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COMPARATIVE STUDY REGARDING THE OLIGOTROPHIC CHARACTER OF HABITATS WITH *ARNICA MONTANA* FROM THE TWO GEOMORPHOLOGICAL UNITS OF GÂRDA DE SUS COMMUNITY

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Abstract: Habitats with endangered medicinal species *Arnica montana* are spread on both geomorphological units of Gârda de Sus community, also on siliceous substratum as well as on limestone substratum. Species of vascular plants have been studied under qualitative and quantitative aspects. These species make obvious their oligotrophic character for both regions, but ones on siliceous substratum show a more pronounced and more restructiv oligotrophic character than the ones from northern region, mostly limestone. In both regions this character is not an extreme oligotrophic one, the *Arnica montana* species developing sometimes better along mezotrophic species on grasslands fertilized in traditional system in relatively small quantitives of stable manure.

INTRODUCTION

Habitats with *Arnica montana* are in general being represented by secondary grasslands founded on land favourable for mix mountainous forests. Oligotrophic character of these habitats generate the natural installing of species with more reduced requests towards nutritive substances content in soil. These oligotrophic species dominate also under quantitative aspect of cover degree.

Undertaken studies during the year of 2005 in habitats with *Arnica montana* from Gârda de Sus community reveal their oligotrophic character for both geomorphological units under study. But this character is not an extreme oligotrophic one, the *Arnica montana* species developing sometimes better along mezotrophic species on grasslands fertilized in traditional system in relatively small quantitives of stable manure.

MATERIAL AND METHODS

In year 2005, 26 sample parcels were random selected for the northern limestone region and, respectively, 23 sample parcels for the southern siliceous region of Gârda de Sus community (Michler 2005). On each of these random selected parcels was taken a vegetation relevee. For each vegetation sample the metric frame method along with Braun-Blanquet modified method. Through metric frame method all the species of vascular plants had been identified over a 1 m² surface and their cover degree was estimated with an aproximation of 0.25 %, especially for species with a more decreased cover degree. Having the metric frame as center, a square surface with the side of 5 m was limited in which the species of vascular plants were cuantified through modified Braun-Blanquet method. In this way very exact data was obtained, concerning the cover through metric frame method and more revealing data regarding diversity through Braun-Blanquet method on 25 m². In order to calculate the procentage on the 25 m² surfaces, the aproximate estimation of cover procentage through converting the values from the Braun-Blanquet method was used.

Trophicity indexes were given to the identified species by using the values frequent in Central Europe and published on the Internet: 1 - extreme oligotrophic, 2 - high oligotrophic, 3 – oligotrophic, 4 – oligo-mezotrophic, 5 – mezotrophic, 6 – mezo-eutrophic, 7 – eutrophic, 8 -high eutrophic, 9 – extreme eutrophic (Floraweb.de).

In this way obtained data were later processed by the help of some statistic programmes like Excel and SPSS. The charts were performed through Box plots method. In these charts the limited rectangles interior represents 50% of the samples arranged in increasing order. The line in rectangles interior represents the mean value. The side lines limit the other 50% of the samples, and the remote points represent the identified extreme values.

The trophicity diagram for each of the two regions was performed also for metric frame method, as well as for Braun-Blanquet method. Distinct diagrams for the number of species (presence – absence) and also for cover degree of each species were performed, according to trophicity indexes.

RESULTS AND DISCUSSIONS

By analyising the distribution diagrams of the species number per relevee for trophicity categories taken in discussion, a distribution quite similar for the northern limestone region and southern siliceous region can be noticed. The big number of high oligotrophic species was noticed also for 1 m² sample surfaces as well as for the 25 m² ones in both regions. After this comes a decreasing number of oligotrophic, oligo-mezotrophic and respectively mezotrophic species. This distribution reveals the oligotrophic character of *Arnica montana* grasslands (Fig. 1, 2, 3, 4).

A quite large number of mezo-eutrophic species was noticed. These species occurence is due to the use of natural fertilizers as stable manure, which is being traditionally practiced on these grasslands. The consequence of this practice is also the occurence of eutrophic species that colonise the accumulation places of these fertilizers. But high eutrophic and extreme eutrophic species like *Urtica dioica* or *Rumex alpinus* rarely occure, and when they occure, they have a very low cover in *Arnica montana* grasslands (Fig. 1, 2, 3, 4).

Extreme oligotrophic species occure more frequently in southern siliceous region, underlining the more extreme oligotrophic character of some habitats with *Arnica montana* from this region (Fig. 1, 2, 3, 4)

The differences between 1 m² relevees and 25 m² ones are noticed especially at mezotrophic, mezo-eutrophic and eutrophic species level. These species occur in higher number in 25 m² relevees, being better seen on the bigger surface of these relevees, comparative to the ones undertaken with metric frame (1 m²). This fact suggests the more grouped distribution of these species in eutrophization points spread on *Arnica montana* meadows, which are in general oligotrophic meadows (Fig. 1, 2, 3, 4).

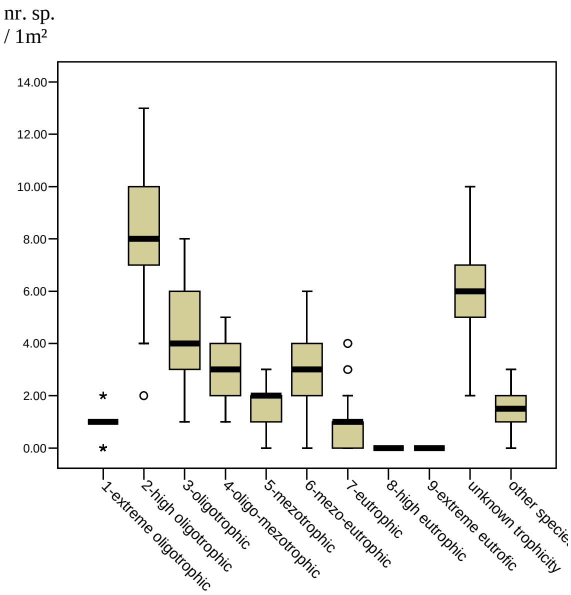

Fig. 1 Number of species per relevee, for *Arnica montana* grasslands from northern region (limestone) of Gârda de Sus community – 1 m² relevees.

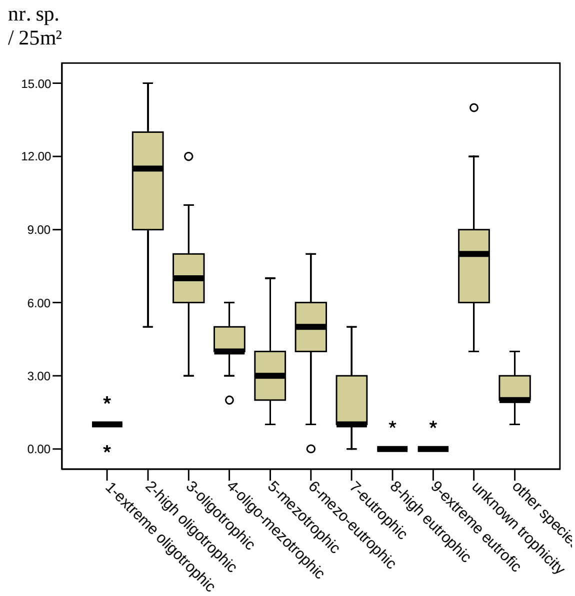

Fig. 2 Number of species per relevee, for *Arnica montana* grasslands from northern region (limestone) of Gârda de Sus community – 25 m² relevees .

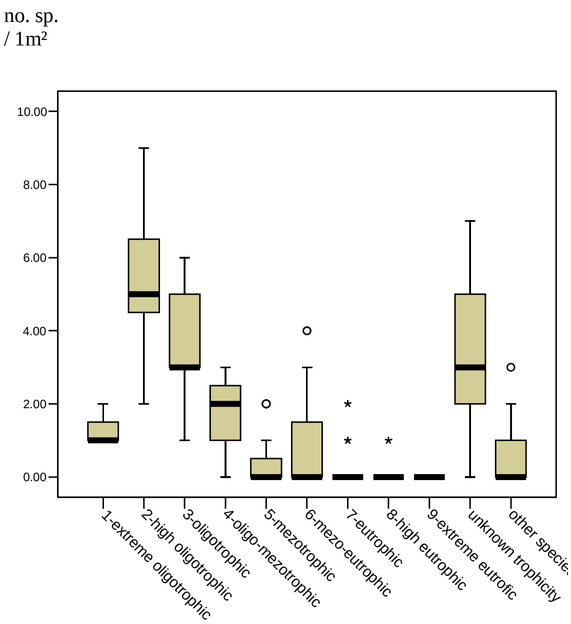

Fig. 3 Number of species per relevee, for *Arnica montana* grasslands from southern region (siliceous) of Gârda de Sus community – 1 m² relevees.

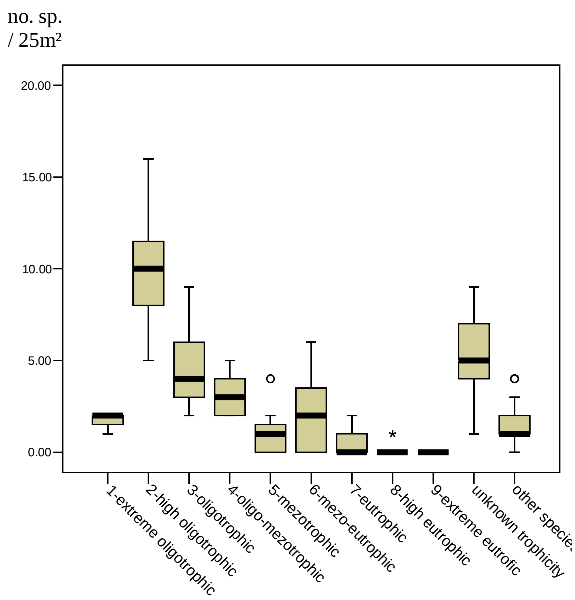

Fig. 4 Number of species per relevee, for *Arnica montana* grasslands from southern region (siliceous) of Gârda de Sus community – 25 m² relevees.

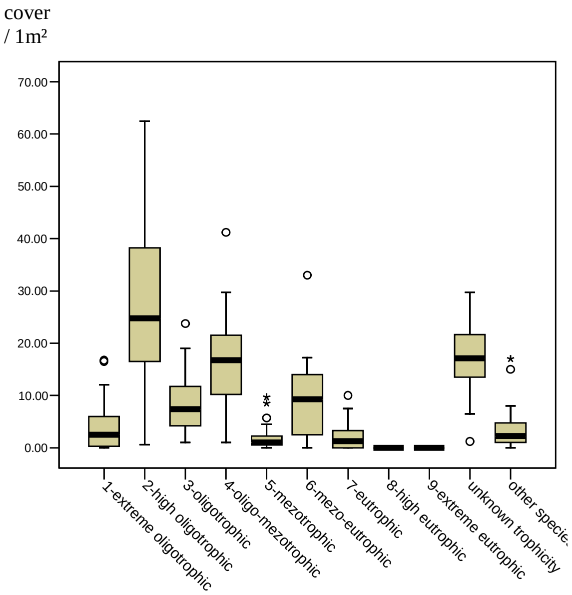

Fig. 5 Cover of species categories per relevee, for *Arnica montana* grasslands from northern region (limestone) of Gârda de Sus community – 1 m² relevees.

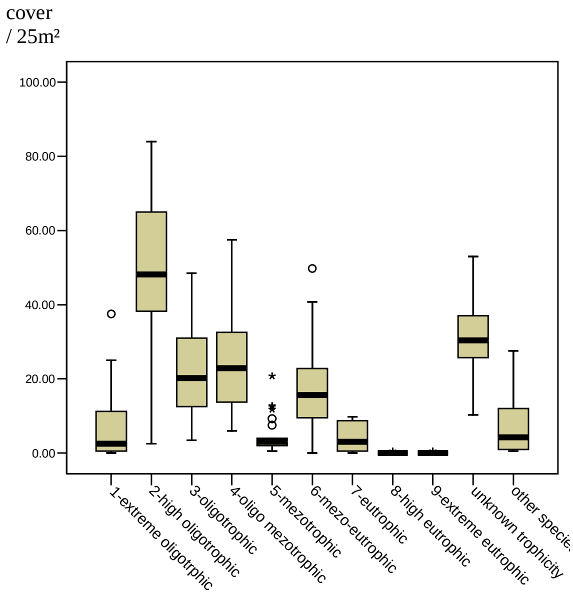

Fig. 6 Cover of species categories per relevee, for *Arnica montana* grasslands from northern region (limestone) of Gârda de Sus community – 25 m² relevees.

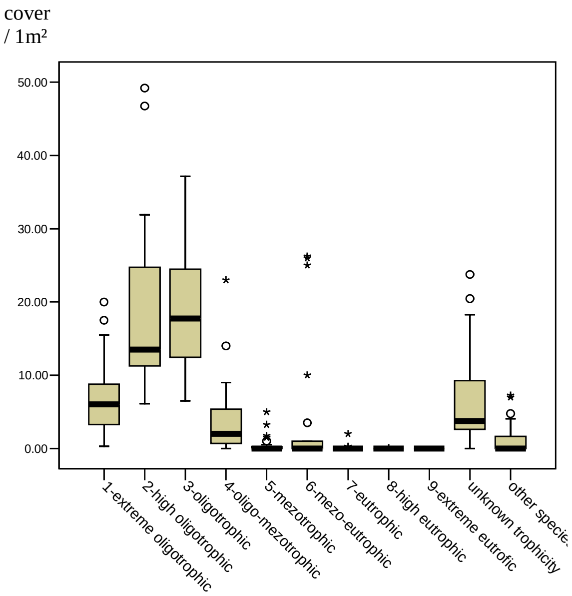

Fig. 7 Cover of species categories per relevee, for *Arnica montana* grasslands from southern region (siliceous) of Gârda de Sus community – 1 m² relevees.

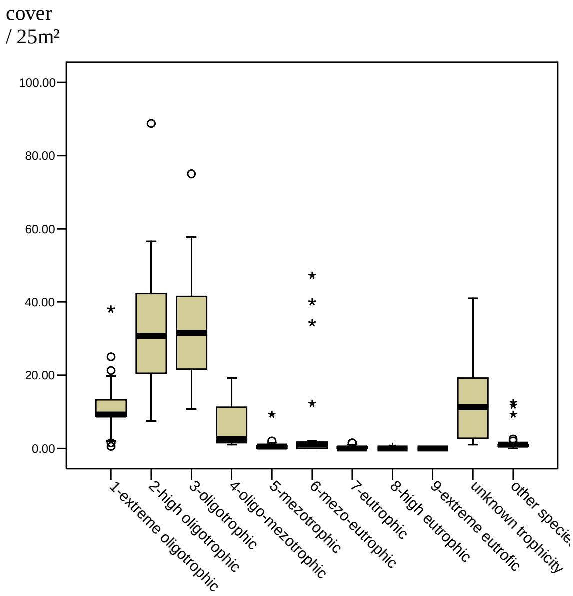

Fig. 8 Cover of species categories per relevee, for *Arnica montana* grasslands from southern region (siliceous) of Gârda de Sus community – 25 m² relevees.

In diagrams which take in consideration also the cover of each species per relevee, certain differences are noticed, that reveal the phisiologycal and ecologycal competition power of species previous discussed (Fig. 5, 6, 7, 8).

In diagrams concerning cover degree, the differences between northern limestone region and southern siliceous region are much more obvious. High oligotrophic species dominate in both regions, but species from the other trophicity categories show obvious differences.

In northern limestone region, species of vascular plants have a much more balanced cover comparative to the species number. In this way, a cover degree quite important for mezotrophic and even eutrophic species is noticed. This distribution is due to better fertility and productivity of grasslands from the limestone plateau. Consequence of this fact is also the better maintenance and fertilization of these more profitable grasslands (Fig. 5, 6, 7, 8).

Though noticed also in diagrams of species number, the oligotrophic character of *Arnica montana* grasslands from southern siliceous region is clearly revealed in the diagrams regarding the cover degree. Starting in this way with the species with mezotrophic character up to the ones with extreme eutrophic character, all of them show a very low cover degree in this region. In comparison to grasslands from the northern region, here in the southern siliceous area, the low fertility, productivity and profitability of habitats with *Arnica montana* draw after them less intense maintenance and fertilization works, sometimes their lack for several consecutive years. This fact leads to increasing ologotrophication of these habitats and to increasing danger of abandoning their maintenance. Through total lack of use and maintenance of these grasslands, they evolve by natural succession phenomenon towards shrubb and forest. These phenomenons also lead to disappearence of *Arnica montana* species, as well as its entire habitat from respective areas.

CONCLUSIONS

The higher oligotrophic character of *Arnica montana* habitats from southern siliceous area of Gârda de Sus community is prooved also by here identified species, but especially through their cover degree (Fig. 1- 8).

Habitats with *Arnica montana* from northern limestone area of Gârda de Sus community, though oligotrophic also, show a mosaic character of oligotrophic and mezotrophic species. This prooves a better supply with nutritive substances in this grassland regions.

High and extreme eutrophic species rarely occur in *Arnica montana* habitats and show a very reduced cover degree. Thus, a eutrophization of these habitats would rapidely lead to their disappearence, fact that was noticed on certain parcels during field studies.

In order to longtime maintenance of *Arnica montana* habitats in Gârda de Sus community, the preserving of their mostly oligotrophic character is necessary. Also an extreme intensification of oligotrophicity as well as an eutrophization lead to deterioration and, finally, to disappearance of these habitats. Thus, it is necessary the adaptation of traditional management to actual socio-economic situation in order to maintain the actual ecological conditions, but also to keep economic profitability of these grasslands. Abandonment of their use would lead to succesion phenomenons towards shrubb and forest vegetation and, as a result, to disappearence of these habitats with high conservative value.

From this point of view, *Arnica montana* habitats from southern siliceous region are more endangered as a result of extensification and abandonment of their use. On the other hand, some especialy from northern limestone region can be endangered through intensification and eutrophization in order to obtain a higher productivity.

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