

Ecological study of natural habitat of endemic specie *Aristolochia baetica* L. in Tessala mountains (western Algeria)

Ali Latreche, Nabil Mekhfi and Zoheir Mehdadi

Abstract—This study is interested in the ecological habitat of endemic specie of western Algeria, in Tessala mountains, *Aristolochia baetica* L. Plant association with its floristic, biological, biogeographical, physiognomic spectra is evaluated. For the physical environment, the climate is characterized and also the soil factors determining the distribution of this specie.

Results shows that floristic richness of plant association *Aristolochia baetica* L. is rich, characterized by a dominance of hemicryptophytes and therophytes in the biological spectrum. The biogeographical spectrum is dominated by mediterranean elements. The physiognomy is often low, herbaceous or shrubby type. For soils, analysis shows a dominance of sands in texture. The organic matter soil varies with physiognomic characters of stations.

All these characters confirm criteria of mediterranean hotspot where studies on species conservation and spaces are urgent.

Keywords— *Aristolochia baetica* L., ecology, flora, habitat, soil.

I. INTRODUCTION

ECOLOGICAL studies of endemic and rare species in conservation areas is priority [1]. The north region of Algeria, part of the Mediterranean hotspot contains a rich flora with high number of endemic and rare species [2] [3]. Many of these species have not yet been studied, and we still do not know their biology, ecology, conservation status and quantitative aspects of their populations.

At the Mountains Tessala, in north west of Algeria, we are interested in western mediterranean endemic taxon, *Aristolochia baetica* L. affected by a local rarity, for to determine the ecological characteristics of its habitat and the plant association where she settled.

II. STUDY SITE

The study area is inserted at the Tessala Mountains, located in the north west of Algeria (Fig.1). This massif is represented by several mountains where the highest point rises to 1060m.

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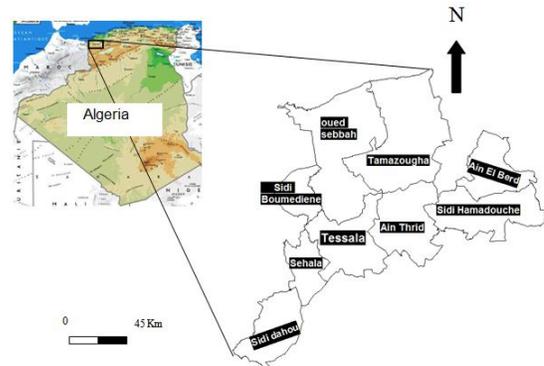


Fig. 1 localization of study site

The climate is semi arid. The annual rainfall represents a volume of 323.74 mm/year in the period 1980-2010. The dry season lasts from April to October (Fig. 2).

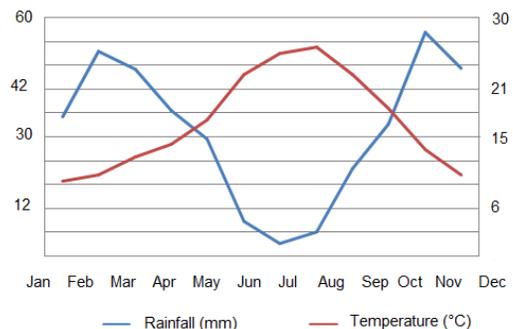


Fig. 2 Ombrothermic diagram of Tessala zone (1980-2010)

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The soils in this area are essentially calcimagnesian with calcareous accumulations and ferrallitic soils. Erosion is very important, especially when coupled with intense erosion which seriously degrades the soil cover [4].

III. METHODS

Aristolochia baetica L. is the specie chosen for this study (fig 3) because it is interesting for several reasons. It is an endemic specie of western Mediterranean, priority species in

studies of biodiversity conservation.



Fig. 3 *Aristolochia baetica* L. in Tessala Mountains (western Algeria)

In Tessala mountains, *Aristolochia baetica* L. is in the limit of distribution area, which is a second justification validating further our choice (fig. 4)

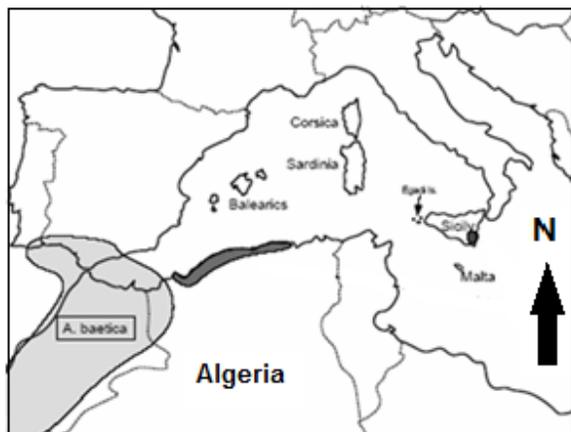


Fig. 4 Distribution area of *Aristolochia baetica* L. in the Mediterranean region. [5]

The spatial distribution of the population of *A. baetica* is restricted. This specie is also affected by the local rarity which further confirms the appropriateness choosing of this species.

Seven experimental stations were selected. They represent the entire surface when *Aristolochia baetica* is present.

The determination of the flora and studied species was done according to Quézel and Santa key [6].

For local phytodiversity studied, we measured the richness. We have established biological, biogeographical and morphological spectra to assess the link between flora and conditions of environment.

Biological types were classified according to the life forms of Raunkiaer [7].

For soil, the variables used for the soil analysis are: texture, structure, pH, soil conductivity (S. E. C), total and active limestone and soil organic matter. These are the most decisive characters of soil in geobotany distribution of plants

IV. RESULTS AND DISCUSSION

1. Soils characteristics

The results of soil analysis are reported in Table 1 (Tab.1). The low soil moisture confirms arid climate. The results confirm the dominance of sands in textures. This is a desertification indicator. The quantity of limestone marks the type of soil and confirms the geological nature of the substratum. pH values remain close to neutrality. Soil organic matter varies with the density of the vegetation. The station S1 where vegetation is low and herbaceous has the lowest rate. Other stations marked higher rates because they are under a bushy plant formations and tree type.

Analysis results of soil conductivity show that they are not saline.

TABLE I
RESULTS OF SOIL ANALYSIS

	S1	S2	S3	S4	S5	S6	S7
Moisture %	8.8	12.4	13.5	14.4	13.3	13.5	12.2
Coarse sands %	34	16.4	16.4	23	17.3	17.1	32.6
Fine sands %	31	45	45.7	39.2	50.2	47.5	35.4
Clay %	8.5	13.7	13.9	15.2	12.7	12.2	8.4
Silt %	5.5	7.4	6.6	12	6.6	6.9	5.2
pH	6.9	7.4	7.3	7.5	6.7	7.4	6.8
S. E. C (m. S./cm)	0.13	0.36	0.42	0.14	0.16	0.37	0.22
Organic matter (%)	1.6	5.8	6.2	6.9	8.8	5.6	8.2
Active limestone (%)	1.2	1.5	2.3	1.4	2.1	0.43	1.24
Total limestone (%)	27.6	45.6	45	25	28.5	42	21

2. Species richness

Species richness varies from 53 to 12 in the experimental stations. The maximum number of 53 species is observed in the station S5 confirms the high richness of mediterranean flora in this area. The other plots, including S1, S6 and S7 also confirm degrading threats of biodiversity in this region of western Algeria.

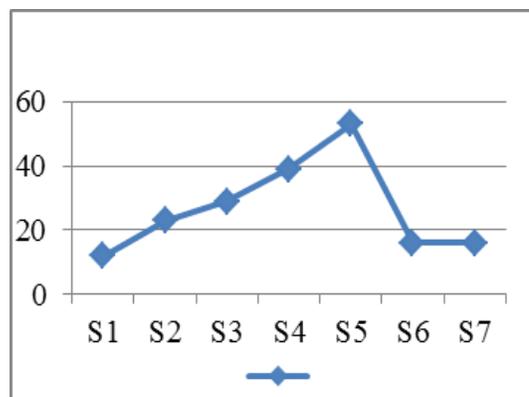


Fig. 5: Species richness in experimental stations

3. Morphological types

Morphological types show a dominance of the herbaceous and the lowest rate of the tree structures. This is explained by

the arid climate that does not provide enough moisture and by anthropogenic degradations that limit the development of the vegetation. This finding is widespread for all vegetation of in Mediterranean area.

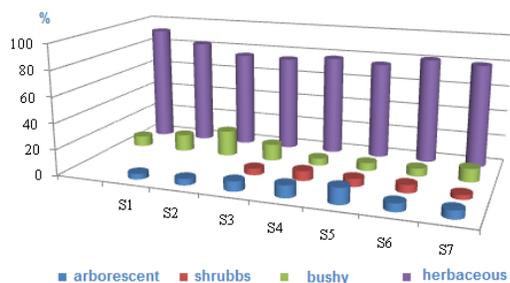


Fig. 6 Distribution of morphological types

4. Life forms and biological types

Biological types are adaptation of vegetation to the conditions of environment. In all biological spectra of the vegetation in different stations, we find the dominance of hemicryptophytes followed by therophytes (Tab.3). These data confirm the composition of biological spectrum in mountains. Then, the dryness is responsible for the significant presence of therophytes. Indeed, therophy is the best adaptation of plants to rigor climate conditions and aridity of long dry season [6]-[7].

TABLE III
DISTRIBUTION OF MORPHOLOGICAL TYPES

Biological types	Rate %
Phanerophytes	15.2
Chamaephytes	19.50
Geophytes	7.6
Hemicryptophytes	32.85
Therophytes	25.3

5. Biogeographical Types

All flora inventoried shows the dominance of mediterranean element. This group totals 68.36%. This percentage confirms the originality of the native flora and its local differentiation. The diversity of non-native elements informs the multiplicity of biogeographical origins involved in the local richness of plant diversity. These findings are repeated throughout the circum mediterranean region [8].

V. CONCLUSION

In this note, we explained characteristics of the ecological habitat of endemic and rare specie of Tessala Mountains of west Algeria. These features confirm the nature of this habitat linked to the mediterranean hotspot which combines a remarkable richness but deteriorated by various threats, that affect flora and physical environment.

This finding keeps this studied area in emergency modes of conservation. This will keep flora and habitat intact and in margin of irreversible alterations.

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