Bangladesh J. Bot. **51**(4): 821-827, 2022 (December) DOI: https://doi.org/10.3329/bjb.v51i4.63503
- Short communication

GROUPS OF A MALVACEOUS *MALVA SUBOVATA* (DC.) MOLERO & J.M. MONTS. OF THE MOUNTS OF TRARAS: PHYTOSOCIOLOGICAL AND PHYTOECOLOGICAL ASPECTS

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Keywords: Malva subovata, Mounts of Traras, AFC, Phytosociological, Phytoecological

Abstract

Analysis of phytological and phytoecological aspects of groups of *Malva subovata* (DC.) Molero & J.M. Monts. in Mounts of Traras was studied. The interpretation was done by correspondence analysis (AFC), the latter makes it possible to seek the affinities which exist between the species or the statements, it aiming to study the dynamics of vegetation and the nature of their evolution in the study environment. This approach allowed to identify groups based on the studied species and specially to know these phytosociological groupings, it presents a broad ecological spectrum. This global treatment allowed one to have an overview of plant formations and to verify that there is indeed an original floral procession. Using phytosociological and phytodynamic data, it was possible to understand the evolution of this species as well as its diversity. In this research, a phytoecological analysis is evident. More than 40 families have been listed. Results showed the importance of the phyto-diversity of the region studied.

The vegetation cover is generally influenced by various climatic, edaphic and even anthropozoic factors (Bouayad 2018). Malvaceae consists of shrubs and annual or perennial grasses, more rarely trees, comprising 4225 species under 244 genera. The genus *Lavatera* has in its ranks about ten dicotyledonous plant species belonging to Malvaceae (subfamily of the Malvoideae, tribe of the Malvea) of mainly Mediterranean origin. Phytoecological analysis makes it possible to specify the effect of ecological factors, which are also very varied, on the dispersion, development and abundance of plant species. In fact, the distribution and structure of the groups in *Lavatera maritima* had a close relation ship with the ecological environment.

To determine the dynamics of vegetation in a natural environment, one must first do a floristic analysis of these high-contribution species and then treat them by phytosociological and phytoecological work. (Babali 2014). AFC's factorial correspondence analysis is a method of summarizing the information contained in a table comprising n rows (the stations in this case) and p columns or variables (the species) (Hassani 2013).

The digital processing of floristic record was approached using the statistical method. Factorial Correspondence Analysis (AFC) by the statistical software Miniteb 16. The present study was aimed to show the potential of this technique through various examples concerning plant communities (Babali 2014).

For this analysis, on the ecological determination of the floristic diversity of *Lavatera maritima* would be focused. This analysis was carried out on several readings per station which means 20 readings at the level of the Mounts of Traras.

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The commune of Fellaoucen is located in the northern part of the wilaya of Tlemcen Longitude (1°41'00.00" W) and Latitude (35° 00'00.00" N). It covers a total area of 6870 ha. It is limited to the North East by the commune of Beni Ouarsous in the North-West: by the municipality of Ain Kebira in the South by the municipality of OuledRiah; West: By the commune of Ain Fetah; East: through the town of Zenata (Fig. 1).

Fig. 1. Map of the geographical location of the Djbel fellaouecen region.

The objectives of the present study is relate the biostatistical aspect of the groups with Lavatera maritima (Malvaceae) in the Traras Mountains region. These groupings are characterized by a great floristic diversity which is linked to ecological and anthropogenic factors ; this processing concerns the Monts des traras with the Djbel Fellaoucen station.

To ensure data processing, the factor analysis of matches were chosen because it is an ordination method that meets the purpose (Belhassini 2011).

Each species is assigned two indices (AFC and CAH), the first concerns abundance-dominance, the second sociability and makes it possible to develop groupings of records and species in order to facilitate the interpretation of the contributions of the factorial correspondence analysis.(Barka 2016).

In order to carry out this analysis, the data were collected in a doublé entry table whose columns correspond to the records and the rows represent the species. Only the coefficient "abundance dominance" of the species was considered. The value 1 in the event of presence and the value "0" in the event of absence. And this was done using the MINITAB 16 software. (Bouayad 2018). The dendrograms used the distances between species when forming groups. Three main cores were selected for this analysis (cores A, B and C).

Description of *Lavatera maritima*

Lavatera maritima is a woody plant, over 1m tall. Flowers of a pale pink ± purplish in the center, isolated and long stalked in the axils of the leaves. The flowers are arranged all along the branches and have a good holding in clusters. The leaves are deciduous, persistent, downy of a beautiful ash-green gray.

Fig. 2. *Malva subovata* (Ghalem 2019).

Fig. 3. Clump of *Malva subovata* (Ghalem 2019).

For the computer processing of data, a number is assigned to each statement, in the order of their execution. Likewise, the taxa were coded according to a two or three digit code and the first letter of the genus in the order of successive and alphabetical appearance (Table 1). (Ghennou 2014).

Table 1. Species coding technique.

Kind species	Coding
Urginea maritima	Um
Lavatera maritima	Lm1

The map related to the distribution of the readings in plane 1-3 showed a point cloud with clear discontinuity. The use of an aid (CHA) for the interpretation of the AFC is necessary. The ascending hierarchical classification (CHA) makes it possible to carry out a partition in all the statements. The program provides the result in the form of a dendrogram (Fig. 5).

The hierarchical distribution on the dendrogram has brought out three cores A, B and C for this station.

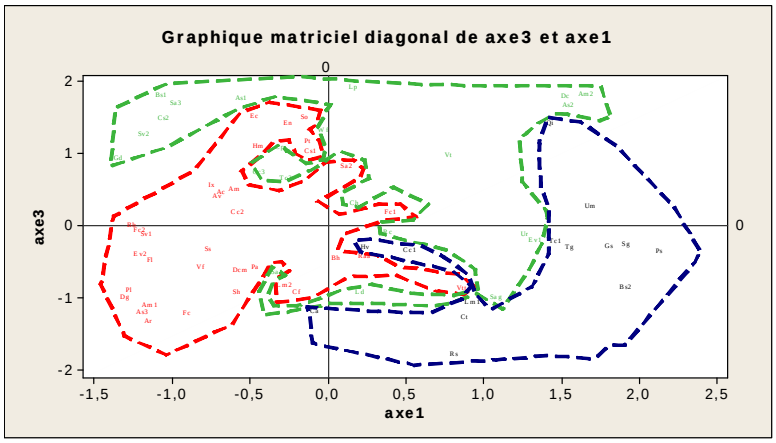

Fig. 4. 3-1 factorial plane of the ACP at the level of the Traras Mounts.

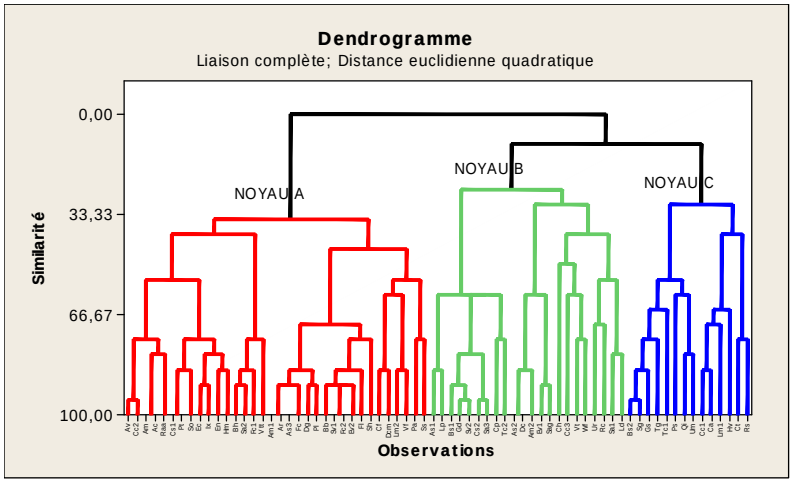

Fig. 5. Dendrogram of the CHA of the species.

Graphique of Axis 3-1 showed a regressive evolution of formations thus translating into a regressive evolution of the vegetation cover (Fig. 4). It is therefore an anthropization gradient due to the strong presence of therophytes in the three cores.

The factorial plan 3-1, showed that the three cores 1, 2,3, present a strong anthropization with a very high percentage of therophytes, an increase in the percentage of Chamaephytes of "33.33%" in the cores B.The percentage of hemicryptophytes was high in cores A and C.

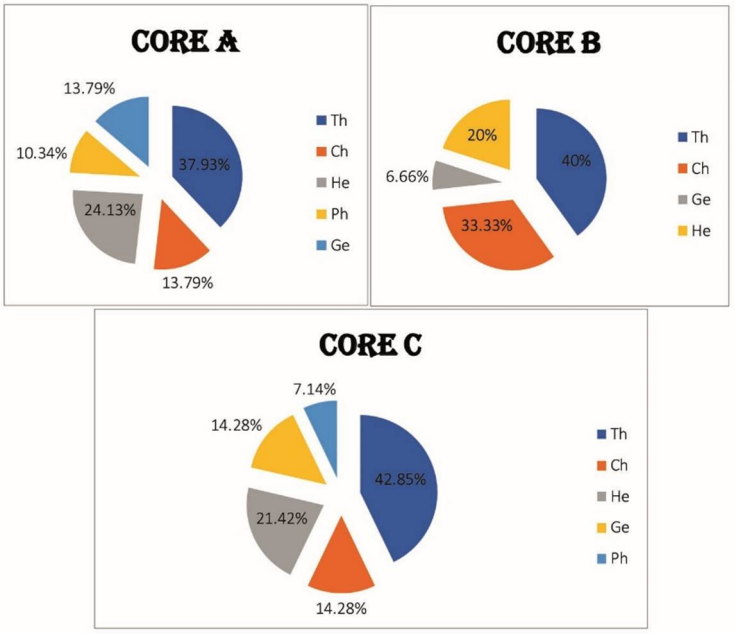

Fig. 6. Biological type of taxa of cores A, B, C.

There is also an absence of Phanerophytes for nucleus A and for the other nuclei it remains relatively weak.

The shape of the curve allows to split the 20 readings into Three groups A, B and C: The analysis of the factorial plans and dendrograms allowed the identification of three types of core (A, B and C) of the floristic species from the synthaxonomic point of view in the study area. The factorial axes 1 and 3 are well individualized. In order to determine the characteristic species and which always accompanies the present species an A.F.C of the floristic statements was calculated the frequency of each species in the cores of the A.F.C and then the frequency of the main readings.

Cores A **:***Ampelodesma mauritanicum, Chrysanthemum coronarium,Rhamnus alaternus subsp alaternus,Pistacia lentiscus, Poa annua, Ferula communis, Hordeum murinim, Stachys ocymastrum, Sedum sediforme, Vicia faba, Lobularia maritima, Daucus carota Subsp maximus, Clematis flammula, Scolymus hispanicus, Ferula lutea, Echium vulgare, Fumaria capreolata, Cistus villosus, Bituminaria bituminosa, Dactylis glomerata, Asparagus stipularis, Anagalis arvensis, Anthirrhinum majus, Viburnum tinus subsp tinus, Fedia cornucopiae, Sinapis arvensis, Ballota hirsuta, Euphorbia nicraeensis, Iris xiphium, Erodium ciconium, Pistacia terebinthus, Coronilla scorpioides, Anacamptis coriophora, Arisarum vulgare*.

Cores B **:** *Leucanthemum paludosum,Chrysanthemum segetum, Sinapis alba, Asphodelus microcarpus, Withania frutescens, Lavandula dentata, Valeriana tuberosa, Umbiliscu srupestris, Sonchus asper, Rosa canina, Chamerops humilis, Sedum album subsp gypsicolum, Eruca vesicaria, Daucus carota,, Avena sterilis, Trifolium compestre, Centaurea pullata,, Sinapis alba, Silene vulgaris, Galactites duriaei, Brachypodium sylvaticum, Allium subvillosum.*

Cores C : Bromus scoparius, Silene gallica, Gladiolus italicus Mill=Gladiolus segetum, Quercus ilex, Thymus ciliatus, Pallenis spinosa, Urginea maritima, Convolvulus althaeoides,

Catananche caerulea, Ranunculus spicatu, Convolvulus tricolor, Hordeum vulgare, Lavatera maritima, Thapsia garganica, Silene gallica.

The biological types or life forms of the species express the form presented by the plants in an environment without taking into account their systematic membership. They reflect a biology and a certain adaptation to the environment according to (Barry 1988). Syntanomically, the grouping of species belonging to the same biological type contributes together to the optimal definition of syntaxons.

The order of Pistacio-Rhamnetalia alaterni (Rivas-Martinez 1974) with the presence of other more degraded sclerophyll formations such as: *Ampelodesma mauritanicum; Asparagus albus, Jasminum fruticans, Juniperus phoenicea, Pinus halepensis*. For core B: (Barbero and Quezel 1979) it brings together edge groups, even wooded coastline, sometimes climax, especially in semi-arid bioclimatic zones, or which can lead by progressive evolution to frankly forest structures (*Quercetea ilicis*), especially in subhumid and humid bioclimate.

These groupings, according to (Barbéro et al. 1981), constitute potential climaxes when the ecological conditions do not allow the dense forest to develop.

The core C characterizes the class of Théro-brachypodietea, according to (Barbéro and Quézel (1995) who defined this Therophytisation as the ultimate stage in the entire Mediterranean bioclimate which reaches during the extraction of living plant material.

The factorial correspondence analysis (AFC), allowed to consider the vegetation in its dynamism and its physiognomy, and to withdraw hypotheses as to the action that a certain number of ecological factors can play on the installation of plant formations in this region (Kerzabi 2017).

For this analysis were criteria ecological determining the floristic diversity and the syntaxonomic analysis were used and devoted to the description of phytosociological units linked to *lavatera maritima.*

Study of the phytosociological and phytoecological grouping in *lavatera maritima* showed that the study area is undergoing a regressive dynamics of vegetation. From a phytosociological point of view, the study area is covered with vegetation dominated much more by species related to Pistacio-Rhamnetalea alaterni.

The dendrograms produced were found to be able to identify the main species characteristic of the major phytosociological units.

Cores A: This core is characterized by taxa generally attached to the order Pistacio-Rhamnetalia alaterni.

Ampelodesma mauritanicum	*Rhamnus alaternus subsp alaternus*
Dacthylis glomerata	*Sedum sediforme*
Pistacia lentiscus	*Ferula lutea*
Pistacia terebinthus	

The presence of *Ampelodesma mauritanicum* indicates a burnt environment.

Since the genus species *Chamerops humilis* is present in core B it can be said that this group also belongs to the class of Pistacio-Rhamnetalia alaternie. The cores C belongs to the class of Therobrachypodietea with a large number of therophytic species.

Acknowledgements

The author would like to thank Mr. Hassani Faisal and all the members of the Ecology and Environment laboratory of the faculty of Tlemcen for their help during the research program.

References

Babali I 2014. Contribution to a phytoecological study of the Moutas mountains (Tlemcen-Western Algeria): Syntaxonomic biogeographic and dynamic aspects. PhD thesis: Univ. 142 p.

Barbéro M Quézel P 1979. The problem of forest cover of Pistacio-Rhamnetalia alaterni in the eastern Mediterranean. Coll. Phytosociol. Lille, VIII: 9-20.

Barbéro M, Quézel P and Rivas-martinez S 1981. Contribution to the study of forest and pre-forest groups in Morocco. Phytocoenol. **9**(3): 311-421.

Barbero M and Quezel P 1995. Desertification, desertization, aridification in the 4 Mediterranean region and global changes. In Functioning and dynamic of natural and perturbed ecosystems. Bellan. Bonin and Emig edit., Lavoisier Pub., Paris: 549-569.

Barka F 2016. Study of matorral groupings in the coast of the Tlemcen region. Phytoecol. Aspects Cartogra. 267 p.

Barry J 1988. Ecological Approach to the Arid Regions of Africa.

Belhacini F 2011. Contribution to a floristic and biogeographic study of the matorrals of the southern slope of the Tlemcen region. 104 p.

Bouayad I 2018. Study of groupings with *Withania frutescens* (Panquy, 1825) (Solanaceae) in the region of Tlemcen, Western Algeria.83 p.

Ghennou S 2014. Contribution to a dynamic study of *Stipa tenacissima* L. in the south-west of the Tlemcen region. 119 p.

Hassani F 2013. Study of Caelifera (Orthoptera) and floristic characterization (floristic biodiversity) of their biotope in stations located in Tlemcen and Ain Temouchent. Diet of *Calliptamus barbarus* and *Sphingonotus rubescens*. 124 p.

Kerzabi R 2017. The anthropogenic effect on halophyte vegetation in the semi-arid and arid environment of Orania; Vegetation dynamics in relation to edaphic factors. 1991p.

Rivas-Martinez S 1974. Vegetation of the class Quercetea ilicis in Spain and Portugal. Anal. Inst. Bot. Cavanilles Madrid **31**(2): 205-259.

(Manuscript received on 03 December, 2021; revised on 27 August, 2022)