THE STUDY GROUPS TO *ERICA ARBOREA* PHYTOECOLOGIQUE IN THE NORTH–WEST ALGERIAN : CASE OF THE FOREST OF BISSA

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Abstract

This study focuses on the groups to *Erica arborea* in the forest of Bissa, which located to the North-East of the wilaya of Chlef. This is a study that shows some originality phytoecologique and appealed to three ecological variants: biological, floristic and biogeographical.

The analysis allowed us a better approach of the main factors governing the evolution of these groups and their potential. In fact, degradation processes: anthropic action (grazing, fire) know the groupings to *Erica arborea* in the study area, seem to be a hint of disruption; so it is infinitely probable that this regressive evolution of these ecosystems is committed.

Key words : *Erica arborea*, phytoecology, forest of Bissa, plant grouping, North-west Algian.

Introduction

Erica arborea (tree Heath, white Heather or Heath in tree) is part of the Ericaceae family a large cosmopolitan family represented by 124 genera including shrubs (Arbutus), Calluna (calune), Erica (Heath), Rhododendron) and about 4 100 species (Maberley, 1987). These are often plants to Mycorrhizae preferring poor and acidic soils. Their habitat is generally characterized by low nutrient availability, low organic matter and often a period of drought (Stevens *et al*, 2004).

It is an African-Mediterranean plant., meaning that it is found both on the mountains of tropical Africa and in the Mediterranean region. She lives in southern Europe: Spain, Portugal, South of France, Corsica, Italy. Sicily, Dalmatia, Istria, and Greece. In Asia minor, found at the bridge and the western Caucasus, she is also known in several Atlantic Islands: Madeira, Azores, Canaries (Paul, 2005).

A plant group is a group of species that is gifted with a certain stability, with a fixed floristic composition whose essential characteristics result from the fidelity of species in the Group and on the other hand the dynamic value of these species (Maire, 1926).

These vegetation can be references, points leader, and to some extent, can give an overview about local conditions.

It is in this context that fits the present work aimed to study groups to *Erica arborea* in the forest of bissa.

The presence of species that are part of forestry groups and forest meadow testify to the favourable evolution of the *Erica arborea*. Indeed, the proper installation and good distribution of this species in the study area level show that there is an adaptation of this essence to environmental conditions.

1. *Erica arborea* taxonomie

Branch : Spermatophyta

Sous-embranchement : Angiospermae

Class : Magnolopsida

Order : Ericale

Family : Ericaceae

Genre : Erica

Species : *Erica arborea*

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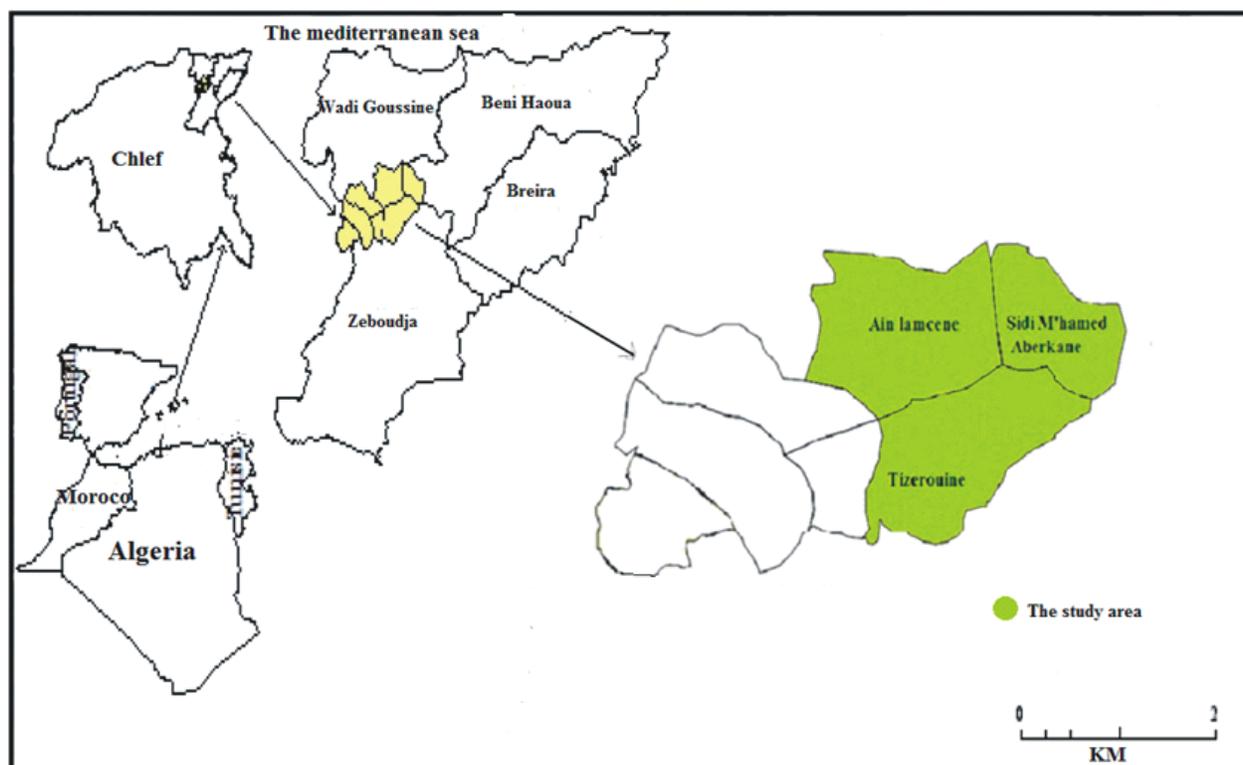
Fig. 1 : Location of the study area.

Methods of Study

The forest of bissa fits in the Dahra mountains, part of the chain of the tell Atlas, which forms a ridge between the Cheliff Valley to the South and the Zaccar mountains to the East.

For all ecological studies based on field surveys, sampling is the first phase of the work.

It is then based on the analysis of the spatial variations of the structure and floristic composition, analysis to add that of local environmental conditions in a uniform sectoral ecological context. It is based on altitude, exposure, slope, substrate, the recovery rate, and the physiognomy of vegetation (Lepart and Escarre, 1983).

For a good overview of the floristic diversity and heterogeneity of the present plant formations, of many phytoecologiques surveys were conducted on homogeneous surfaces (in the same area).

The commonly used method is to harvest all plant species encountered and make a list of the species on a plot of minimum area.

A statement will be considered as representative of the individual association studied only if it is made on a surface at least above the minimum area. Although, this technique is actually very rarely used, classically defined the minimum area of an individual of association from the curve area-species (curve to increase the number of species depending on the surface, that is increased by successive doublings of nested plots.

In the Mediterranean region, this minimum area is of the order of 100 to 400 m² for the forest communities of 50 to 100 m² for the formations of matorral (Benabid, 1984).

To meet this goal 79 statements phytoecologiques have been made and tracked by GPS from the center of the feeder system.

The choice of the location of our records is done in a way in respect of the floristic and ecological structural homogeneity criterion after acquisition of the coordinates to the GPS.

Results and Discussion

Composition systematics

After an analysis and identification of the floristic cortege of stands has *Erica arborea* in the forest of bissa, flora inventoried are about 118 species. They belong to the sous-embranchement of the gymnosperms and Angiosperms; with 44 families and 98 types (fig. 2).

From this analysis of the floristic cortege, we notice that the family of the Asteraceae and Fabaceae are the most represented by a percentage (14%) and (12%),
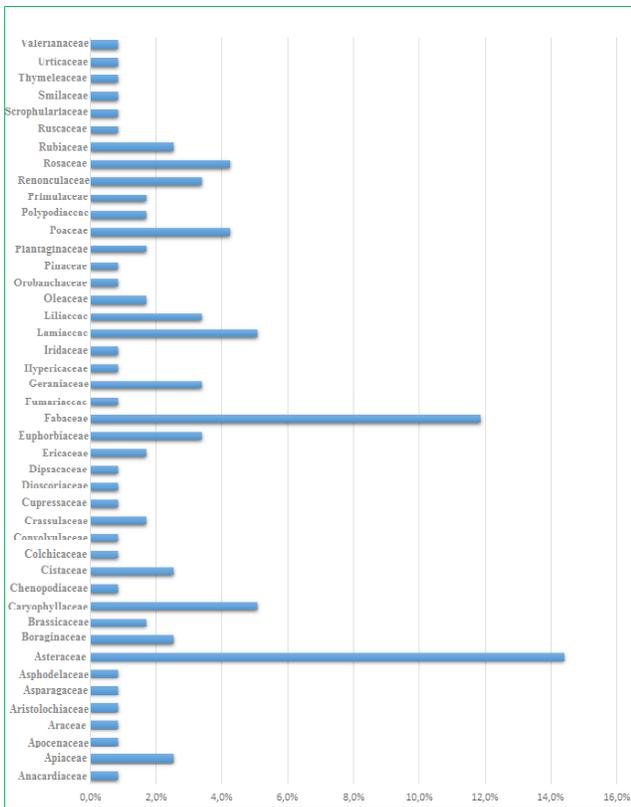
Fig. 2 : Families, genera and species composition.

Fig. 3 : Percentage of biological types.

respectively, in the second place we find the family of Caryophillaceae and Lamiaceae (5%) then thirdly is the family of Poaceae and Rosaceae (4%). Other families have a low percentage to very low.

Biological characterization

The structure of the flora of a station can be, characterized by its biological spectrum which indicates the biological rate of each of the types.

We have identified five forms of life or biological types (fig. 3), according to the global list of identified species, we can determine the percentage of each organic type.

For all of the study area, the distribution of the biological types is following :

Th > He et Ch > Ge > Ph

The northeast side of the forest of bissa is marked by a high percentage of therophytes with 49% (fig. 3), this dominance is evidence of intensive overgrazing.

The rate of Therophytes is related, regardless of the scale of the analysis and the level of perception adopted, at the opening of the vegetation and overall moisture from the environment (Daget, 1980).

The meaning of the Therophytes has been extensively debated by those authors who attribute it be adaptation
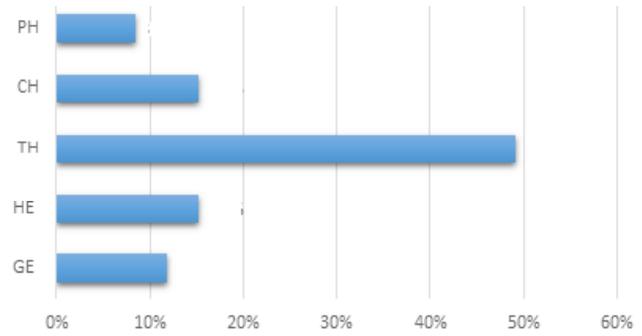
to the stress of the cold winter or summer drought, or disruptions to the Middle by pasture, crops, etc.

They are represented by :

*Reichardia intermedia *Convolvulus althaeoides

*Silene conica *Evax argentea

*Geranium purpureum *Euphorbia peplis

*Bromus rubens *Medicago rugulosa

Then come the Chamaephytes, with 15%, who are generally more common in the shrubs (Dahmani, 1996).

In fact, their proportion increases as soon as there is degradation of forest environments because this biological type seems to be better suited than the Phanerophytes to summer drought (Danin and Orshan, 1990).

They are represented by :

*Erica arborea   *Ampelodesma mauritanicum

*Cytisus villosus *Phillylerea angustifolia

*Cistus montpeliensis   *Calycotome intermedea

*Daphne gnidium   *Clematis cirrhosa

*Rubus ulmifolius   *Cistus ladaniferus

*Rosa canina   * Phillylerea latifolia

* Lonicera implexa

Hemi cryptophytes with the same percentage than the Chamaephytes, are represented in all (15%), can be explained by the poverty of the soil organic matter (Bouazza and Benabadji, 2002). They are represented by:

*Anagallis monelli   *Scolymus hispanicus

*Chrysanthemum coronarium

*Rubia peregrina

*Hypochaeris lavigata   *Daucus carota

*Plontago lagopus   *Mentha pulegium

*Matthiola fruticulosa   *Umbilicus rupestre

*Dianthus caryophyllus   *Nepeta multibracteata

*Erygium tricuspidatum   *Eryngium campestre

The geophytes are weakly represented with only 12%. They are certainly less diversified in degraded environment but they can in some cases of representation in specific mono trend (overgrazing, fire recurrence), through their recovery.

Asparagus acutifolius   *Ruscus aculeatis*

Iris planifolia   *Asphodellus microcarpus*

Ranunculus millefoliatus

Anemone palmata

Finally, the phanerophytes are the least represented in the set with (9%), reflecting the existence of forestry training and / or pre-forestiere. They are represented by:

Quercus suber   *Quercus ilex*

Arbustus unedo   *Quercus canariensis*

Crataegus oxyacantha *Prunus avium*

Crataegus monogyna   *Juniperus oxycedrus*

Indice of disruption

The disturbance index allows to quantify the therophytisation of a medium (Loisel and Gamila, 1993).

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

For our case, the disturbance is of the order of 64, 4% for the study area, strong degradation caused by human action is clearly visible (fire, clearing, grazing and urban development).

Morphological types

From the morphological point of view, the plant formations of the study area are marked by heterogeneity between the Woody and herbaceous plants and perennials and annuals.

The herbaceous annual dominate with a percentage of 46%, then there are the perennial herbaceous 30% and finally the woody perennials with 24%.

Biogeographical types

The geobotany has for object the study of the distribution of plants in the world. It is defined as the study and understanding of the distribution of organisms in the light of the factors and processes present and past (Hengevel, 1990).

Fig. 5 shows the predominance of the species of Mediterranean biogeographical type with a percentage of 27%. The West-Mediterranean elements follow the Mediterranean with 15% and 9% Euro-asiatiques items and Mediterranean-Atlantic with 8%. The rest represents a low participation; but contribute to the diversity and
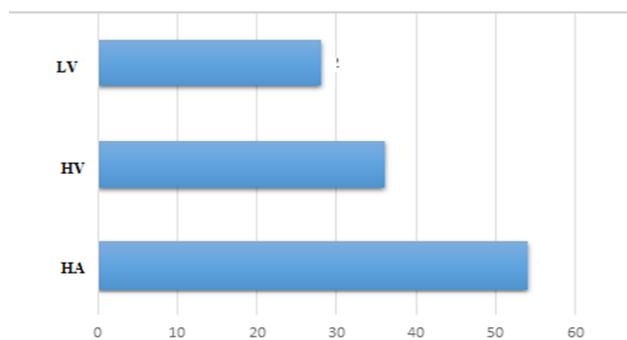

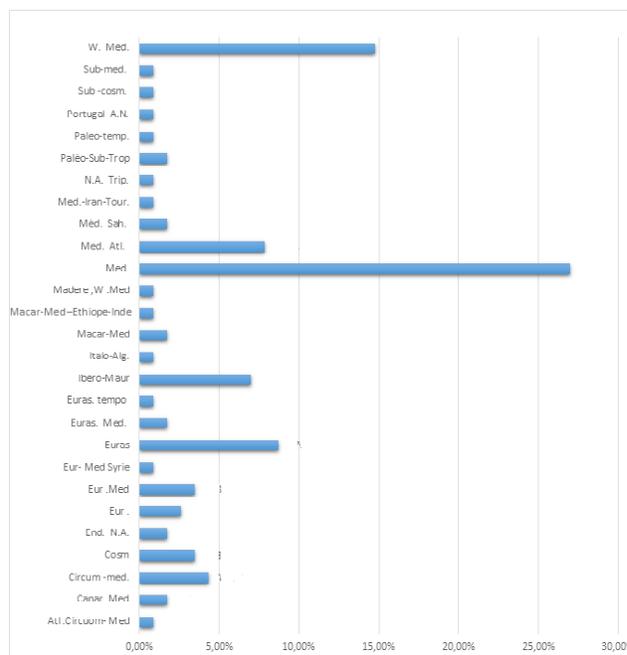**Fig. 4 :** Percentage of morphological types.

Fig. 5 : Distribution of biogeographic types.

the richness of the phytogeographic potential of the northeast side of the forest of bissa.

Conclusion

The forest heritage of bissa is characterized by heterogeneity floristics and synataxonomique which is linked to a combination of environmental factors.

We have identified nearly 118 species representative 98 genera and 44 families, according to analysis of the floristic cortege, one notices that the family of the Asteraceae and Fabaceae are the most represented.

Analysis of biological types shows that the forest of bissa is marked by a high percentage of therophytes with 49%, this dominance reflects intense overgrazing, in addition to the anthropisation, the therophytisation would find its origin in the phenomenon of aridification.

Then the Chamaephytes which are usually more frequent in the shrubs and which are better adapted to aridity.

Point of seen morphological plant formations are marked by heterogeneity between the Woody and herbaceous plants and perennials and annuals.

On the phytogeographic plan, the distribution of the species accuses a dominance of species of Mediterranean type with a percentage of 27%, followed by the West Mediterranean with a percentage of 15%.

In the light of increased population and the intensity of anthropogenic pressures resulting, emergency planning, protection and conservation are needed more than ever.

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Abbreviation:

HA: herbaceous annual
HV: herbaceous perennials.
LV: Woody perennials.
Ph: phanerophytes
Ch: chamaephytes
He: hemicryptophytes
GE: geophytes
Th: therophytes
TBG: biogeographic type
Eur méd : European Mediterranean
End N.A : Endemic North African
Esp des Canaries àl'egyptAsie Occ : Spain from the canaries to the re Western Asia
Sah : Saharan
Sah Méd : Saharan-Mediterranean
Sah Sind : Saharan Sindien
End Nord Sah : Endemic North Saharan
End G Atla : endemic Gattefossé atlantic
Med : mediterranean
Ibero Maur : Ibero Mauritanian
Paléo sub trop : paleo tropical sub
Alg Mar : Algiers Morocco
End Sah : Endemic Saharan
E Méd : East Mediterranean
Mar : Morocco
N A : North Africa
Paleo temp : Tropical Paleo
Sah sind Méd : Sahara Mediterranean sindien
Iran Tour Eur : European touranien Iranian
Méd Atl : Mediterranean Atlantic
Circumbor : Boreal circum
W Méd : Mediterranean West
Euras N A : Eurasian North Africa
Cosm : Cosmopolitan
Sub Med Sib : Mediterranean Sub sib
Macar Méd : Mediterranean Macaronisien