ECOLOGICAL ANALYSIS OF THE *MEDICAGINI-FESTUCETUM VALESIACE* WAGNER 41 ASSOCIATION PRESENT ON THE ROMANIAN TERRITORY

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Abstract: The analysis of the ecological requirements of the *Medicagini-Festucetum valesiacae* phytocenoses present in the Romanian territory, has a great importance since it provides information concerning the evolution of the ecological relationships from a region, across historic time, but also about the species migration from certain origin areas and subsequent integration in groups similar to those identified. The spectral analysis, using the ecological species indices, has shown certain particular characteristics of the phytocenoses, with regard to the geographical area which they underlie.

***Keywords**: forest steppe, ecological indices, ecological spectra.*

1. Introduction

The ecological factors have an essential role in creating a great diversity of woodland associations, through the adaptations they impose to the phytocenoses. Bed rock, relief, climate, altitude as well as latitude and implicitly the altitudinal zonation, water, the edaphic factor, etc., all determine particular characteristics to the phytocenoses, all linked to a certain geographical zone, or to a certain woodland association.

The present paper attempts to cover some differences within the composition of the ecological groups, differentiated for the different factors – humidity, temperature, soil reaction and trophicity.

2. Materials and methods

For this study, there have been taken phytocenoses belonging to the same vegetal association - *Medicagini-Festucetum valesiacae* Wagner 41 – identified in forest steppe territories, situated on the territory of Romania, in different altitudinal ranges: Suceava river basin (280-410m), Jijia river basin (90-150m), the surroundings of Iaşi municipality, (80-350m) grouped as nordic phytocenoses, Feneş river basin (Alba) (500-550m), Blaj river basin (350-450m), Secaşelor interfluve (260-450m) – in the Transylvanian depression, grouped as western phytocenoses and the Wallachian plain (Romanian plain) (70-80m) – southern phytocenoses. We must state that the woodland associations surveys were published in *Vegetaţia României* 1992, coordinator N.Doniţă, and are of a significant count (334).

As work methods used, the ecological spectra were calculated (using ecological indices, established by V.Sanda and collab., 1983, using the Ellenberg method, 1975) for the

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phytocenoses grouped in accordance with their geographical location and subsequently, comparisons were made for each spectrum with the others, this way emphasizing the particular characteristics of each woodland association.

3. Results and discussions

The number of species found in the *Medicagini–Festucetum valesiacae* Wagner 41 association differs according to the sampling area for the survey; the total number of species for the Romanian forest steppe is 410. Aside from the woodland associations taken into consideration, there were also identified: in Suceava river basin, 170 species; în Jija river basin, 54 species; în the surroundings of Iaşi , 170 species; în Jija river basin, 54 species; în the surroundings of Iaşi municipality, 265 species; în Blaj river basin, 40 species; in Feneş river basin (Alba), 40 species; on Secaşelor interfluve, 34 specie în the Wallachian plain, 87 species.

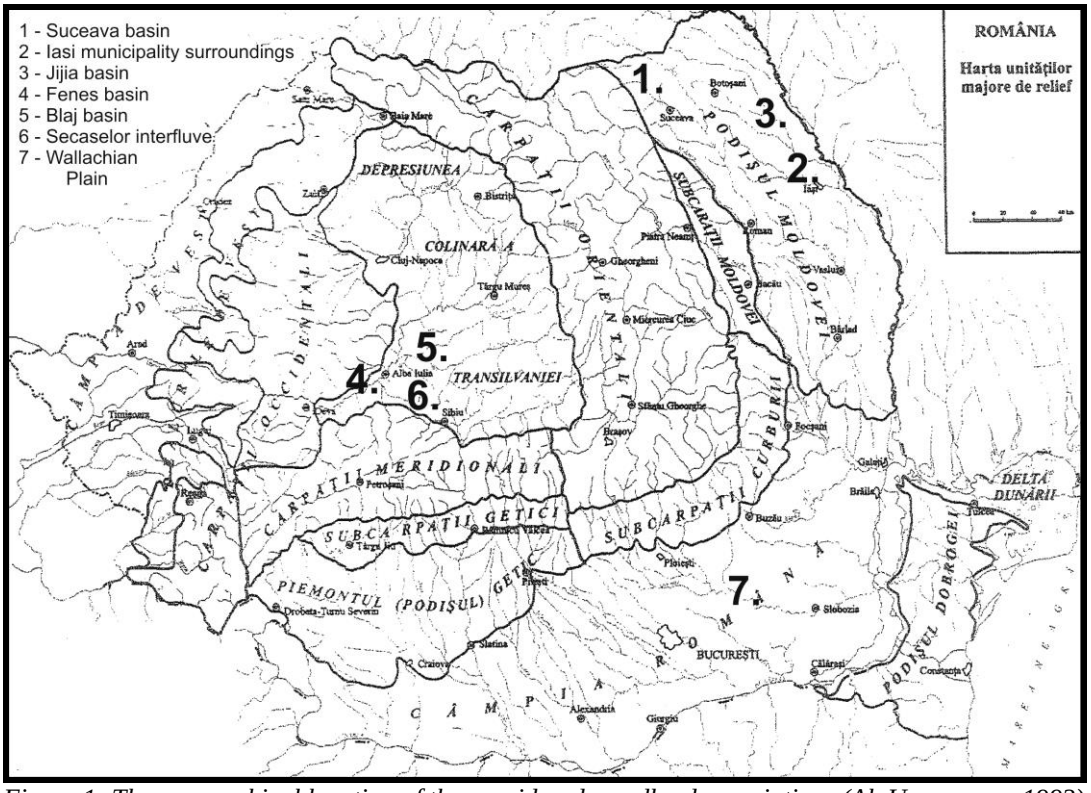

Figure 1: The geographical location of the considered woodland associations (Al. Ungureanu, 1993)

According to the floristic compositon of the complexes, the forest steppe large area is divided into sub-areas: the northern forest steppe area (characterized by woods comprised of mesophile oaks), respectively the north of Moldova and southern forest steppe area (which has woods comprised of xero-mesophile oaks), respectively the south of Moldova, Dobrogea, Muntenia and Oltenia regions (V.Cristea, 1993).

On the other hand, Al.Roşu (1973) believes that the highly accentuated regional climatic differentiations found in the plains, have determined the establishment of three types of forest steppe: northern, southern and western. Thus, the northern forest steppe area appears

in Suceava river basin, Jijiei depression and the surroundings of Iaşi municipality; the southern forest steppe appears in the southern parts of Bârlad plateau and the Wallachian plain, and the western forest steppe in the western part of the country.

Synecological analysis

The comparative synecological analysis for the behavior of the *Medicagini-Festucetum valesiacae* phytocenoses from the Romanian territory, and the respective ecological spectra analized show the following:

a. For the ***humidity factor*** (Fig. 2) a single ecological group is emphasized in the analized areas, but also a differentiation for the preferences is present, so:

- the eastern phytocenoses have the greatest frequency of xero-mesophile species, respectively 44,4%; the values decrease slightly for the southern phytocenoses, 42,68% and even more for the western ones.
- 35,83% the frequency for the phytocenoses contained within the whole territory is 43,29%.
- high values for the mesophyte species are recorded in the western side of the country.

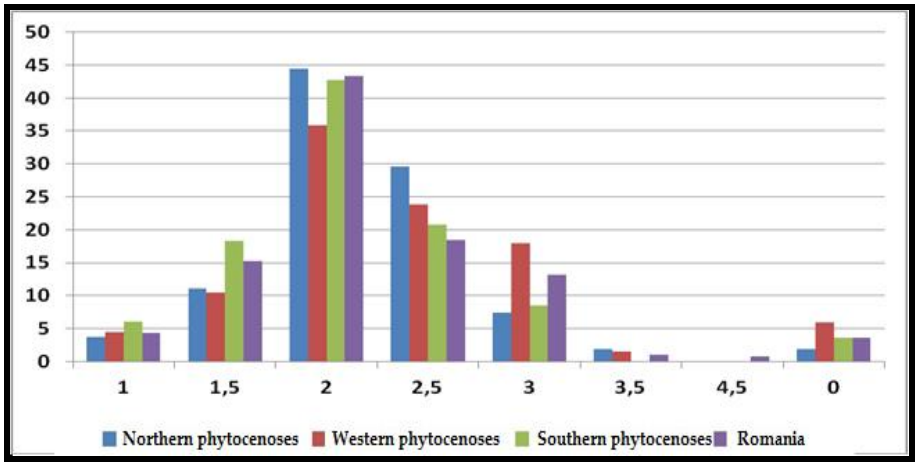

Figure 2: Comparative ecological spectra for the humidity factor
Northern phytocenoses (Suceava river basin, Jijia river basin and Iaşi municipality surroundings);
Western phytocenoses (Feneş river basin, Blaj river basin on Secaşelor interfluve);
Southern phytocenoses (Wallachian plain), Romania.

b. For the ***temperature factor*** (Fig. 3) we can notice a certain aggregation of the species, in the mesotherm domain and moderately thermophile, with some variation (10,38-23,88%) of the frequency of the amphytolerant species:

- the ecological group of transition mesotherms to the moderately termophile (3-3,5-4 ecological indices) indicate a single ecological group for the eastern and shoutern phytocenoses and two groups for the western phytocenoses and the rest of the country.
- the phytocenoses found in the Transylvanian basin are individualized by the predominance of mesotherm elements in comparison with the moderately thermophile ones.

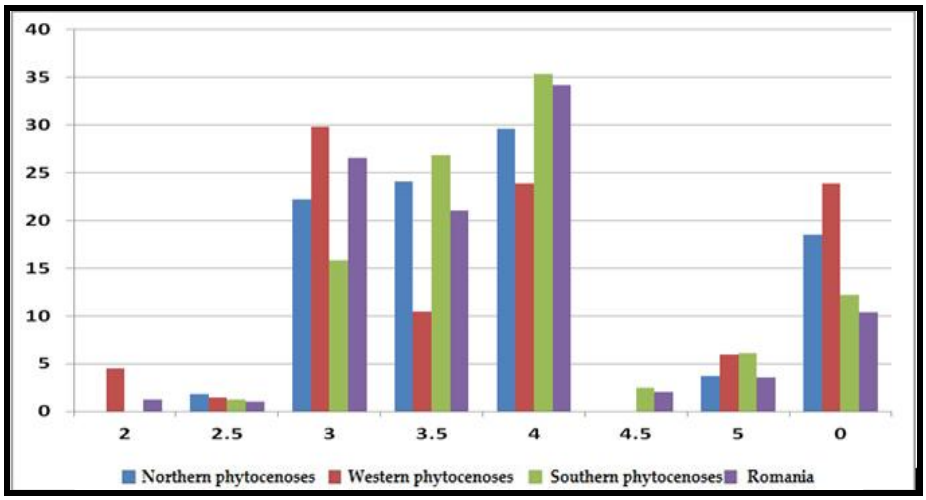

Figure 3: Comparative ecological spectra for the temperature factor
Northern phytocenoses (Suceava river basin, Jijia river basin and Iaşi municipality surroundings);
Western phytocenoses (Feneş river basin, Blaj river basin on Secaşelor interfluve);
Southern phytocenoses (Wallachian plain), Romania.

c. For the ***soil reaction factor*** (Fig. 4) a single ecological group is emphasized – the species which prefer weakly acidic neutrophile soils; the species from this group vary between 34,33% and 38,88% (for the southern phytocenoses, the ecological indices 4 and 4,5 are represented almost similary); the amfiionic species vary between 25,61% and 32,83%, 23,54% for the rest of the country.

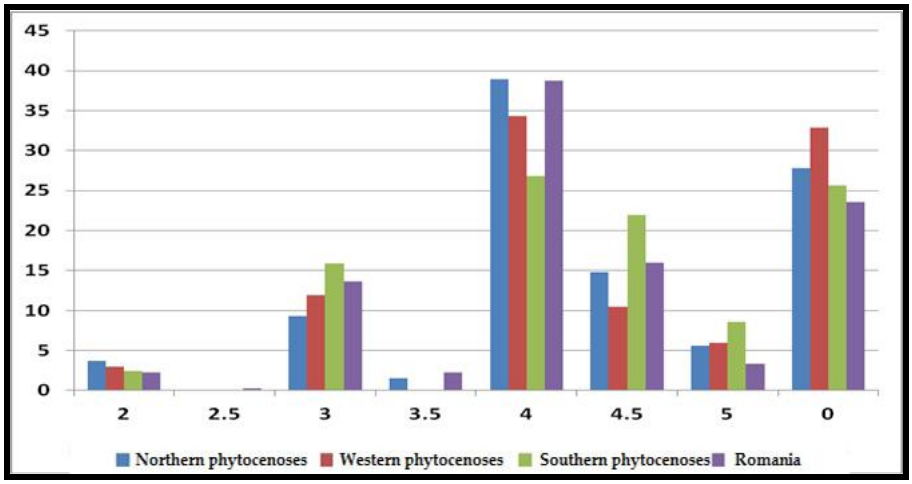

Figure 4: Comparative ecological spectra for the soil reaction factor
Northern phytocenoses (Suceava river basin, Jijia river basin and Iaşi municipality surroundings);
Western phytocenoses (Feneş river basin, Blaj river basin on Secaşelor interfluve);
Southern phytocenoses (Wallachian plain);Romania.

d. The analysis of the preferances of *Medicagini – Festucetum valesiacae* association for the soil trophicity was made using the same method of spectra (Table 1), and as a phytocenosic group, respectively the northern, western and southern phytocenoses show the following:

- the spectrum constructed for all the phytocenoses in the country (334 surveys, 410 species from which 328 with trophicity informations) show the predominance of the oligotrophic species (36,58%) and very low values for the euritrophic species; the other categories of trophicity are well represented, varying between 11,28 and 17,98%.

- the trophicity spectrum made for the northern phytocenoses (112 surveys, 298 species with trophicity information) shows cantitatively close frequencies of the general spectrum – the logical explanation being the overlapping of the majority of the two floristic inventaries;

- the western forest steppe phytocenoses (20 surveys, 63 species with trophicity information) have a better separation from the general spectrum, both in the species composition, and also in the predominance of some ecological trophic categories; the floristic diversity is weaker in the western side of the country; the oligotrphic and oligo-mesotrophic species have greater frequencies than in the rest of the country, and the other categories, respectively meso-eutrophic and eutrophic, have quite low frequencies;

- the phytocenoses from the southern forest steppe, respectively the Wallachian plain, allthough having a floristic inventory just as diverse as the western inventory (in the southern areas there were 20 surveys and 70 species have trophicity indicators), show a quite accurate trophic categories classification, with very low devations from the general spectrum; thus emphasizing differences between the soil trophicity found in the different woodland associations around the country.

Table 1: Comparative ecological spectra for the soil trophicity factor

Ecological category	Oligotrophic %	Oligo-mesotrophic %	Mesotrophic %	Meso-eutrophic %	Eutrophic %	Euritrophic%
Northern phytocenoses	35,92	15,77	18,12	12,08	15,10	3,35
Western phytocenoses	42,27	22,22	14,28	6,35	9,52	6,35
Southern phytocenoses	37,14	15,71	17,14	12,85	14,28	2,85
Romania	36,58	15,85	17,98	11,28	15,24	3,04

Northern phytocenoses (Suceava river basin, Jijia river basin and Iaşi municipality surroundings);
Western phytocenoses (Feneş river basin, Blaj river basin on Secaşelor interfluve);
Southern phytocenoses (Wallachian plain), Romania.

Conclusions

The synecological analysis of the phytocenoses of the same vegetal associations – *Medicagini – Festucetum valesiacae*, that are grouped on confined spatial units, offers a large amount of data regarding the humidity, temperature, soil reaction and trophicity conditions within each geographical unit.

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