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FLORISTIC DIVERSITY OF SAADIA MOUNTAIN (ALGERIAN NORTH-WEST)

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Abstract

The Saadia Mountain, administratively dependent on the wilaya of Chlef and Relizene in the north-west of Algeria, its vegetation carpet is composed mainly by the oak. The analysis of our results shows very well that the floristic composition amounts to 109 species belonging to 92 genera and 36 families whose Poaceae, Asteraceae and Fabaceae are the most represented. From the biological point of view the thérophytes are the most dominant in the study area and the analysis of the biogeographical types indicates the predominance of the Mediterranean element.

Key words : Saadia Mountain, vegetation, diversity, floristic, north-west Algeria.

Introduction

Knowledge, characterization, classification and conservation of different taxa is a global scientific priority for the assessment and management of biodiversity (Cotterill, 1995). Degradation of forest ecosystems is one of the most important causes of biodiversity reduction in the world. The current situation of the Algerian forest ecosystems is one of the most critical in the Mediterranean region (Ikermoud, 2000). Indeed, the persistence of destructive factors such as fires, overgrazing, deforestation and parasitic attacks, only accentuates the process of degradation of the existing forest system, with the destruction of reserves Estimated from 45 000 to 50 000 ha/yr (Mezali, 2003). The annual deforestation rate was estimated to be more than 13 million hectares between 1980 and 1995 (FAO, 1997). This study is an initial analysis of the floristic composition, in the Mountain of Saadia (north-west of Algeria) This region offers a model of study of the evolution of flora and vegetation very interesting, allows to understand and interpret the various ity of this floristic heritage through the floristic composition, the biological, morphological and biogeographic type.

Materials and Method

Presentation of the Study Area

Mountain of Saadia Forest is located in northwestern Algeria (Fig. 1). It is administratively shared between the wilaya of Chlef and Relizan. Geographically, it is located in the southeast of the Ouarsenis Massif, part of the tell Atlas chain and is located between 1°18'23" and 1°21'55" longitude, 35°53'5" and 35°55'47" north latitude.

The study area is considered to be a mountainous area with a maximum elevation of 1198 m (Fig. 2) and an area of 1058 Ha, it rests on a massif dating from the Oligocene formed alteration of the marls and limestones, the soils are characterized by a neutral pH varies between 6.16 and 6.77, with a fairly high level of organic matter.

The climate of the study area is characterized by a semi-arid to sub-humid bioclimatic stage, the average annual rainfall varies from 380 mm for low altitudes to 660 mm for high altitudes, the average minimum temperature of the coldest month varies from 1.71 to 6.16 ºC and the average maximum temperature for the warmest month ranges from 30.21 to 35.12 °C. Average annual temperatures range from 10 to 20 ºC. This type of climate promotes the extension of xérophyte vegetation and especially théophytes (Amara and Bouazza, 2016).

Methodology

We have carried out floristic surveys on the plant mat in the study area, or the survey area must be sufficient to understand the maximum number of plant species (Guinochet, 1973). The identification of plant species was made using the flora of Quezel and Santa (1962). The Stigmatiste method consists of establishing a complete inventory of the species on a 1 m² parcel. By successively doubling this area, new species that appear are added. We are supposed to get a zone "n " called "minimum area" (Gounot, 1969).

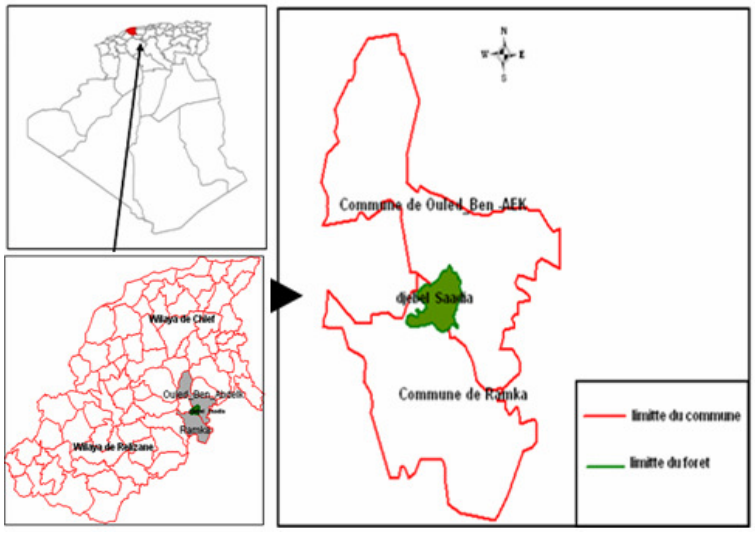

Fig. 1: The geographical location of the study area

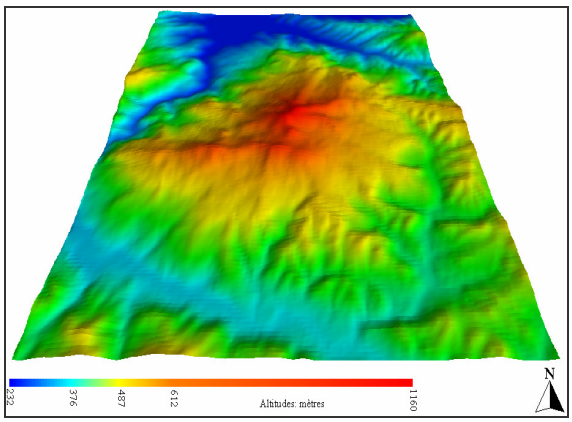

Fig. 2 : Digital terrain model of the study area

In the Mediterranean region, this minimum area is in the range of 100 to 400 m² for forest formations and 50 to 100 m² for Matorral (benabid, 1984). For our case the minimum air is m^2.

Floral samples were collected in the spring to obtain as many species as possible. These floristic surveys are carried out over several consecutive years in the field using the Braun-Blanquet Method (1951). For the completion of this study, 50 phytosociological surveys were carried out in the forest.

Results and Discussion

Systematic Composition

One hundred and nine (109) species were identified in the forest and belong to 92 genera and 36 families (Fig. 3).

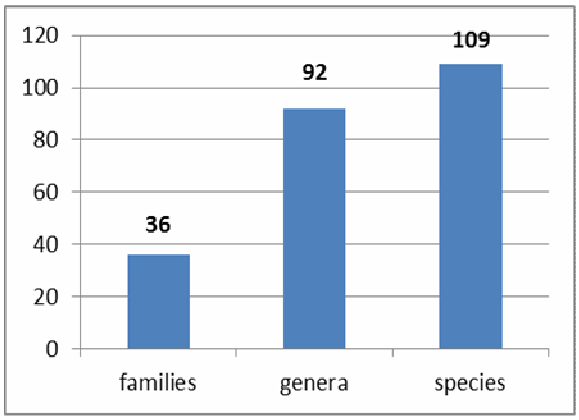

Fig. 3 : Total number of families, genera and species recorded

The Poaceae are most represented with 16 species, or about 14.41% (Fig. 4), this family is dominated by two genera Bromus and Avena. These species are frequently represented by annual plants considered to be anthropization indicators (Miara *et al*, 2017).

The Asteraceae family is in second place with 15 species (13.41%). Then, the Fabaceae with 8 species (7.20%). Apiaceae families (6 species, 5.40%), Lamiaceae (6 species, 5.40%) and Fagaceae (4 species, 3.20%) were moderately represented. Caryophyllaceae families (3 species, 2.70%), Crassulaceae (3 species, 2.70%), Convolvulaceae (3 species, 2.70%), Rosaceae (3 species, 2.70%), Geraniacées (3 species, 2.70%) and Asparagaceae (2.70%) were poorly represented.

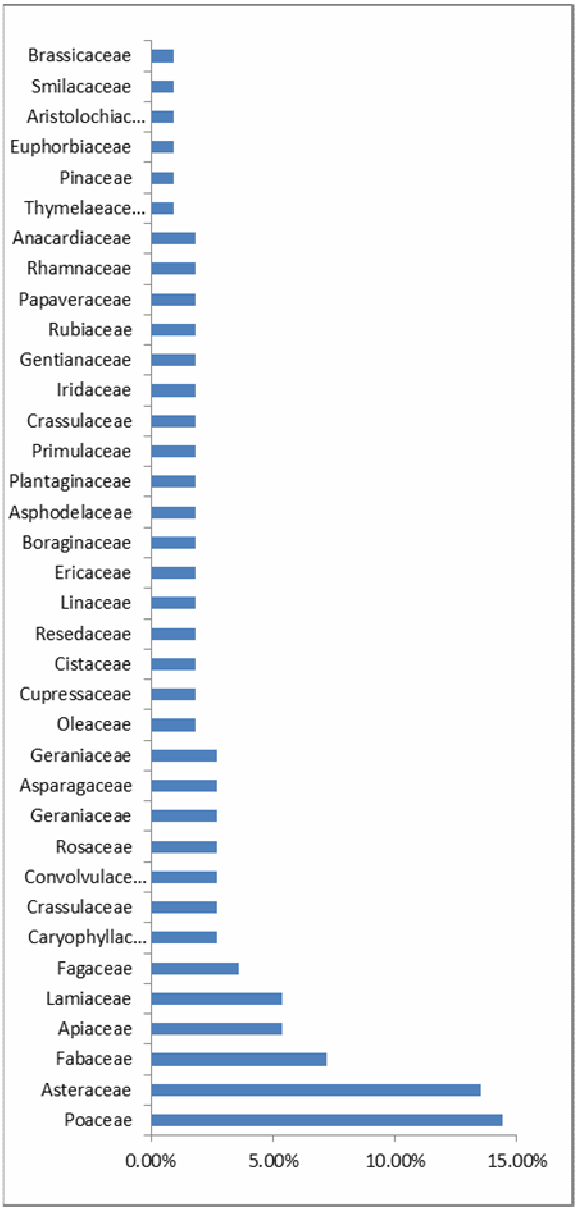

Fig. 4: The percentage of families in the study area.

Biological Characterization

Biological characterization analysis of organic types can inform us about the effects of environmental factors on local vegetation (Raunkiaer, 1907).

With respect to the proportions of biological types in this study, Thérophytes occupy the largest share with a percentage of 45%, followed by hemicryptophytes (17.11%), chaméphytes (13.51%), phanerophytes (12.61%) and at the end the Geophytes With (10.80%).

Figure 5 shows that the distribution of the biological types of the Jebel Saadia forest follows the following pattern: Th > He > Ch > Ph > Ge.

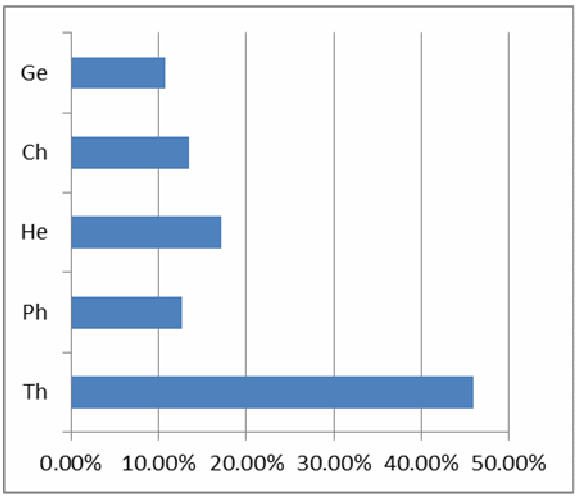

Fig. 5: The percentage of biological types in the study area

The high number of thérophytes shows strong anthropogenic action, although the percentage of thérophyte is generally high in Mediterranean formations. It is between 25% and 50% for forest formations (Barbero, 1989). Indeed, Barbero and *al.* (1990) and Quézel (2000) stressed that "thérophytisation" is considered to be a final phase of degradation of the Maghreb forest and pre-forest ecosystems.

The hemicryptophytes are abundant, this explains by high altitude, the presence of organic matter and moisture (Barbero and *al*, 1989).

The chaméphytes are also well represented in this region, their high proportion tindique that there is degradation in the study area, as this biological type seems to be better adapted than the phanerophytes to the summer drought as noted by Danin and Orshan (1990).

The phanerophytes are less represented with only 12%. Despite their low specific diversity, they sometimes dominate by their recovery and thus play a decisive role in setting up a floristic procession specific to the forest environment (Lecompte-Barbet, 1975).

The vegetation of the study area consists of a pre-forest formation based on oak, lentisk (*Pistacia lentiscus*), Cedar (*Tetraclinis articulata*), and mosaic matorral consisting of: *Cistus monspeliensis, Cistus Salvifolius and Calicotome spinosa.*

Morphological Types

The high degradation affects the regeneration of species and the non-regeneration of perennial plants leads to a change in potential production and botanical composition (Wilson, 1986).

From a morphological standpoint, the plant formations of Mountain Saadia are marked by a heterogeneity between woody and herbaceous plants and between perennial and annual plants.

Annual herbaceous plants are dominant with a percentage of 47% (Fig. 6), herbaceous perennials with 31.37% in second place, and finally perennial woody plants with 21.56%.

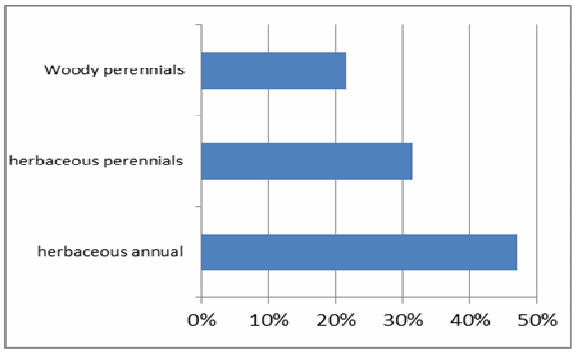

Fig. 6: Percentage of morphological types in the study area

The Disruption Index

Disruption Index index is calculated by (Loizel and Gamila, 1993), enabled us to quantify the Thérophysitisation of an environment.

$$IP = \frac{\text{Number of chamaephytes} + \text{Number of therophytes}}{\text{Total number of species}}$$

In our case, the disruption index is in the order of 59.45% for the entire study area, which confirms a strong degradation. This index remains very close to the results found by Belhacini (2017) in the matorral of the south slope of the southeast in a semi-arid Mediterranean bioclimatic stage.

Biographical Types

The biogeographical analysis of the current Flora provides valuable information about this ecosystem. Figure 7 shows the prevalence of Mediterranean biogeographical type species with a percentage of 38.20%. The Euro-Mediterranean elements follow the Mediterranean with 12.75% and 10.80% of the West Mediterranean elements and the Eurasian with 7.80%. The remainder is a low turnout; But contributes to the richness and plant diversity of Mountain Saadia.

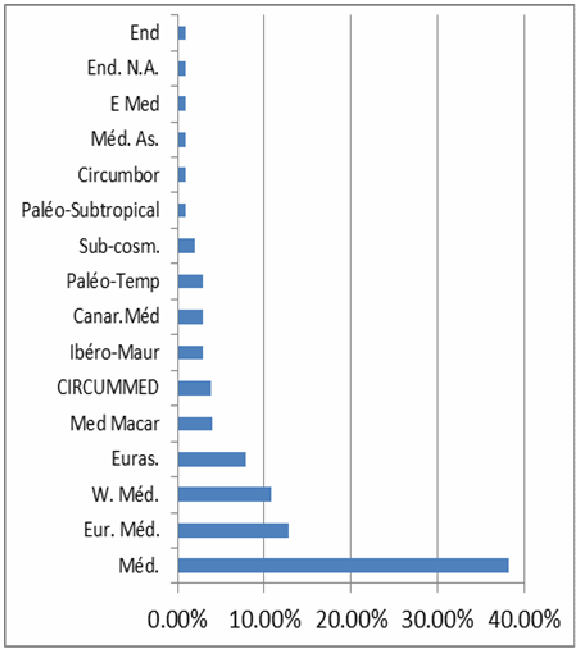

Fig. 7: Distribution of biogeographic types in the study area

Our observations concerning the dominant biogeographical type are generally similar to those of several authors in different regions of Algeria: Medjahdi and *al* (2018) in the cork oak forests of the Tlemcen mountains, Miara and *al* (2017) in the Tiaret mountains, Belhacini and *al* (2017) in the Bissa, Belhacini and Bouazza (2015) in the southern matorrals of Tlemcen, Messaoudéne and *al* (2007) in the Akfadou forest of Bejaia.

Conclusion

This study sheds some light on the nature and condition of the forest S in northwestern Algeria. The floristic inventor of Mountain Saadia identified 109 taxa in 36 families and 92 genera.

The richest families are the Poaceae, Asteraceae, Fabaceae, Apiaceae and Lamiaceae with 16, 15, 8, 6, and 6 taxa respectively. These five families account for more than 50% of the total wealth of the study area.

From the biological point of view, Thérophytes (45%), hemicryptophytes (17.11%) and chaméphytes (13.51%) are the most dominant in this region, emphasizing high anthropogenic pressure and confirms the great degradation of this ecosystem near Forest. On the biogeographical level, the rate of Mediterranean species is quite high, which clearly confirms that the registered flora belongs to the Mediterranean territory.

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Abbreviation

Ph	:	phanerophytes
Ch	:	chamaephytes
He	:	hemicryptophytes
GE	:	geophytes
Th	:	therophytes
Eur méd	:	European Mediterranean
End N.A	:	Endemic North African
End	:	Endimic
Med	:	mediterranean
Paléo sub trop	:	paleo tropical sub
E Méd	:	East Mediterranean
Paleo temp	:	Tropical Paleo
Circumbor	:	Boreal circum
W Méd	:	Mediterranean West
Euras N A	:	Eurasian North Africa
Sub-Cosm	:	Cosmopolitan
Sub Med Sib	:	Mediterranean Sub sib
Macar Med	:	Mediterranean Macar