region of Tlemcen (Oranie-Algeria)

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### ABSTRACT

This study is devoted to the analysis of psammophile of coastal dunes of the region of Tlemcen. The interpretation by the factor analysis of matches (A. F. C.) has allowed us to individualize classes' phytosociologique different.

The colonize psammophile, par excellence, the embryonic dunes. Some species colonize the dunes vivid. Finally, other occupies the dunes the most advanced and laid down.

Using the data and phytosociologique phytodynamiques, we were able to understand the evolution of this vegetation, and its diversity.

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### KEYWORDS

Phytosociologie;  
Psammophile;  
Coastline;  
Tlemcen;  
Algeria;  
Diversity.

### INTRODUCTION

The vegetation, the region of Tlemcen, presents a good example of study of plant diversity; and especially an interesting synthesis on the natural dynamics of ecosystems from the shoreline up to the steppe. This study has been launched by several authors. These include mainly:<sup>[3-6]</sup>.

The ecosystems Mediterranean coastlines are characterized by climatic constraints and strong soil, salinity, wind, drought and shallow soils or mobile.

The work that we are presenting here concerns the evolution of psammophiles the coastline of the region of Tlemcen. The latter is linked to a high percentage of sand, always higher than 60 %. Although they are located in the northern part; in the South, these formations are well represented and are essentially related to the importance of deposits of sand and the presence of

gypsum and salts.

This study has been carried out on the basis of the readings phytosociologiques to determine the narrow affinities of different plant groups. In the second place, the knowledge of this floristic richness allows you to make proposals leading to the preservation and improvement of these fragile environments, to limit the degradation and to promote their development in a rational way.

### MATERIALS AND METHODS

The study area is characterized by a high floristic diversity which is related to the combination of ecological factors that are also very varied (variation bioclimatic, Action anthropozoogène).

This study has been carried out on the basis of the readings phytosociologique to determine the narrow af-

finites of different plant groups. In the second place, the knowledge of this floristic richness allows you to make proposals leading to the preservation and improvement of these fragile environments, to limit the degradation and to promote their development in a rational way.

For this study it was selected 05 stations to study locating 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 geographically limited:

- to the North by the Mediterranean sea
- to the south by the wilaya of Na'mah
- to the west by the moroccan-algerian border
- to the east by the wilaya of Temouchent
- to the south-east by the wilaya of Sidi Bel Abbes

These recent help us to better understand the dynamics of the vegetation but also to better understand the ecological factors. For this we chose 03 areas at the level of the coastline and which are: Rachgoune, Beni Saf and Ghazaouet).

These 03 zones differ from one another by: the geographical position, the bioclimat, topography, soil conditions, anthropogenic factors and plant diversity.

## Beni-Saf

The lands are calcareous in lithothamniees rich in shells of fossil type lumachellique of Miocene age post-tablecloths.

These limestones are based on clays to sandstone partings age Tortonien (Miocene).

The limestone's are a plateau called "plateau of Sidi Safi" of or is levied the calcium carbonate for cement of Beni-Saf These limestones are covered in some places by volcanic formations of basalt type<sup>[7]</sup>

## Rachgoune

The station is located at the mouth of the Tafna. This are the dune deposits to "El-Guedim", and on the right bank of the oued, under these dunes appear of lava flows of basalt black in color inter stratified with the volcanic tuffs (this are the sediments of volcanic origin)<sup>[7]</sup>.

The bioclimatic study for two periods (1913-1938) and (1970-2002) Figure. 2 showed a vertical indent of each station in direct relation with the Q2 Emberger<sup>[8]</sup>. Station Ghazaouet, despite falling on of the value of Q2 always under floor lower semi-arid to hot winter

This climate favors the extension of a vegetation



Figure 1: Location of studies stations

therophytic xerophyte...

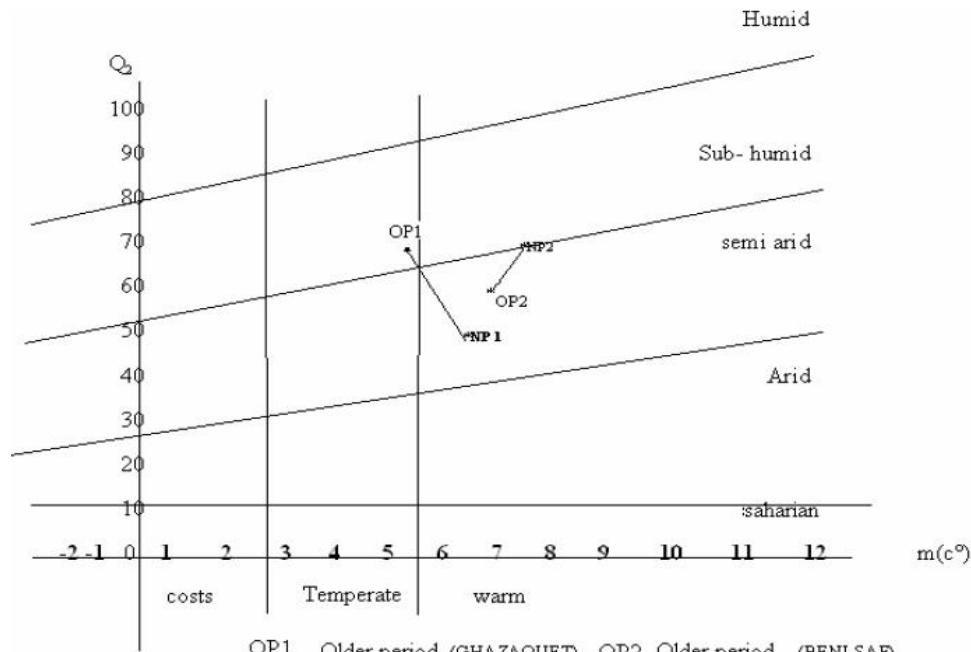
To study the evolution of psammophiles the coastline we have conducted 50 readings per station; and each statement has been carried out in a surface floristiquement homogeneous.

The surface of the reading should be at least equal to the minimum surface area, containing almost all of

the species present.

The execution of the readings is accompanied by the rehabilitation of characters stationnel. (Location, altitude, exposure, recovery rate, substrate, slope etc.); then, each species is assigned to two indices, the first relates the abundance- dominance, the second the sociability.

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OP1 Older period (GHAZAOUET) OP2 Older period (BENI-SAF).

NP1: New period (GHAZAOUET) NP2: New period (BENI-SAF).

Figure 2 : Temperature and humidity within them different zones

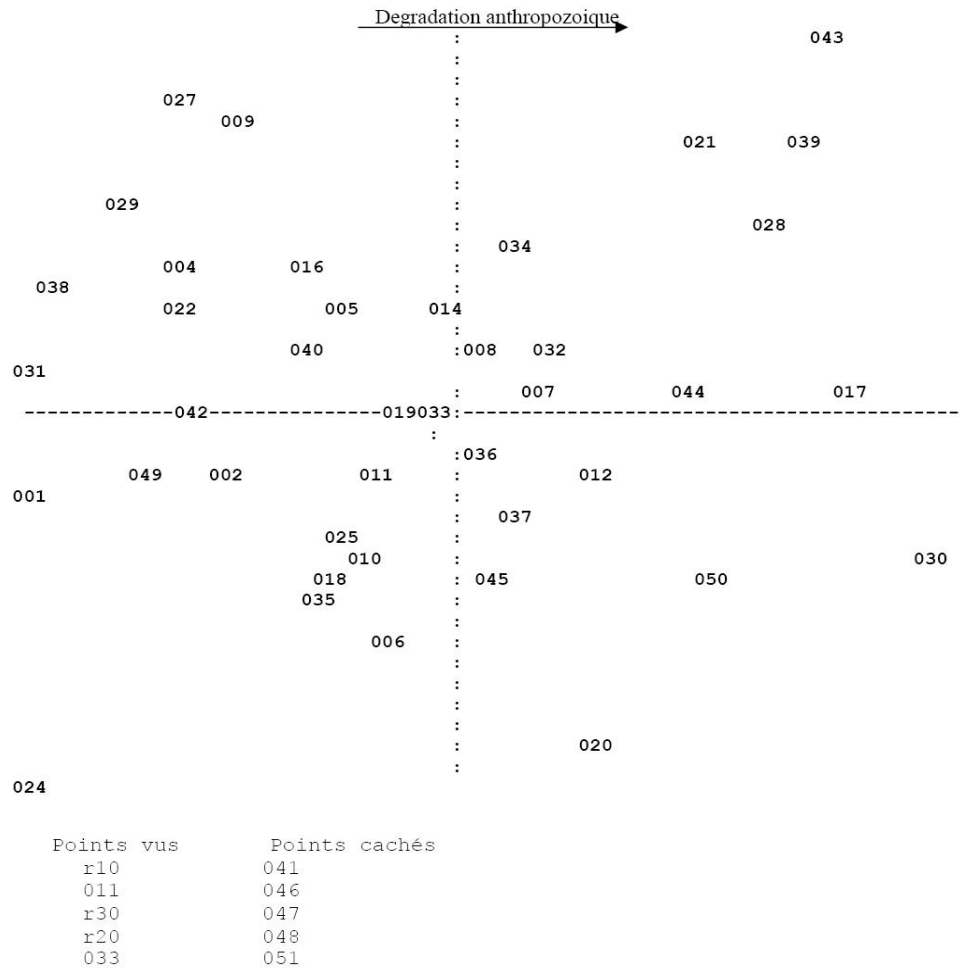
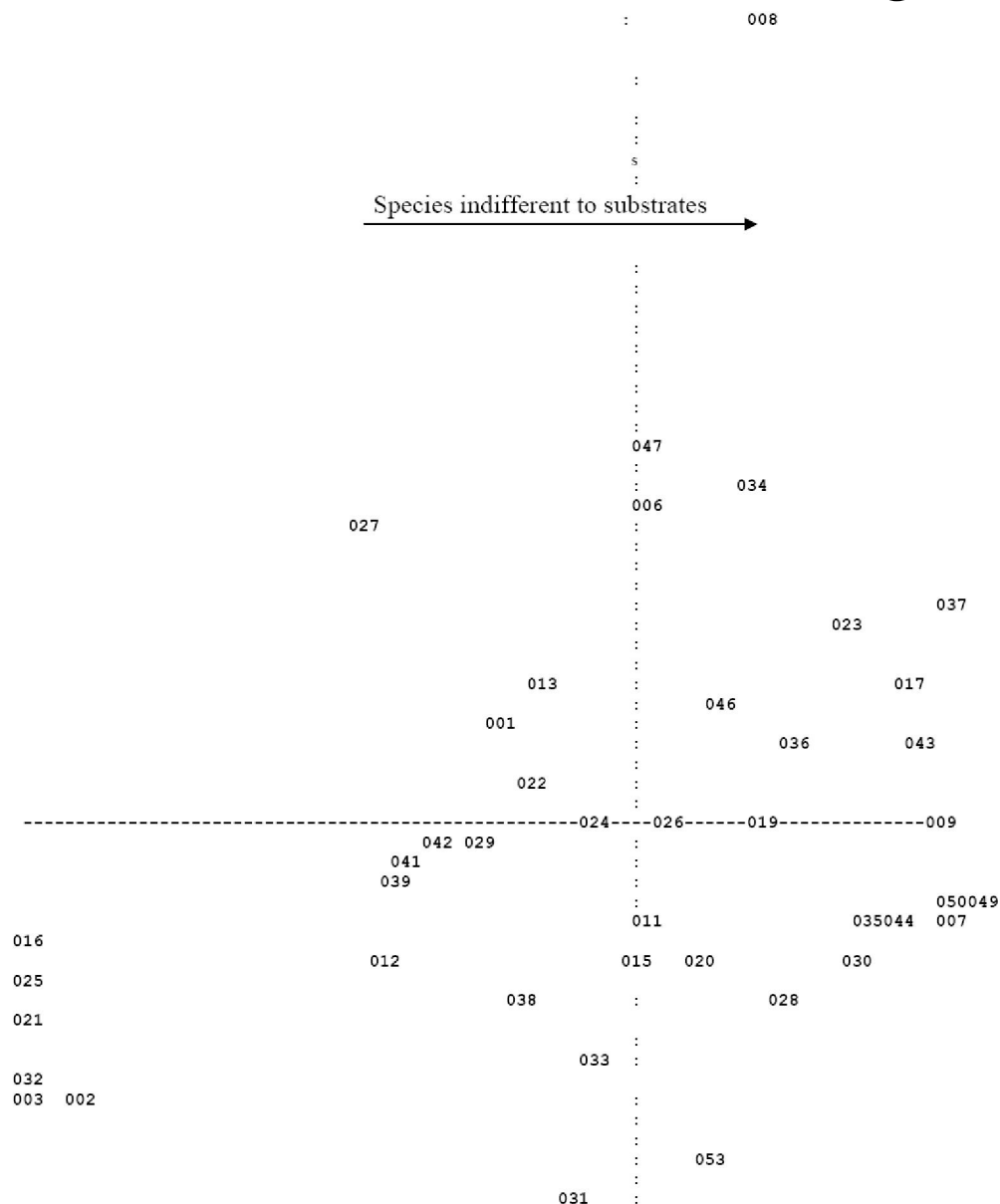


Figure 3 : Projection of species on the plan 1/2 of the station of Beni-Saf



**Figure 4 : Projection of species on the plan 2/3 of the station of Rachgoune**

The abundance - dominance expressed the space occupied by the projection on the ground of all the individuals of each species. This coefficient admits the following scale<sup>[1]</sup>

+ Species introduced to recovery and to abundance low

5 Superior Recovery 75 with any abundance

The sociability expresses the mode of distribution of individuals of the same species together by contribution to the other. It is evaluated according to the scale proposed by<sup>[1]</sup>

1 The individuals of the species are isolated

5 The individuals of the species are in continuous

stands.

Once the readings, they were sorted by a factor analysis of matches (A. F. C) and a bottom-up classification hierarchical (C. A. H).

For this analysis we will focus on the determination of ecological diversity and floristic analysis syntaxonomique which will be devoted to the description of the units phytosociologiques encountered.

This analysis is scope on 150 readings.

**RESULTS AND DISCUSSION**

**Station Beni-Saf**

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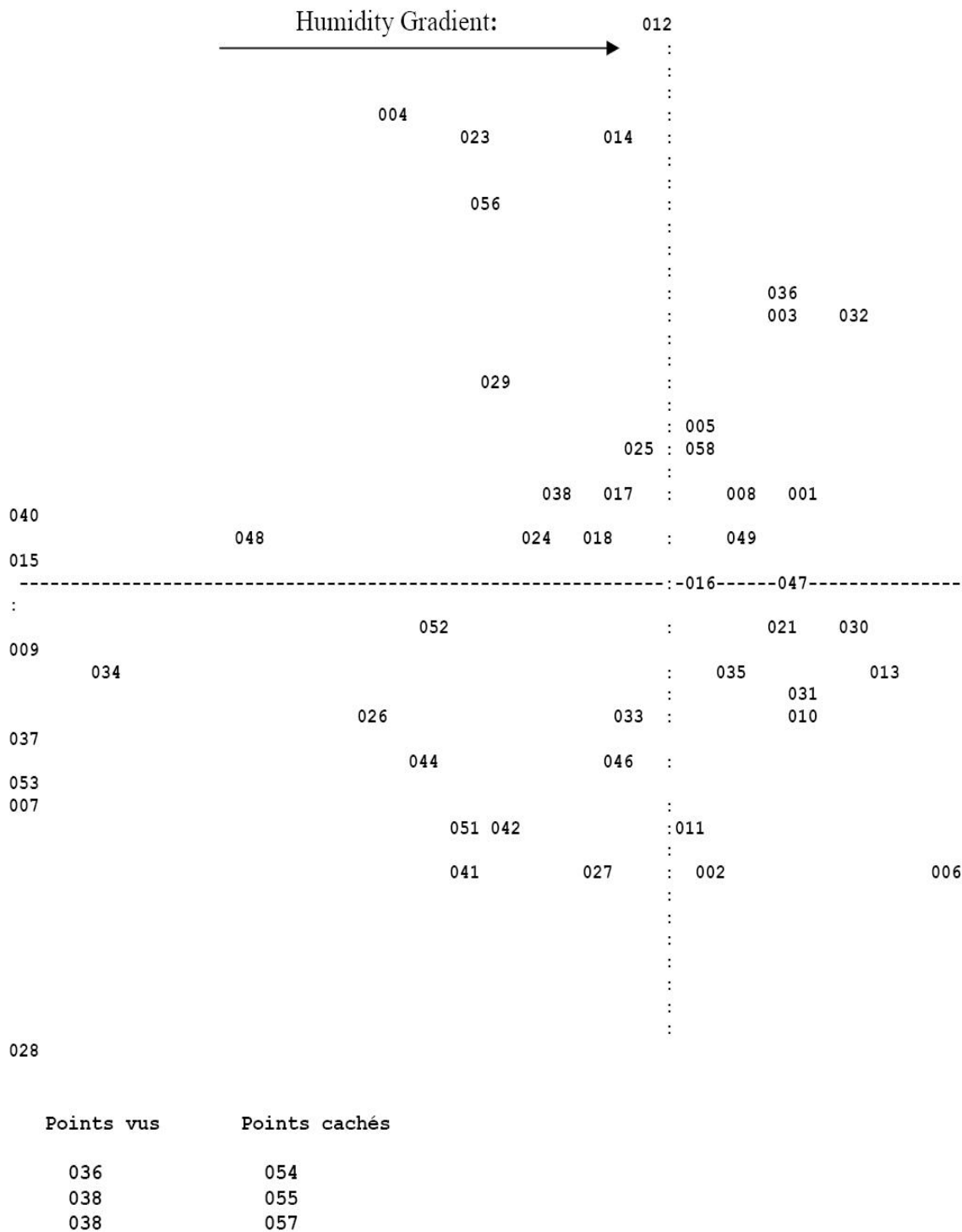


Figure 5 : Projection of species on the plan 1/3 of the station of Ghazaouet

On the positive side is presented of species relatively meso-hygrophiles such as *Ononis reclinata* and *Ranunculus spicatus* and on the negative side the species are relatively more tolerant: *Centaurea incana*, *Paronychia argentea* and *Xeranthemum inapertum*. This axis is very clearly identified by a gradient of moisture.

Station rachgoune

It presents a lot of species psammophiliques Figure 2 by excellence (purely psammophiles) which grows on the mobile dunes to high accumulation sander during periods of respite of marine erosion. This group of species is observed in the center of the axis.

TABLE 1 : Them floristic surveys of the beach and valleys of Rachgoune

station : valleys of Rachgoune. Beach and Siga																
exposition : north-South																
Recovery : 60-70%																
altitude (m)		172	180	205	204	214	206	190	209	212	160	185	180	210	200	160
GENRES SPECIES	Survey	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>Ammophila arenaria</i> (L.) Link.	Poacées										+					
<i>Anagalis arvensis</i> L.	Primulacées	0	0	+	+					+		+				
<i>Asperula hirsuta</i> L.	Rutacées	0	0	+	+	1	1						+	+		
<i>Asphodelus microcarpus</i> Salzm et Viv.	Liliacées	0	0	0	+											
<i>Avena sterilis</i> L.	Poacées	0	0	0	+							+				
<i>Bromus rubens</i> L.	Poacées											+				
<i>Cakile maritima</i> Scop.	Brassicacées										1					
<i>Calendula arvensis</i> L.	Astéracées	3	0													+
<i>Calycotome spinosa</i> (L.) Link.	Fabacées	2	2	1	+	1	1									
<i>Calystegia soldanella</i> L.	Convolvulacées										1					
<i>Centaurium umbellatum</i> (Gibb). Beck.	Gentianacées	+	1	2	+	+		+								
<i>Chamaerops humilis</i> L.	Palmacées	0	0	0	1											
<i>Chrysanthemum grandiflorum</i> (L.) Batt.	Astéracées									+	+	+				
<i>Chrysanthemum coronarium</i> L.	Astéracées											+				
<i>Cistus monspeliensis</i> L.	Cistacées	2	2	3	4	3	4	+	3	3	2		1	2		1
<i>Cistus salvifolius</i> L.	Cistacées	2	2	2	2		+	1								
<i>Cladanthus arabicus</i> (L.) Cass.	Astéracées	2	2	3	4		2	+	+			3	1	2		3
<i>Cuscuta sp</i> (Tourn). L.	Cuscutacées															+
<i>Dactylis glomerata</i> L.	Poacées	1	0		+	+										
<i>Daucus carota</i> L.	Apiacées	2	0	2	+	1										
<i>Daucus carota subsp gummiifer</i> Lamk.	Apiacées									1	+					
<i>Echinops spinosus</i> L.	Apiacées									1	+				+	
<i>Echinophora spinosa</i> L.	Apiacées										1		+			
<i>Echium vulgare</i> Tourn.	Borraginacées	3	0		+		+							+	+	
<i>Ephedra fragilis</i> Desf.	Ephedracées									1	+					
<i>Erica multiflora</i> L.	Ericacées	1	1	1	2	2				1	+					
<i>Euphorbia paralias</i> L.	Euphorbiacées									1	1	1				
<i>Euphorbia peplis</i> L.	Euphorbiacées	0	0	0	+											
<i>Fagonia cretica</i> L.	Zygophyllacées	3	0													
<i>Gla diolus segetum</i> Ker-Gawl.	Iridacées									+						
<i>Globularia alypum</i> L.	Globulariacées	2	0			+										
<i>Gnaphalium luteo-album</i> L.	Astéracées	0	0	0	0	+			1			+				1
<i>Hedysarum sp</i> L.	Fabacées	2	1		2			+	+							3
<i>Inula crithmoides</i> L.	Astéracées			+					+							
<i>Juncus maritimus</i> Lamk.	Juncacées									1	+					2
<i>Juniperus oxycedrus</i> L.	Cupressacées	4	3	4	4	4	4	4	4	3	4					4
<i>Juniperus phoenicea</i> L.	Cupressacées	0	0	+	1		+					2				2
<i>Lagurus ovatus</i> L.	Poacées	2	0									1				1
<i>Limonium sinuatum</i> (L.) Mill.	Linacées	0	0	0	0	0	0	+								



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GENRES SPECIES	Survey	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>Linum strictum L.</i>	Linacées	3	0					+		+	1	1				
<i>Lygeum spartum L.</i>	Poacées											1				
<i>Marrubium vulgare L.</i>	Lamiacées	0	0	0	0	0	+	+				+				4
<i>Medicago marina L.</i>	Fabacées	0	0	0	0	0	0	0	0		1	2	2	+		3
<i>Medicago minima Grufb.</i>	Fabacées	0	0	0	0	0	0	0	+		1					
<i>Medicago littoralis Rhode.</i>	Fabacées										1					
<i>Mesembryanthemum nodiflorum L.</i>	Aizoacées	0	0	0	+											
<i>Muscari comosum (L.) Mill.</i>	Liliacées	0	0	0	0	0	0	0	+							
<i>Myrtus communis M.</i>	Myrtacées	0	+				+	+		+						
<i>Olea europaea L.</i>	Oléacées	0	0	0	0	0	0	+	+							
<i>Ononis spinosa L.</i>	Fabacées	+	0													3
<i>Ononis natrix L.</i>	Fabacées	0	0	0	0	+				+	1		+		1	
<i>Paronychia argentea (Pourr.) Lamk.</i>	Caryophyllacées	2	0	1	+											+
<i>Phagnalon saxatile (L.) Cass.</i>	Astéracées	2	2	3	3	2	3	+		+	2					
<i>Phragmites communis</i>	Poacées									+		+				+
<i>Pinus halepensis L.</i>	Pinacées	1	0											1		
<i>Pinus maritima L.</i>	Pinacées	2	0	3	1		1	4	2	2	1					1
<i>Pistacia lentiscus L.</i>	Oléacées	0	0	+	+	+										
<i>Plantago argentea Desf.</i>	Plantaginacées	3	0									1				
<i>Plantago lagopus L.</i>	Plantaginacées									+	1			+	1	
<i>Plantago marina L.</i>	Plantaginacées	0	2	2			+					1				
<i>Plantago psyllium L.</i>	Fabacées	0	1	2			+									
<i>Quercus coccifera L.</i>	Fagacées	3	2	2								3				
<i>Raphanus raphanistrum L.</i>	Brassicacées	0	0	0	+											
<i>Reichardia tingitana (L.) Roth.</i>	Astéracées	0	0	0	+											
<i>Rhamnus alaternus L.</i>	Rhamnacées	0	0	0	0	0	1			1	+					+
<i>Rhamnus lycioides L.</i>	Rhamnacées	1	1			1	+			1	1					
<i>Rosmarinus officinalis L.</i>	Lamiacées									1	+					
<i>Rubia peregrina L.</i>	Rubiacées															1
<i>Rubia sp L.</i>	Rubiacées	0	0	4	4		+									
<i>Salicornia ramosissima L.</i>	Chénopodiacées									+	+					
<i>Scabiosa stellata L.</i>	Dipsacacées	2	1	3	2	1	+		2	+	2					+
<i>Scorpiurus vermiculatus L.</i>	Fabacées									1	+					
<i>Senecio leucanthemifolius Poiret.</i>	Astéracées				+							+	+			
<i>Silene coeli-rosa (L.) A. Br.</i>	Caryophyllacées				+							2			2	1
<i>Silene maritima L.</i>	Caryophyllacées	2	2			2										
<i>Spartium junceum L.</i>	Fabacées	+	1	3	4	3	3			1	2					
<i>Teucrium fruticans L.</i>	Lamiacées	0	1							+	1					
<i>Teucrium polium L.</i>	Lamiacées									+	1	+				
<i>Thymus ciliatus Desf.</i>	Lamiacées									1	+	+				3
<i>Trifolium stellatum L.</i>	Fabacées	0	1	0	+	1		+		+	1			+		
<i>Ulex parviflorus Pourret.</i>	Fabacées	0	0	0	1		+									+

Station Ghazaouet Figure 3 the specific values are respectively 0.33 and 0.32; they are significantly stron-

ger than their counterpart's notes in previous treatments. The structuring of the cloud (species) is therefore better.

TABLE 2 : Them floristic surveys of beach of Ouled Ben Ayad (Ghazaouet)

Station : Ouled Ben Ayed					
exposition : north east					
Covering rates : 40-50%					
Substrate : silicious					
Altitude (m)					
		185	16	40	20
GENRES SPECIES	Survey	1	2	3	4
<i>Alopecurus pratensis</i> L.	Poacées	+		+	
<i>Arenaria emarginata</i> Brot.	Caryophyllacées	+		+	+
<i>Asteriscus maritimus</i> (L.) Less.	Astéracées	1	+	+	+
<i>Atriplex halimus</i> L.	Chénopodiacées	+			+
<i>Avena sterilis</i> L.	Poacées	+		+	+
<i>Bromus madritensis</i> L.	Poacées	1		+	1
<i>Bromus rubens</i> L.	Poacées	+			1
<i>Cakile maritima</i> Scop.	Brassicacées	+		+	+
<i>Centaurea pullata</i> L.	Astéracées	+	+	+	+
<i>Chrysanthemum grandiflorum</i> (L.) Batt.	Astéracées	1	1	+	+
<i>Dactylis glomerata</i> L.	Poacées	1		+	1
<i>Erodium moschatum</i> L.	Géraniacées	+	+	+	+
<i>Frankenia laevigata</i> L.	Frankeniacées	+	+	+	+
<i>Gnaphalium luteo-album</i> L.	Astéracées	+		+	+
<i>Hedysarum</i> sp L.	Fabacées	1	1	1	+
<i>Hippocrepis multisiliquosa</i> L.	Brassicacées	+		+	+
<i>Hordeum murinum</i> Witth.	Poacées	1	1	+	+
<i>Inula crithmoides</i> L.	Astéracées	+		+	+
<i>Lagurus ovatus</i> L.	Poacées	1	1	1	+
<i>Lavatera maritima</i> Gouan.	Malvacées	1	1	+	+
<i>Lobularia maritima</i> (L.) Desv.	Brassicacées	+		+	+
<i>Lolium rigidum</i> Gaud.	Poacées	+		+	1
<i>Lotus ornithopoides</i> L.	Fabacées	+		+	+
<i>Malva sylvestris</i> L.	Malvacées	+		+	+
<i>Matthiola sinuata</i> (L.) R. Br.	Fabacées	1	+		+
<i>Medicago marina</i> L.	Fabacées	+	1	1	+
<i>Medicago littoralis</i> Rhode.	Fabacées	+	+	+	+
<i>Medicago minima</i> Grufb.	Fabacées	+		+	
<i>Oxalis pes-caprae</i> L.	Oxalidacées	+		+	+
<i>Orchis purpurea</i> L.	Orchidacées	+	+		+
<i>Ononis natrix</i> L.	Fabacées		1	+	
<i>Paronychia argentea</i> (Pourr.) Lamk.	Caryophyllacées		+		+
<i>Phagnalon saxatile</i> (L.) Cass.	Astéracées	+		+	+
<i>Plantago lagopus</i> L.	Plantaginacées	+	+		+
<i>Plantago marina</i> L.	Plantaginacées	+		+	+
<i>Plantago psyllium</i> L.	Plantaginacées	+	1		+
<i>Raphanus raphanistrum</i> L.	Brassicacées	1	1	1	+
<i>Reichardia tingitana</i> (L.) Roth.	Astéracées	+		+	+
<i>Senecio leucanthemifolius</i> Poir.	Astéracées	+		+	+
<i>Silene maritima</i> L.	Caryophyllacées	+		+	+
<i>Suaeda maritima</i> (L.) Dumort.	Chénopodiacées	+	+		+
<i>Trifolium angustifolium</i> L.	Fabacées	+			+
<i>Trifolium stellatum</i> L.	Fabacées	+		+	



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TABLE 3 : Them floristic surveys of beach of Beni Saf; Sidi Boucif and Sid Safi

Station : beach of Beni Saf		Station : beach of Sidi Boucif										Station : beach of Sidi Safi									
Exposition : North		exposition : North										Exposition : North									
Covering rates: 05-10%		Covering rates : 20-25%										Covering rates : 10-20%									
Altitude (m)		190	209	212	160	191	191	200	200	210	210	210	200	200	271	273	270	260	215	202	180
GENRES SPECIES	Survey	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
<i>Andropogon hirtus L.</i>	Poacées	+		+	1																
<i>Anagallis arvensis L.</i>	Primulacées															+		+		+	
<i>Arenaria emarginata Brot.</i>	Caryophyllacées	1	+		1	1		+	+	1	1	+	+	+							
<i>Asparagus stipularis Forsk.</i>	Liliacées	1		+	1	1	1	+		+	+		+								
<i>Asteriscus maritimus (L.) Less.</i>	Astéracées						+	+	+	+	+		+	+	1	+	1	1		1	+
<i>Atractylis concellata L.</i>	Astéracées	+														+					
<i>Atractylis pycnocephalus L.</i>	Astéracées	+														+					
<i>Atriplex halimus L.</i>	Chénopodiacées				+														+		
<i>Avena sterilis L.</i>	Poacées					+					+			+							
<i>Bellis annua L.</i>	Astéracées					+	+	+	+	+	+										
<i>Bupleurum protractum Hoffm. et Link.</i>	Apiacées	1		1	+																
<i>Bromus rubens L.</i>	Poacées					+					+								1		
<i>Calycotome spinosa (L.) Link.</i>	Fabacées	+		+												+					
<i>Calystegia soldanella L.</i>	Astéracées	1		+	+																
<i>Catananche coerulea L.</i>	Astéracées	1	+		+	+	+	+	+	+	+	+		+							
<i>Centaurea pullata L.</i>	Gentianacées						+														+
<i>Chamaerops humilis L.</i>	Chénopodiacées	+		+	1										3	+				+	1
<i>Chenopodium album L.</i>	Astéracées															+					
<i>Chrysanthemum grandiflorum (L.) Batt.</i>	Astéracées															+					
<i>Chrysanthemum coronarium L.</i>	Cistacées	+		1																	+
<i>Cuscuta sp (Tourn). L.</i>	Cuscutacées						+														+
<i>Dactylis glomerata L.</i>	Poacées					+	+	+													
<i>Daucus carota subsp gummifer Lamk.</i>	Apiacées	1		1	+										+	1		2	1		1
<i>Delphinium peregrinum L.</i>	Renonculacées														+		+				
<i>Echinophora spinosa L.</i>	Apiacées	1		+	+																
<i>Echium vulgare Tourn.</i>	Borraginacées																1				
<i>Ephedra fragilis Desf.</i>	Ephedracées														+	1					
<i>Erica arborea L.</i>	Ericacées	+																			
<i>Erica multiflora L.</i>	Ericacées	1	+		+		1	+		+	+			+	+						
<i>Erodium moschatum (Burm) L'Her.</i>	Géraniacées																				
<i>Eryngium tricuspidatum L.</i>	Apiacées					+		+	+	+		+	+	+							
<i>Eryngium maritimum L.</i>	Apiacées																				1
<i>Fagonia cretica L.</i>	Zygophyllacées															+					
<i>Globularia alypum L.</i>	Globulariacées														2	+		3	+	1	1
<i>Gnaphalium luteo-album L.</i>	Astéracées					+		+	+	+	+		+	+							
<i>Halimium halimifolium (L.) Willk.</i>	Cistacées														1				1	1	+
<i>Hedysarum sp L.</i>	Fabacées	2	3	1	+																+
<i>Hordeum murinum Witth.</i>	Poacées					+				+											
<i>Inula crithmoides L.</i>	Astéracées		1											+							
<i>Juncus maritimus Lamk.</i>	Juncacées														2	1					

GENRES SPECIES	Survey	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
<i>Juniperus phoenicea L.</i>	Cupressacées	1	2	2	1	+		+		1					2	2				1	
<i>Lagurus ovatus L.</i>	Poacées														1	+	+		2		1
<i>Lavandula stoechas L.</i>	Lamiacées					+				+				+							
<i>Lavandula dentata L.</i>	Lamiacées	1	+	+	1																
<i>Limonium sinuatum (L.) Mill.</i>	Plumbaginacées														+		+			1	+
<i>Linum strictum L.</i>	Linacées																	+			
<i>Lobularia maritima (L.) Desv.</i>	Brassicacées	+	1		+			1						+							
<i>Lotus ornithopoides L.</i>	Fabacées	1	+		1																
<i>Malva sylvestris L.</i>	Malvacées																		1		
<i>Marrubium vulgare L.</i>	Lamiacées														3	3				1	
<i>Medicago marina L.</i>	Fabacées							+	+	+	+	+		+			1	1		1	
<i>Medicago littoralis Rhode.</i>	Fabacées							+	+	+	+	+		+							
<i>Mesembryanthemum nodiflorum L.</i>	Aizoacées	1	+		+																
<i>Ononis spinosa L.</i>	Fabacées														1					+	
<i>Periploca laevigata Auct.</i>	Asclépiadacées															+	1	1			
<i>Paronychia argentea (Pourr.) Lamk.</i>	Caryophyllacées					+		+	+	+	+		+	+	+						
<i>Phagnalon saxatile (L.) Cass.</i>	Astéracées	1	+	+	2																
<i>Pinus maritima L.</i>	Pinacées														1	+					+
<i>Pistacia lentiscus L.</i>	Oléacées	1		2	1										+	+		+			
<i>Plantago argentea Desf.</i>	Plantaginacées														+		1				
<i>Plantago marina L.</i>	Plantaginacées	1		+											1	1		+	1	2	
<i>Plantago psyllium L.</i>	Plantaginacées							+	+	+	+										
<i>Raphanus raphanistrum L.</i>	Brassicacées					1	+	+	+	+	+	+	+	+		+		1			+
<i>Reseda alba L.</i>	Résédacées																				+
<i>Reichardia tingitana (L.) Roth.</i>	Astéracées					+		+	+	+	+	+	+	+							
<i>Reseda lutea L.</i>	Résédacées	+		+	+										1					+	
<i>Rhamnus alaternus L.</i>	Rhamnacées																	1	2		+
<i>Rhamnus lycioides L.</i>	Rhamnacées					+					+		+	*							
<i>Rosmarinus officinalis L.</i>	Lamiacées	+	1		1																
<i>Rubia peregrina L.</i>	Rubiacees	+		+																	
<i>Rumex bucephalophorus L.</i>	Polygonacées	1		1	+	+	+				+	+									
<i>Ruta chalepensis L.</i>	Rutacées							1	1	1	+		+	+							
<i>Salicornia ramosissima L.</i>	Chénopodiacées																		+		1
<i>Satureja graeca L.</i>	Lamiacées	+	1	1																	
<i>Scorpiurus vermiculatus L.</i>	Fabacées														+			3	1		
<i>Sedum acre L.</i>	Crassulacées	+		1		+	+	+	+	+	+	+	+	+							
<i>Senecio leucanthemifolius Poir.</i>	Astéracées														1			1			
<i>Silene maritima L.</i>	Caryophyllacées														3	2		1	2	1	1
<i>Smilax aspera L.</i>	Liliacées														4	3	+		+	3	4
<i>Stipa tortilis Desf.</i>	Poacées							+				+									
<i>Taraxacum officinalis L.</i>	Astéracées	+		+		+			+	+	+	+	+		+				1	+	+
<i>Tamarix gallica L.</i>	Tamaricacées																		+		1
<i>Teucrium polium L.</i>	Lamiacées	+	1	+	1											3		+	1	1	1
<i>Trifolium stellatum L.</i>	Fabacées														2	1					+
<i>Ulex parviflorus Pourret.</i>	Fabacées											+	+	+							

## Regular Paper

- Positive Side: *Euphorbia paralias* ; *Catananche coerulea* ; *Phagnalon saxatile*, *Rhamnus lycioides*
- Negative Side: *Juncus maritimus* ; *Ziziphus lotus* ; *Scolymus hispanicum* *Bellis annua*; *Avena sterilis*; *Lagurus ovatus*; *Reseda phyteuma*

On the positive side the species are of the substrates to textures relatively thinner, richer in silt.

The negative side is being interrelated of species to coarse texture.

On this axis we observe mainly of species to matorral more or less indifferent to substrates. We find in the structuring of the cloud the correspondence of a gradient of moisture by the emergence of *Erica multiflora* and *Erica arborea*. This is a dune in track mounting.

### CONCLUSION

- The application of the factor analysis of the correspondences to our data faunal has led:
- of a part of the individualization of psammophile by excellence and who are:
  - *Ammophila arenaria*
  - *Pancratium maritimum*
  - *Cakile maritima*
  - *Echinophora spinosa*
  - *Daucus carota subsp maritima*
  - *Calystegia soldanella*
  - *Eryngium maritimum*

These species related to the class of AMMOPHILETEA and CAKILETEA MARITIMAE TX and Preis 1950. They occupy the summits of the beaches in maritime boundaries and also it designates a vegetation therophytes psammo-halo-more nitrophilous<sup>[2]</sup> which characterize the embryonic dunes.

Away from the beach, vegetation very diversified is installed to secure these dunes in giving birth to bright dunes more or less fixed. This vegetation refers to the class of THEROBRACHYPODIETEA these dunes are brightly laid down by the installation of species pre-forestry and forestry such as *Geniperus phonicea*; *Asparagus acutifolius*; *myrtus communis* and *Asparagus stipularis*; these species are weakly psammophiles and/or plastic even in the matorrals and forest formations forests.

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