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Floristic Diversity of the Stand to *Pistacia Atlantica* Desf *Atlantica* in the Saharan Atlas of Bechar (Western Algeria)

Benaradj Abdelkrim*[1], Bouazza Mohamed[2], Hasnaoui Okkacha[3] and Boucherit Hafidha[4]

[1]University Centre of Naama, BP 66, Naama 45000 (Algeria).
[2]Laboratory of Ecology and Management of the Natural Ecosystems, Department of Ecology and Environment, University Abou BakrBelkaid , Tlemcen 13000 (Algeria).
[3]Department of Biology, University of Saïda (Algeria).
[4]Department of Agricultural Sciences and Forestry, University Abou BakrBelkaid, Tlemcen 13000, (Algeria).

ABSTRACT

The Oran Saharan Atlas covers significant plant resources spread over the Plains, the mountains, chott, the dayas and desert areas.Their potential for biological resources and their impressive diversity across the national territory must require that a preservation strategy is developed. The ratification by the Algeria of the Convention on biological diversity is an important step in managing this invaluable capital and an irrefutable token which the place of our country in the preservation of biodiversity at the global level and in the building of a sustainable development. Our work fits into an overall framework which aims the preservation of plant species such as the case of the Atlas pistachio (*Pistacia atlantica* Desf. subsp. *atlantica*) which are currently the object of our concern .It is a very particular forest heritage since it an attractive species in many ways. The Atlas pistachio, known locally as the vernacular of « Betoum » is a large powerful scrublands special trunk tree that can reach 10 meters in height. The *Pistacia atlantica* is a species of future for the Western Algeria, its adaptation to environmental stress allows a dynamic and a certain biological recovery. This species can live in very dry places from 700 to 1200 m altitude where the rainfall exceeds much the 100 mm/year , a maximum temperature of 42 ° c. and a storm-heat quotient(Q_2) greater than 7. The floristic diversity of the group to *Pistacia atlantica* is very special because of its biological characterization, systematic and phytogeographic .This review highlights the importance of the Saharan species endemic thanks to an adaptation and a more favorable resistance under typical Saharan bio.

Keywords: *Pistacia atlantica,* Phyto-Ecology, diversity, Saharan Atlas, Vegetation Dynamics, Adaptation, Bechar, Algeria.

Corresponding author

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INTRODUCTION

The Saharan Atlas has always been a critical component in the stability of the economic and social balance of rural areas. In fact, the course is a natural resource for grazing animals, provide habitat for wildlife, home to underground water reserves, protect watersheds and contribute to the fight against desertification.

Monjauze [19] describes the Atlas as pistachio is the essence of the original and the most remarkable of the North Africa both by his botanical interest and its social value. It focuses on the economic importance of this species.

Work on this species in the family Anacardiaceae is numerous authors [2, 3, 6, 7, 8, 9, 10, 11, 12, 16, 18, 19, 20, 22, 23 and 25]. Overview by briefly autecology, the phytoecology and factors related to the multiplication of the species.

Our work is part of an overall framework that aims to preserve plant species such as the case of Atlas Pistachio (*Pistacia atlantica* Desf. Ssp. *atlantica*) are currently the object of our concern. It aims to assess the allocation of Atlas Pistachio in the region of Bechar by phytécologique approach to quantify the floristic and ecological data groups in *Pistacia atlantica* Desf. in relation to climatic and soil conditions.

MATERIALS AND METHODS

Description of the station « Bou Yala »

The station of Bou Yala is located in the municipality of Beni Ounif which is at an altitude of 800 m and 114 Km North of Bechar (Fig. 1). A population of pistachio trees of the Atlas *Pistacia atlantica* Desf. ssp. *atlantica* has been the subject of our study It is located close to village of Fendi, the place is said Bou Yala 30 km to the South of Beni Ounif worms Bechar close to the road national n ° 06.

Biogeographically, the station made part of the sector of the Saharan Atlas records is located in the sub sector AS1 within the meaning of Quezel and Santa [25]. It is in the westernmost part of the Saharan Atlas.

The Betoum distribute themselves along the beds of wadis Fendi and Bou Yala distribute themselves along the beds of wadis

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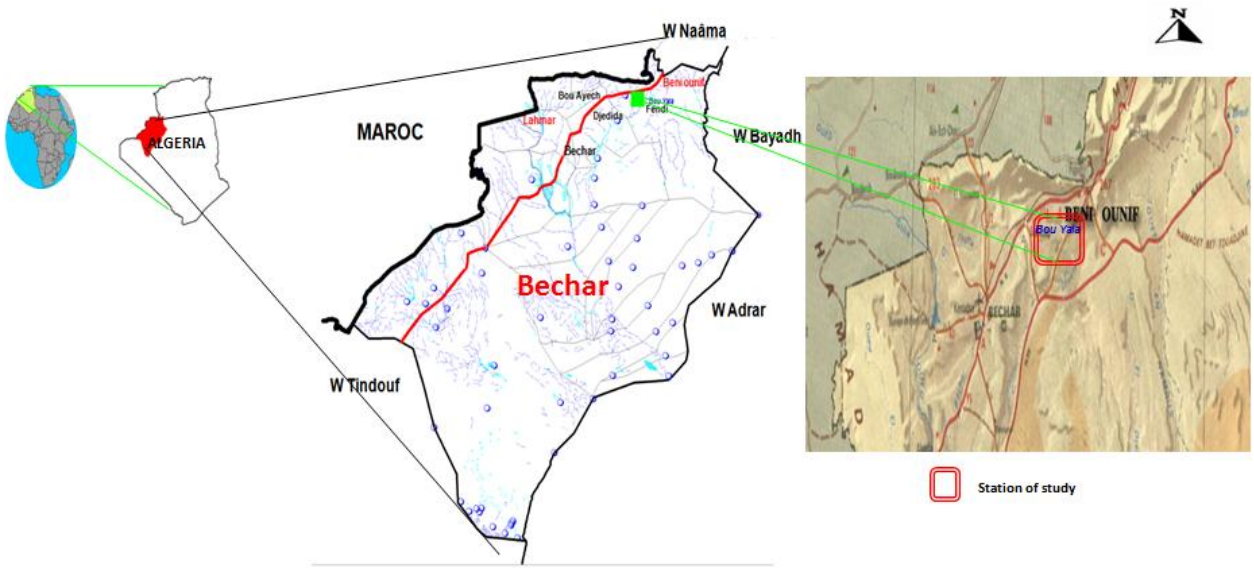

Figure 1: location of the study site Bou Yala

Methodological approach

The present work carried out at the level of range of the Atlas pistachio, fits in this context. It aims the characterization phytoecological of these groups in relation to the Saharan climate. The part of the pre-Saharan sector (Saharan Atlas) study area. It is located on the glacis of the Quaternary.

After the description of the vegetation inventory, we have developed a record sheet for the realization of records corresponding to a floristic inventory of the vegetation in the ranges of the Atlas pistachio, as well as measures or estimates of ecological site types (geomorphology, Topography, lithology and altitude). To give our work a participatory approach, we approached with the aboriginal population for its opinion on these groups to preserve this ecosystem.

The methodology includes a series of transects made device in different topographic units in the study area.

Phyto surveys are arranged every 200 m depending on the variability of vegetation and the ecological conditions (topography, exposure).

The plot is bounded using a thread and an area of 100 m^2. We have thus opted for a sampling of what systematic transect through the station.

This sampling will be carried out on grouping physiologically and morphologically homogeneous geo.

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RESULTS AND DISCUSSION

Analysis of ecological data is certainly a prerequisite of first order for the understanding of the functioning of ecosystems and environmental design.

It is essentially an instrument of investigation, combination, and as a result of use of the information for, among other things, a reflection on the development [17].

An analysis of the vegetation on 25 surveys resulted in a floristic and ecological characterization of groups of Atlas Pistachio (scattered population in general) in the region. Thus, this analysis led to the identification of vegetation associated with Pistachio.

Characterization of the recovery rate

On the recovery of vegetation, we note that there is a recovery in the largest study site.

TABLE: 1. Recovery rates of vegetation

Recovery rate (in %)	40 %

From the table, we see that the recovery is generally high (40%) in the study site, this increase is due to the exceptionally wet year (more than 130 mm in the month of October). Therefore, the recovery rate is directly influenced primarily by rainfall. This improvement in the recovery rate is due to the process of biological recovery.

Characterizations of species richness

Plant biodiversity of different types of courses can be measured by their floristic richness [14 and 15].

TABLE: 2. Wealth floristic

Number of species	131 species

There is a clear diversification of the procession floristic the group by the presence of 131 species (tab.2).

According Aidoud [1], floristic richness in arid zone depend mainly annual species, environmental conditions and the correlation of all the characters (climate, edaphisme and operation).

Characterizations of the floristic composition

The identification of taxa was made from flora of Quezel and Santa [21 and 25].

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The study site is characterized by the systematic floristic following that includes 38 families, 105 genera and 131 species. This enrichment is due to the floristic exceptional rainfall of October of 2008.

Biological characterization

To treat station, species identified were indicated by their biological type [26]. Subsequently, organic raw spectra (taking into account the absolute frequency and real) were performed.

TABLE: 3. Spectrum crude biological

Frequency	**Ph**	**Ch**	**He**	**Th**	**Ge**	**T**otal	biological spectrum
Fréq. Absolute	08	26	19	71	08	**131**	**Th>Ch>He>Ph=Ge**
relative Freq. (%)	6,06	19,7	14,39	53,79	6,06	**100%**	

From the table, the biological spectrum as follows: Th> Ch> He> Ph> Ge. This station is characterized by a strong presence of the herbaceous layer predominates. Therophytes occupy 53.79%, the chamaephytes (19.7%), hemicryptophytes (14.39%), geophytes and phanerophytes (6.06%).

Therophytisation this is a characteristic of arid [13, 4]. According Daget, [13], the therophytie is an adaptation strategy vis-à-vis adverse conditions and a form of resistance to the harsh climate.

Systematic characterization

The results of the floristic composition of these stations are presented in the following table 4.

TABLE: 4. Major taxa station study.

Taxa	**Number**
Families	38
Genera	105
Species	131

From Table 3, the station is always characterized by the following floral procession consisting of: 38 families, 105 genera and 131 species.

The vegetation of the Saharan Atlas specifically consist pre-Saharan trainings.

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TABLE: 5. Botanical families list of the study site

N°	Families	Number of genera	Number of species	N°	Families	Number of genera	Number of species
1	Asteraceae	28	23	21	Zygophyllaceae	2	2
2	Poaceae	13	12	22	Apocynaceae	1	1
3	Brassicaceae	11	10	23	Convolvulaceae	1	1
4	Fabaceae	9	5	24	Cucurbitaceae	1	1
5	Caryophylaceae	6	4	25	Cynomoriaceae	1	1
6	Borraginaceae	5	4	26	Cypéraceae	1	1
7	Lamiaceae	5	4	27	Ephédraceae	1	1
8	Géraniaceae	4	1	28	Malvaceae	1	1
9	Liliaceae	4	3	29	Oléaceae	1	1
10	Resedaceae	4	2	30	Onagaceae	1	1
11	Apiaceae	3	3	31	Orobanchaceae	1	1
12	Plantaginaceae	3	1	32	Palmaceae	1	1
13	Plombaginaceae	3	3	33	Papavéraceae	1	1
14	Anacardiaceae	2	2	34	Rhamnaceae	1	1
15	Chénopodiaceae	2	2	35	Rosaceae	1	1
16	Cistaceae	2	1	36	Rubiaceae	1	1
17	Euphorbiaceae	2	1	37	Thyméléaceae	1	1
18	Joncaceae	2	1	38	Verbénaceae	1	1
19	Polygonaceae	2	2		**Total**	**131**	**105**
20	Scrophulariaceae	2	2				

From table 5, we note a clear dominance of the cosmopolitan family which is the family of the Asteraceae (with 23 genera and 28 species), followed by Poaceae (with 12 genera and 13 species), and the family Brassicaceae (with 10 genera and 11 species), respectively in third and fourth position Fabaceae (with five genera and 9 species), followed by the families of Caryophylacees (4 genera and 6 species), Boraginaceae and Lamiaceae (4 genera and 5 species), Liliaceae (3 genera, 4 species).

We are also seeing the presence of families presented by 3 genera and 3 species such as: Plombaginaceae and Apiaceae as well as the presence of the families presented by 2 genera and four species are the case of the family of the Resedaceae. For these families of Anacardiaceae, Polygonaceae, Scrophulariaceae, Zygophyllaceae and Chenopodiaceae (two genera and two species) and these families of Cistaceae, Euphorbiaceae and Juncaceae (a single genus and two species). There is, in some cases, the presence of the families presented by a single genus and one species as: Apocynaceae, Convolvulaceae, Cucurbitaceae, Cynomoriacee, sedges, synonym, Malvaceae, Oleaceae, Onagaceae, Orobanchaceae, Palmaceae, Papaveraceae, Rhamnaceae, Rosaceae, Rubiaceae, Daphnaceae and Verbenaceae

These systematic analyze shows diversity in families and Genera more nuanced in the study station. Asteraceae, Poaceae and Fabaceae are three families of Mediterranean affinity with a clear dominance in the floristic lists. These three families represent 35 to 40% of the flora in each Saharan area [21]. This predominance is justified because they are cosmopolitan families that are widespread on the entire surface of the globe.

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Phytogeographic characterization

According to Barry and Celles [5] the study area phytogeographical belongs to the Holarctic empire in the Mediterranean region, and the Saharan Atlas. The area subject to floristic migration due to two major causes Quezel [24].

Both biologically and in terms biogeographic, we note that the station Bou Yala is dominated by the presence of the first element Endemic (25%), and other elements biogeographical we note the strong presence of Mediterranean elements (19.60%), with Pluri regional (17.40%) and the Saharo-sindien (14.10%), the low presence of Ibero-Mauritanian element (5.43%), Mediterranean-Saharo -sindien (5.43%), Mediterranean-Saharan (6.52%) and Sahara (6.52%).

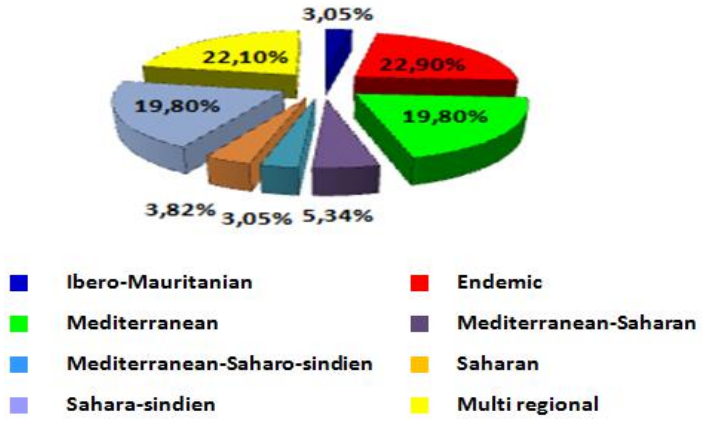

Figure 2: Spectrum phytogeographical

The interaction of the Saharan and Mediterranean flora to date remains widely known but requires detailed studies to characterize the. This interaction includes a very high diversity and as such deserves special protection.

The floristic diversity of the group of pistachio

Our contribution concerns the study of biological and phytogeographic ecosystem diversity presahariens.

Asteraceae: *Scorzonera undulata, Carduncellus Devauxii, Centaurea dimorpha, Asteriscus pygmaeus, Picris albida, Pallenis cuspidata, Filago spathulata, Calendula aegyptiaca, Catanche arenaria, Launaea glomerata, Tourneuxia variifolia, Bubonium graveolens, Centaurea maroccana, Chrysanthemum macrocarpum, Launaea nudicaulis, Launea resedifolia, lifago coropifolia, Stephanochilus omphalodes, Waronia saharae, Xantium sp, Cladanthus arabicus, Ifloga spicata, Lifago dielsii, Matricaria pubescens Cladanthus arabicus, Ifloga spicata, Lifago dielsii, Matricaria pubescens.*

Poaceae: Hordeum murinum, Schimus barbatus, *Cynodon dactylon, Stipa parviflora, Phalaris minors, Avena alba, Avena sterelis, Bromus rubens, Cutandia dichotoma, Cymbopogon schoenanthus, Panicum turgidum, Trisetum pumilum.*

Brassicaceae: *Mathiola livida*, *Malcolmia aegyptiaca, Morettia canescens, Dilpotaxi pitardiana, Sisymbrium reboudianum, Eruca vesicaria, Zilla macroptera.*

Fabaceae: *Astragalus cruciatus, Astragalus eremophilus, Astragalus Vogelit fatimensis, Medicago laciniata, Medicago minima, Tephrosia leptostachya, Trigonella anguina, Trigonella stellata.*

CONCLUSION

Analysis of the floristic diversity of individualized groups, their biological and chronological nature would differentiate the different ecosystems and assess their value heritage, given to their sound management.

Floristic diversity in forms of the pistachio is very diversify by a group purely Sahara and desert: *Pistacia atlantica* Desf*, Hammada scoparia, Rhus tripartitum, Ziziphus lotus, Ephedra alata, Anabasis articulata, Anabasis aretioïdes, Ephedra alata, Anvillea radiata, Asphodelus tenuifolius, Bassia muricata, Bubonium graveolens, Cotula cinerea, Daucus biseriantus, Echium pycnanthum, Euphorbia retusa, Fagonia glutinosa, Globularia alypum, Gymnocarpos decander, Launaea arborescens, Launaea nudicaulis, Limoniastrum feei, Moricandia suffruticosa, Neuroda procumbens, Plantago ciliata, Teucrium polium, Zilla macroptera, Zilla spinosa…..* This grouping of pistachio in association with species phanerophytiques these species are thermomediterranean upstairs in the mountains and mid-slope. The appearance of the species *Rhus tripartitum* and *Anabasis aretioïdes* is an indicator of the Saharan Atlas.

This species deserves adequate measures of protection, including in its natural habitat. Indeed, in addition to an interest in forestry and ecological, the Betoum can also have a certain economic interest, including serving rootstock for Pistachio fruit culture (*Pistacia vera*) in semi-arid areas.

Understanding the problems and factors of the decline of these pistachios would contribute to the protection of biodiversity and better regeneration of this species. And a better understanding of the potential of this gas would allow a better extension.

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