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PREVIEW ON EDAPHO-FLORISTIC BIO-RESOURCES OF GUERTOUFA REGION (TIARET MOUNTAINS - WEST ALGERIA)

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Abstract

The work undertaken consists of evaluating the state of the edaphic and floristic bio-resources of Guertoufa region in Tiaret Mountains (West Algeria), through a phytoecological approach that uses two ecological variants: soil and vegetation. The physico-chemical analyzes of soil samples revealed a Yellow-Red color, low electrical conductivity (0.2 to 0.3 mS/cm), neutral pH and clear dominance of sand (65% to 79%) with low percentages in organic matter (0.18% to 1.35), water (2.1% to 2.7%) and limestone (0.15 % to 1.12 %). The floristic analysis enabled us to release a list of 141 taxa divided into 43 families, the Asteraceae, Poaceae and Fabaceae are the most represented with percentages 18.4%, 8.1% and 9.2% respectively. The comparison of the different biological spectra shows the importance of the therophytes with 51.8%. Biogeographically, the Mediterranean biogeographic type predominates with 50.4%.

Key words: Bio-resources, soil, floristic inventory, Guertoufa (Tiaret mountains).

Introduction

In a global context of preservation of biodiversity, the study of the flora and vegetation of the Mediterranean basin is of great interest, considering its great richness linked to the heterogeneity of historical, paleogeographic, paleo-climatic, ecological and geological factors characterizing them, as well as the secular impact of anthropogenic pressure (Quézel *et al.*, 1980).

The arid and semi-arid regions of North Africa are currently experiencing a degradation of natural resources. The plant formations (forests, pre-forests, matorrals and steppes) decline under the climate-anthropogenic impact. This dual action entails physiognomic and landscape changes that have led to maφor reworking of the biosources (Hasnauoi and Bouazza, 2015).

The work carried out by (Benabadφi and Bouazza, 2001 ; Cherifi *et al.*, 2011; Stambouli-Meziane and Bouazza, 2012; Merioua *et al.*, 2013) on flora and diversity in western Algeria reveals the degree of disturbance of these ecosystems where anthropozoic factors play a maφor role in the dynamics of existing vegetation structures.

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The region of Tiaret is not exempt from the natural circummediterranean laws where the natural ecosystems in this region have suffered severe degradation (Nouar, 2015). Therefore, and given the scale of this phenomenon, our obφective is to study and valorize bio-resources which represent an essential key for any strategy of conservation and sustainable development of relict ecosystems.

Materials and Methods

Study area

Our study area is an integral part of the municipality of Guertoufa, the latter is located in north of the chief town of the Wilaya (municipality of Tiaret) at about 09km (Fig. 1) in the geographical coordinates: 35°23' 35" North and 1°15' 22" East. According to (Nouar, 2015), the bioclimatic floor of this region dropped from sub-humid lower than cool winter to semi-arid lower than cool winter in the twentieth century with an average annual rainfall equal to 349 mm.

Soil analyzes

The soil samples were taken at the same site where the floristic surveys were carried out. We took three soil samples at 30 cm level. In the laboratory, samples were

sieved through a 2 mm diameter sieve to separate the fine soil (φ<2mm) from the coarse elements (φ> 2mm). Only the fine earth is analyzed. The physical parameters: texture, humidity and color and chemical parameters: pH, limestone, electrical conductivity and organic matter were the subφect of these analyzes. These parameters were made using the usual standard methods (Aubert , 1978)

Vegetation

In order to meet the obφective of this study we followed the phytosociological sigmatist method (Braun-Blanquet, 1951**)** which consists in determining the smallest area called "minimum area". In the Mediterranean region, the minimum area is of the order of 100 to 400 m² for the forest groups, from 50 to 100 m² for the matorral formations (Benabid, 1984) Therefore, we deliberately chose a minimum area of 100 m². The floristic surveys were carried out during the optimal period of vegetation during the year 2016-2017. The identification of taxa was made from the flora of (Quèzel and Santa, 1962-1963) updated by the index of (Dobignard & Chatelain, 2010-2013) and the determination of biological spectra was made from the classification of (Raunkiaer, 1934).

Results and Discussion

physicochemical characteristics of the soils studied

The results of the soils analyzes showed a high rate of sand (65% to 79%) followed by Clay (13% to 18%), then Silt (13% to 18%). The triangular graphical representation which shows that all the samples have a sandy-loamy texture (Fig. 2).

The color determined using the international (Munsell, 1992) code, is 2.5 YR (Yellow-Red). The water content remains low in all the samples 2.1% to 2.7%, this can be explained by the high level of sand in the samples analyzed. The pH is 7.12 to 7.42 and low electrical conductivity 0.2 to 0.3 mS/cm, this produce no toxicity to vegetation (Taibi *et al.,* 2017). The limestone loads is low 0.15 % to 1.12 % with low rate of organic matter (OM) 0.18% to 1.35. (Belhacini and Bouazza, 2013) explain that this representation is due to the recovery rate which hardly exceeds 50%. On his side (Benabadφi, 1991) points out that the main edaphic parameters involved in the diversity of the vegetative layer are essentially organic matter and granulometry; nevertheless, these edaphic parameters come after the degree of recovery of the substrate.

Floristic analysis

Systematic analysis

The inventoried flora of the study area has 141 species belongs to 114 genres and 43 families. These last are distributed heteroginically with dominance of Asteraceae (26; 18.4%), then come Fabaceae (17; 12.1%), Poaceae (13; 9.2%), Brassicaceae (8; 5.7%), Lamiaceae (7; 5%) and Cistaceae (6; 4.3%). According to (Miara *et al.,* 2017), these families all dominate the Tiaret forest sector. The families of Asparagaceae, Caryophylaceae and Plantaginaceae are represented with the same number of species with (5; 3.5%), the rest of the families are poorly represented with a rate less than 04% (Fig. 3).

Morphological characteristics

From a morphological point of view, the annual herbaceous plants dominate with a percentage of 53.2%, followed by perennial herbaceous plants 29.8% and finally perennial woody with 17% (Fig. 4). The intense human impact, which the forests of the region continue to suffer, results in the invasion of annual herbs. Thus, the harsh conditions favor the development of short-cycle herbaceous species at the expense of woody perennials generally more demanding in water and nutritional needs (El-Amine Henaoui and Bouazza, 2012).

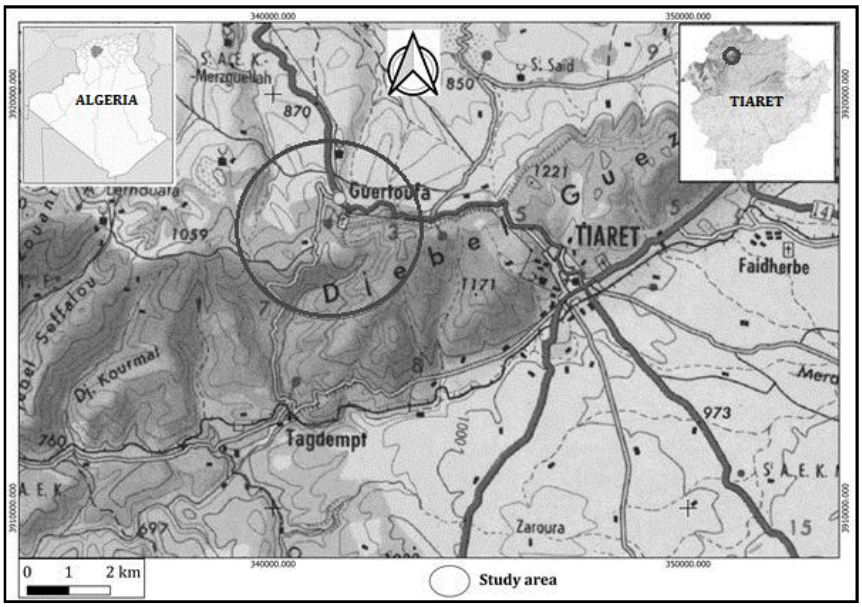

Fig. 1: Location of the study area.

Biological types analysis

The biological spectrum of the study area is of type:Th> He> Ch> Ph> Ge (Fig. 5), dominated by Therophytes (51.8%), followed by Hemicryptophytes (14.9%) then Chamæphytes (12.8%), Phanerophytes (11.3%) and finally by Geophytes (9.2%). This

Therophytisation is linked to the rigor of the climate and the anthropogenic actions which degrade more and more the conditions of installation of new species (Dgaet, 1980; Barbéro *et al.*, 1990; Hachemi, 2015).

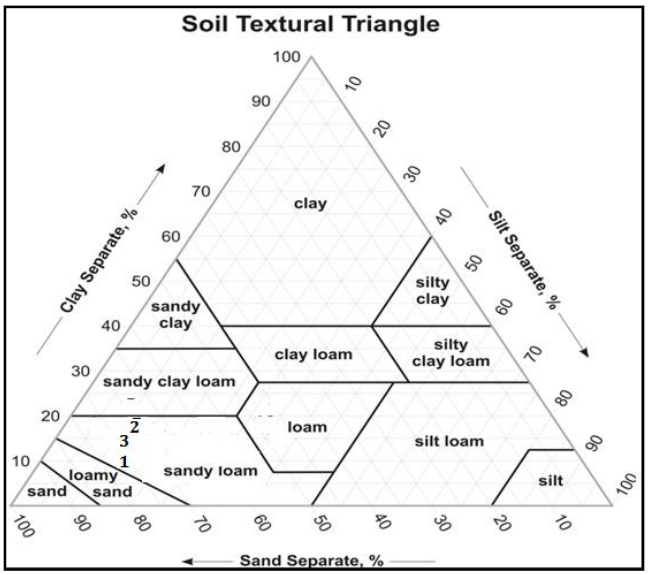

Fig. 2: Texture of analyzed soils.

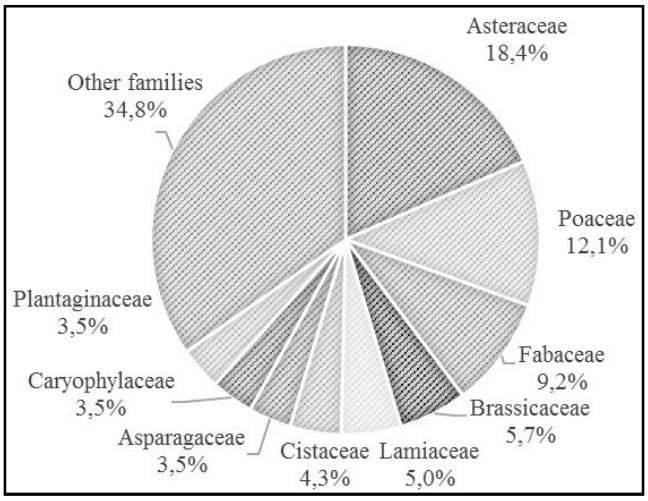

Fig. 3: Composition of flora by family.

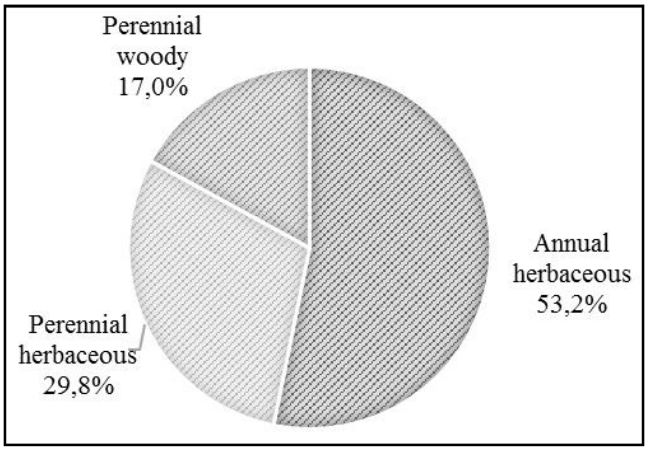

Fig. 4: Composition of flora by morphological types.

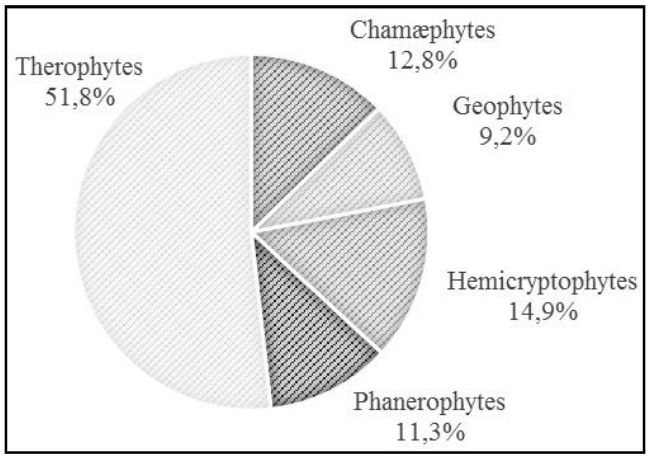

Fig. 5: Composition of flora by biological types.

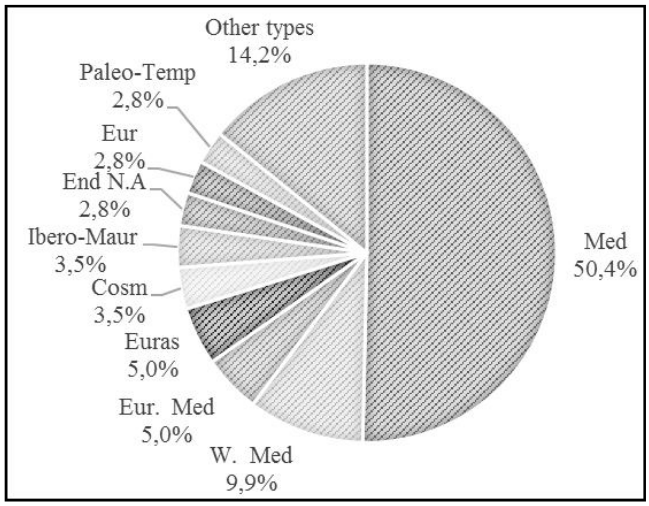

Fig. 6: Composition of flora by Biogeographical types.

Biogeographic analysis

We observe the predominance of Mediterranean biogeographical species with a percentage of (50.4%), one of the characteristics of Mediterranean vegetation (Miara *et al.*, 2017), The West-Mediterranean elements represent (9.9%), in third position the Euro-Mediterranean and Eurasian with same percentage (05%), Cosmopolite and Ibero-Mauritanian are in fourth position with (3.5%). The remaining species represent low participation (less of 03%) but contribute to the diversity and richness of the phytogeographic potential of the study area (Fig. 6).

Conclusion

The results obtained, by combining the edaphic and floristic approach, reveal a poverty of the studied soils especially in organic matter content and important specific richness largely dominated by annual plants represented mainly by the Therophytes which account for 51.8%. This Therophytisation, announced by several researchers, is a form of resistance to drought, as well as to high temperatures in arid environments and a stage of ultimate

degradation of vegetation.

We consider the floristic indicator in this study as a guiding factor in the diagnosis of vegetation dynamics. The abundance of species such as *Chamaerops humilis*, *Ampelodesmos mauritanicus*, *Calicotome spinosa*, *Asphodelus microcarpus*, *Asparagus acutifolius*, *Drimia maritime* are biological indicators of the physiognomic change of ecosystems. The proliferation of these species in this medium indicates its degradation by anthropozoic agents.

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