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STATIONAL CONDITIONS AND THEIR INFLUENCE UPON THE WOOD VEGETATION IN PIONEER STAGE OF SECONDARY SUCCESSION FROM THE NORTH OF THE ORIENTAL CARPATHIAN MOUNTAINS

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ABSTRACT: In the present research, two forest ecosystems have been studied located in the spruce ecological zone, differentiated by their environmental variables, vegetation levels (Lala Valley - subalpine level; Vama - mountain level) and by the disturbances directing the ecological succession. Both of them fall under the pattern of a secondary succession. The ecosystem in the Lala Valley (Rodna Mountains National Park) is frequently affected by avalanches, whereas the ecosystem in the Vama area (Bucovina Ridges), the succession's trigger factor is represented by windfalls. The scope of the research consisted in: i) determining the stational conditions in the two ecosystems, ii) identifying the vegetation classes; iii) analyzing the influence of the stational conditions upon the vegetation in the two ecosystems. The ecological conditions led to the formation of some vegetal communities (vegetation classes). These may be distinguished by the presence of the diagnostic species and offer important information concerning the variability of the stational conditions. In the Vama ecosystem, 4 vegetation classes (*Salix, Populus-Sorbus, Picea Coryllus și Populus-Salix*), and in the Lala Valley - 3 classes (*Pinus m., Vaccinium 1, Vaccinium 2*) were identified. It appears that in both habitats, the micro-stational conditions led to the formation of some distinct vegetal communities. The nutrients quantity makes the difference between the two similar classes in the Lala Valley. Moreover, the fertility of the soil influences also the vegetation classes in the Vama area, which has, along with the competition for light, a significant contribution in their formation. To conclude with, we can state that the in the pioneer stage of secondary succession, stational conditions have a greater importance in the ecosystems highly affected by disturbances, compared with the habitats more developed, where the competition is the main factor governing the formation of the vegetal groups.
Keywords: stational conditions, wood species, environment variables, pioneer species, secondary succession

1. INTRODUCTION

Stational conditions play an important role for the successional dynamics of vegetation. Depending of them, the vegetation growth on a ground affected by different types of disturbances (Teodosiu, 2012) shall be completed in a shorter or longer period of time. The values of topographic gradients vary depending on the vegetation model, being strong predictors of successional dynamics within the vegetal communities (Zelený D., 2007).

We can understand by successional dynamics the replacement of a biocenosis with different ones (Milescu, 2007). The secondary succession is represented by a series of modifications in the structure and content of the vegetation, subsequent to the action of a disturbance which can be natural or anthropical (Schulze, Beck, & Müller-Hohenstein, 2002), or to the opening of the massif in a forest ecosystem, thus being created the conditions for the growth of some plant species(Horn, 1974).

In the alpine area and in the rare forests from the mountain area, there are frequent snow avalanches (Gaspar et al., 1968), which create disturbances in the forest environment. Snow avalanches lead to a fragmentation of the stand and to the total or partial removal of vegetation, depending on their intensity and frequency. The large timeframe between the two events enables a habitat recolonisation (Popovici, 2016). Windfalls represent another disturbances category, where the vegetation's dynamics is different due to the influence of perturbations' features, to the production moments, to the ecologic features of the biotype, to the biocenosis structures before the intervention of the windfall but also to the anthropical intervention (silvicultural measures) (Măciucă, 2006). The pioneer stage of secondary successions is characterized by a low number of tolerant species to ecologic factors, a low density of vegetation and the lack of a well defined cenotic structure (Borza & Boşcaiu, 1965).

In the present research, two forest ecosystems have been studied located in the spruce ecological zone, differentiated by their environmental variables, vegetation levels (Lala Valley - subalpine level; Vama - mountain level) and by the disturbances directing the ecological succession. Both of them fall under the pattern of a secondary succession. Avalanches frequently affect the ecosystem in the Lala Valley (Rodna Mountains National Park), whereas the ecosystem in the Vama area (Bucovina Ridges), the succession's trigger factor is represented by windfalls.

The scope of the research consists in:

i) determination of the stational conditions in the two ecosystems,

ii) identification the vegetation classes;

iii) analyzing the influence of the stational conditions upon the vegetation in the two ecosystems.

2. THE STUDY AREA

The Lala Valley (Figure 1) is located in the Rodna Mountains National Park, being appointed as a Biosphere Reserve by "Human and Biosphere" UNESCO Committee, with a surface of 46,399 ha (Anonymous, 2010). Geographically speaking, it is located between 47°25'54" and 47°37'28"northern latitude and 24°31'30" - 25°0'30" eastern longitude. The area of research situated within the commune limits of Vama (Figure 1) is located on the left side of Moldova River, being bordered in west by Moldoviţa River and Feredeu Ridge (Obcina Feredeului) and in NE by the Great Ridge (Obcina Mare).

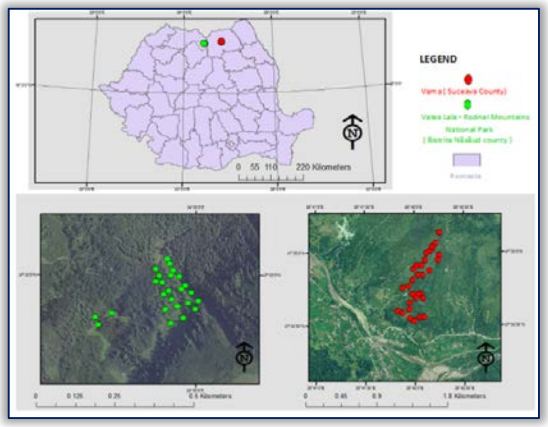

Figure 1. Studied ecosystems

3. MATERIAL AND METHOD

Data collection was performed according to (Al Piticar & Cenuşă, 2014), with a non-systematic stocktaking, in test surfaces of 25 m² where the present species and the percentage coverage from the ground survey surface for each species were identified. In the Lala Valley, there were performed a number of 25 ground surveys, and in the Vama area of research a number of 30 ground surveys. In order to determine some topographic ecological (slope, latitude, exposition) and climatic gradients (insolation), the geographical coordinates of each ground survey were determined using a GPS.

Climatic and topographic variables were determined in the Arcgis 9.3 software, based on geographic coordinates and on specific maps, the digital pattern of the ground being obtained. The NDVI index was also calculated which calculates the vegetation consistency based on multispectral images(Soare, 2012).

In the classification of vegetation, the classification method in the ISOPAM package (Schmidtlein S, 2010), available in the JUICE 7.0 software was used (Tichý & Bruelheide, 2002). In the present research, the identified classes were named vegetation classes. These may be defined as groups of associations of species due to micro-stational conditions and to the available vectors from that specific habitat. This notion is not similar to the classic notion, as in this research we do not seek to taxonomically classify certain vegetal groups, but we want to identify the groups and the mosaic determined by the conditions leading to their association within a secondary succession. The vegetation classes were named depending on the dominant species present in the two ecosystems. The determination of dominant species was realized by the calculation of the coverage, the species having a coverage value of > 50% being considered as dominant. Constant species (with a frequency of >25%) were also determined. Diagnostic species were determined by a fidelity calculation (Tichý, Holt, & Nejezchlebová, 2011).

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In the analysis of the ecologic conditions of the two ecosystems, the indicative values proposed by (Landolt, 1977) were used. They were used with the JUICE 7.0 (Tichý & Bruelheide, 2002) software, in the calculation of different statistical tests (parametric test, initial parametric test, permutation parametric test) in order to analyze the differences between the stational characteristics (humidity, temperature, continentality, soil reaction, nutrients, light) of the vegetation classes. The ANOVA test was also used in the analysis of the vegetation classes by ecological categories.

For the descriptive statistical analysis and in the determination of correlations between ecological gradients the Microsoft Excel software and XLSTAT Package were used.

4. RESULTS

4.1. Interactions between biotic and abiotic factors in the forest ecosystems in the pioneer stage of secondary succession

Table 1 presents the characteristics of the ecologic factors in the two studied ecosystems. They are differentiated in respect of altitude, the research being performed in different altitudinal intervals (Vama ~ 597m ~ 905m; Lala Valley ~ 1599m ~ 1666m).

Table 1. Environment variables and vegetation distribution in the studied ecosystems per ecological categories

GRadient	Descriptive statistics	Ecosystem	Alt (m)	Exp °	Slo °	Ins W/m²	L	T	C	M	S-R	N	Co%
Alt	Corel. r	Va	1	-	-	-	-	-	-	-	-	-	-
		La	1	-	-	-	-	-	-	-	-	-	-
	Summary statistics	Va	Mean= 713.08, Min = 597.42, Max = 905.20										
		La	Mean = 1599.72, Min = 1546.86, Max= 1666.39										
Exp	Corel. r	Va	-0.530	1	-	-	-	-	-	-	-	-	-
		La	-	1	-	-	-	-	-	-	-	-	-
	Summary statistics	Va	Mean = 199.42 , Min = 145.86 , Max = 229.71										
		La	Mean = 307.67, Min = 5.81, Max = 359.76										
Slo	Corel. r	Va	0.520	-0.426	1	-	-	-	-	-	-	-	-
		La	0.830	-	1	-	-	-	-	-	-	-	-
	Summary statistics	Va	Mean = 17.34, Min = 7.20 , Max = 25.98										
		La	Mean = 27.65, Min = 9.09 , Max = 38.92										
Ins	Corel. r	Va	0.555	-0.475	0.480	1	-	-	-	-	-	-	-
		La	-0.818	-	-0.997	1	-	-	-	-	-	-	-
	Summary statistics	Va	Mean = 825.67, Min = 795.89, Max = 850.88										
		La	Mean = 621.93, Min = 517.92, Max = 772.88										
L	Corel. r	Va	-	-	-	-	1	-	-	-	-	-	-
		La	-	-	-	-	1	-	-	-	-	-	-
	Summary statistics	Va	Mean = 3.21, Min = 1 , Max = 4.00										
		La	Mean = 2.31, Min = 1.81, Max = 3.60										
T	Corel. r	Va	-	-	-	-	0.426	1	-	-	-	-	-
		La	0.419	-	-	-	-0.763	1	-	-	-	-	-
	Summary statistics	Va	Mean = 2.99, Min = 2.00, Max = 4.56										
		La	Mean = 2.67, Min = 2, Max = 3.03										
C	Corel. r	Va	-	-	-	-	-	-	1	-	-	-	-
		La	-	-	-	-	0.833	-0.699	1	-	-	-	-
	Summary statistics	Va	Mean = 3, Min = 2.55, Max = 3.48										
		La	Mean = 3.14, Min = 3, Max = 3.60										
M	Corel. r	Va	-	-	-0.397	-0.422	-	-	-	1	-	-	-
		La	-	-	-	-	0.862	-0.784	0.542	1	-	-	-
	Summary statistics	Va	Mean = 3.01, Min = 2.98, Max = 3.16										
		La	Mean = 3.03, Min = 2.78, Max = 3.40										
S-R	Corel. r	Va	-	-	-	-	0.772	0.622	-	-	1	-	-
		La	-0.445	-	-	-	0.785	-0.869	0.661	0.687	1	-	-
	Summary statistics	Va	Mean = 3.02, Min = x , Max = 4										
		La	Mean = 1.68, Min = 1, Max = 3										
N	Corel. r	Va	-	-	-	-	-	0.559	-0.412	-	0.472	1	-
		La	-0.653	-	-0.615	0.595	-	-0.603	-	-	0.758	1	-
	Summary statistics	Va	Mean = 3.03, Min = 2, Max = 3.84										
		La	Mean = 2.39, Min = 2.04, Max = 3.38										
Co%	Corel. r	Va	-	-	-	-	-0.408	-	-	-	-	-	1
		La	0.568	-	0.429	-0.402 -	-	-	-	-	-0.420	-0.740	1
	Summary statistics	Va	Mean = 72.87, Min = 42.40, Max = 100										
		La	Mean = 68.81, Min = 26.80, Max = 87.30										

Abbreviations: Va – ecosystem located in Vama area; La – ecosystem located in Valea Lala; Alt – altitude; Exp – exposition; Slo – slope; Ins – insolation; L – light; T – temperature; C – continentality; M – moisture; S-R – Soil Reaction; N – nutrients; Co% - percentage cover; Values interpretation for exposition - Flat: no slope; North: 0-22.5°; Northeast: 22.5-45°; East: 45-135°; Southeast: 135-180°; South: 180-225°; Southwest: 225-270°; West: 270-315°; Northwest: 315-337°; Northwest: 337.5° – 360°; r – Pearson correlation coefficient (the table contains only the significant values from a statistical perspective, with a materiality level of p<0,05)

The habitat in the Vama area is a sunny one, with southern or south-western exposition versants, the last ones being located in higher areas, which can be explained by the negative correlation between the exposition and the altitude. The Lala Valley presents adumbral versants with predominant northern expositions (northern, north-eastern and north-western expositions) (Table 1).

In respect of the slope, the habitat in the Lala Valley presents the highest values, this orographic factor being decisive for triggering avalanches. The Vama area of research presents lower values of the slope. In both habitats, the higher slopes appear in the upper part of the sides, which can be explained by the significant correlations between the slope and the altitude (Table 1).

The exposition of the versants is reflected in the solar radiation quantity received during the vegetation period. The insolation values are lower in the Lala Valley than in the Vama habitat. According to the correlations identified in the Vama area of research, the insolation values increase in relation to the altitude, they decrease on the south-western exposition versants and increase in relation to the slope (Table 1). Lala Valley presents different values, the insolation being lower in the upper side of the versants, which is due to the modification of the exposition (Table 1).

According to table 1, the vegetation distribution in the two studied areas and the correlation between them and different ecological gradients are as follows:

- Light (L). The distribution of wood vegetation depending on their temperament toward light indicates differences between the two ecosystems. The average values calculated on a unit basis indicate, for the Vama area of research, the general presence of half shadow species which can support also a relative lighting > 10%. However, the presence of light or shadow species cannot be excluded, as they grow up under the cover of species with light temperament. Lala Valley distinguishes by the dominant presence of shadow species, which can support many times a value of relative lighting of <10%. Light species can be also identified, in a lower percentage.
- Temperature (T). The Vama area of research is characterized by the dominant presence of species with high thermal amplitude, with a distribution center in the mountain area. There are species characteristic only for the boreal and mountain area but also heat species in a smaller proportion. The vegetation in the Lala Valley area is mainly formed by generally hechistoterm species with a distribution center in the mountain area.
- Continentalism (C). The characteristic vegetation for the two ecosystems is generally formed by species with high ecological amplitude, which however avoid regions with an extremely continental character. In a very small percentage, there may be also found species with a distribution center in regions with continental climate. Correlations between continentalism and other ecological categories were only highlighted in the Lala Valley. It seems that continental species appear in areas where light species appear, avoiding hechistothermic species which may be found in adumbral areas (Table 1).
- Humidity (U). The average indicative value points out the presence of species that grow up on soils varying from moderate dry to moderate humid soils. In the Vama area of research, correlations have been highlighted indicating an increase of soil's humidity, in areas with lower values of the slope and of the insolation. In the Lala Valley, correlations have been highlighted with the presence of light and continental species. The negative correlation of the ecological category (U) with the temperature category (T) indicate also by the presence of species pointing out low temperatures the increase of soil humidity values in this habitat (Table1).
- Soil reaction (R). The soil reaction is very different in the two habitats. Thus, the average indicative value for this category points out for the Vama ecosystem, moderate acid soils with pH values between 4.5- 6.5 (R = 3). Species with light temperament appear in this habitat in areas with a moderate acid to basic reaction, with heat species, aspect which is highlighted by the correlation with (L), (T) categories. Lala Valley is characterized by the presence of species growing up on acid soils (pH = 3.5-5.5). The negative correlation with the altitude indicates the presence of more acid soils in the lower part of the versants, at lower altitudes. It was also noted the fact that the presence of species indicating acidity is negatively correlated with the presence of heat species (Table 1).
- Nutrients (N). The quantity of nutrients is represented by the presence of species indicating medium fertile soils, for the habitat in the area of Bucovina Ridges and more or less infertile soils for the Lala Valley. According to the indicative values of the species, in the Vama area of research, the nutrients' quantity increases on soils with an alkaline character and in relation with the temperature (rN-S-R=0.472; rN-T= 0.599). In areas with bigger nutrients' quantity, the presence of species with continental character decreases (rN-C=-0.412). In the Lala Valley, soils' fertility decreases together with the altitude (rN-Alt=-0.653), respectively it increases on smaller slopes. Soils with higher fertility can be found in areas with higher insolation values, and the increase of the nutrients quantity is correlated with the increase of pH's value.
- Percentage cover (Co%). The coverage is higher in the Vama ecosystem. It is more developed, being much less affected by disturbances than the Lala Valley ecosystem where avalanches harden the edaphic conditions. The environment variables do not influence in a visible way the vegetation's coverage degree in the habitat affected by windfalls. However, we would like to highlight the negative correlation between the coverage and the presence of light species, aspect which may be explained by the high proportion of spruce (species with a half shadow temperament), which is in its ecological optimum and it largely occupies the free ecological niches. The vegetation in the Lala Valley is more heavily influenced by environment variables. Thus, the increase of the coverage reported to the altitude, slope and its decrease in the highly

insolated areas. Upon the increase of the coverage, the presence of species with a less acid character decreases, as the species resisting to acidity eliminate them (rCo%-S-R = -0.420).

≡ Normalized Difference Vegetation Index (NDVI). The consistency of the vegetation is quite distinct from an area to another. It has lower values in the Lala Valley because the ecosystem is less developed than the ecosystem in the Bucovina Ridges, being generally present species of shrubs and subshrubs. In the Vama area of research, positive correlations of the NDVI index with the presence of species indicating more fertile soils were observed. The explication consists in a higher coverage degree, which shall be realized in a niche with superior edaphic conditions. On the other side, in the Lala Valley, the higher consistency of vegetation shall be performed by species resistant to acidity and to the loss of soil's fertility.

4.2. Vegetation classes

According to (Piticar M. A., 2015) in the studied ecosystem there are 17 wood species. They form 4 vegetation classes.

Salix vegetation class presents a sole species dominating this group (*Salix caprea L.*) with a coverage value of >50%. As diagnostic species, we include those species with a fidelity value of >20 (*Picea abies L., Populus tremula L.*). Species with a frequency value of >25% (*Betula pandula Roth, Corylus avellana L., Salix caprea L.*) were considered as constant species.

Table 2. Cluster analysis and vegetation classes

Vama –ecosystem affected by windfall			Fidelity threshold - 20	Frequency threshold – 25%	Cover threshold – 50%	Valea Lala Ecosystem affected by avalanche			Fidelity threshold - 20	Frequency threshold – 25%	Cover threshold – 50%
Surveys		*Vegetation Class*	*Diagnostic species*	*Constant species*	*Dominant species*	*Surveys*		*Vegetation Class*	*Diagnostic species*	*Constant species*	*Dominant species*
Group number	Nr. of surveys	**Salix**	Picea a. Populus t.	Betula p. Coryllus a. Salix c.	Salix c.	Group number	Nr. of surveys	**Pinus m.**	Alnus v.	Pinus m. Picea a. Salix s.	Pinus m.
1	11					1	4				
Group number	Nr. of surveys	**Populus-Sorbus**	Betula p. Larix d.	Picea a. Populus t. Salix c. Sorbus a.	Populus t. Sorbus a.	Group number	Nr. of surveys	**Vaccinium 1**	Juniperus c.	Picea a. Vaccinium m. Pinus m. Salix s. Pinus c.	Vaccinium m.
2	7					2	15				
Group number	Nr. Of surveys	**Picea-Coryllus**	----	Fagus s. Picea a. Salix c.	Picea a. Coryllus a. Rubus i.	Group number	Nr. of Surveys	**Vaccinium 2**	Rubus i. Sorbus a.	Vaccinium m. Pinus m. Pice a.	Vaccinium m.
3	5					3	6				
Group number	Nr. of surveys	**Populus-Salix**	---	Betula p. Populus t. Rubus h. Salixa c. Sorbus a.	Populus t. Salix c.	----		----	----	----	----
4	7										

Populus-Sorbus vegetation class contains *Populus tremula L.* and *Sorbus aucuparia L.* as dominant species. *Betula pendula Roth.* and *Larix decidua Mill.* are diagnostic species indicating modification of ecological nature of the class, and the constant species are the following: spruce, poplar, goat willow and mountain-ash (it is also a dominant species).

Picea-Coryllus vegetation class contains the aspen and the goat willow as dominant species. *Rubus idaeus L.* can be found among them, having a high coverage within this class. It was not introduced in the name because it is included in the lower layer of the phytocoenosis, the coverage value of the trees species being higher. Diagnostic species are missing from this vegetation class, and the constant species are represented by *Fagus sylvatica L., Salix caprea L.*, along with *Picea abies L.*, which can be considered a constant species within this class.

Populus-Salix vegetation class contains as dominant main species the poplar and the goat willow. As in the previous class, there are no diagnostic species. The constant species are silver birch (*Betula pendula Roth.*), respectively the blackberry (*Rubus hirtus Waldst.* and *Kit*) along with the two dominant species which may also be constant.

For the Lala area of research, inside the avalanche paths, 3 vegetation classes were identified. The first class includes 4 ground surveys, the second one – 15 ground surveys and the third one – only 6 ground surveys.

In the Lala Valley ecosystem, there are 11 wood species forming the following vegetation classes (*Vaccinium myrtillus L., Rubus idaeus L., Picea abies (L.) H.Karst., Pinus mugo Turra, Sorbus aucuparia L., Juniperus communis L., Salix silesiaca Willd., Pinus cembra L., Vaccinium vitis-idaea L., Betula pendula Roth, Alnus viridis (Chaix) DC.*)

Pinus vegetation class presents a sole species dominating this group (*Pinus mugo Turra*) with a coverage value of >50%. Species with a fidelity value of >20 (*Alnus viridis D.C.Chaix*) are considered diagnostic species. Species with a frequency value of >25% (*Pinus mugo Turra, Picea abies L., Salix silesiaca Wild*) were considered constant species.

Vaccinium 1 vegetation class contains *Vaccinium myrtillus L* as dominant class. *Juniperus communis L.* is the diagnostic species indicating class modifications of ecological nature, and

Picea abies L., Pinus mugo Turra, Salix silesiaca Wild, Pinus cembra L. along with *Vaccinium myrtillus L.* are considered constant species.

Vaccinium 2 vegetation class presents bilberry as a dominant species, as in the previous class. Diagnostic species are the raspberry and the mountain-ash, and the constant species are the bilberry, the juniper and the spruce.

4.3. The influence of certain environmental variables upon the vegetation classes.

In the Lala Valley area of research, in the distribution by ecological categories, significant differences (ppar, perm, modif <0.05) were identified between the composed vegetation classes, for the following gradients: light, temperature, species continentality, humidity, soil reaction and nutrients quantity. In the Lala Valley, *Vaccinium 1* and *Vaccinium 2* vegetation classes are composed from half shadow species, resistant to low temperatures, due to the northern exposition of the versants, and the *Pinus m.* class among light species but more resistant to low temperatures than the other two classes. The moderate acid reaction of the soil (pH = 4.5 - 6.5) determines the formation of the *Pinus m.* class and the acid reaction (pH = 3.5 - 5.5) leads to the formation of *Vaccinium 1* and *2* classes. A significant difference is observed in the distribution of nutrients quantity, which results in the separation of *Vaccinium* class into *Vaccinium 1* and *2*. The soil fertility is likely to determine modifications in the composition and the diversity specific of the two classes. The *Pinus m.* class occupies the ecological niche with more fertile soils.

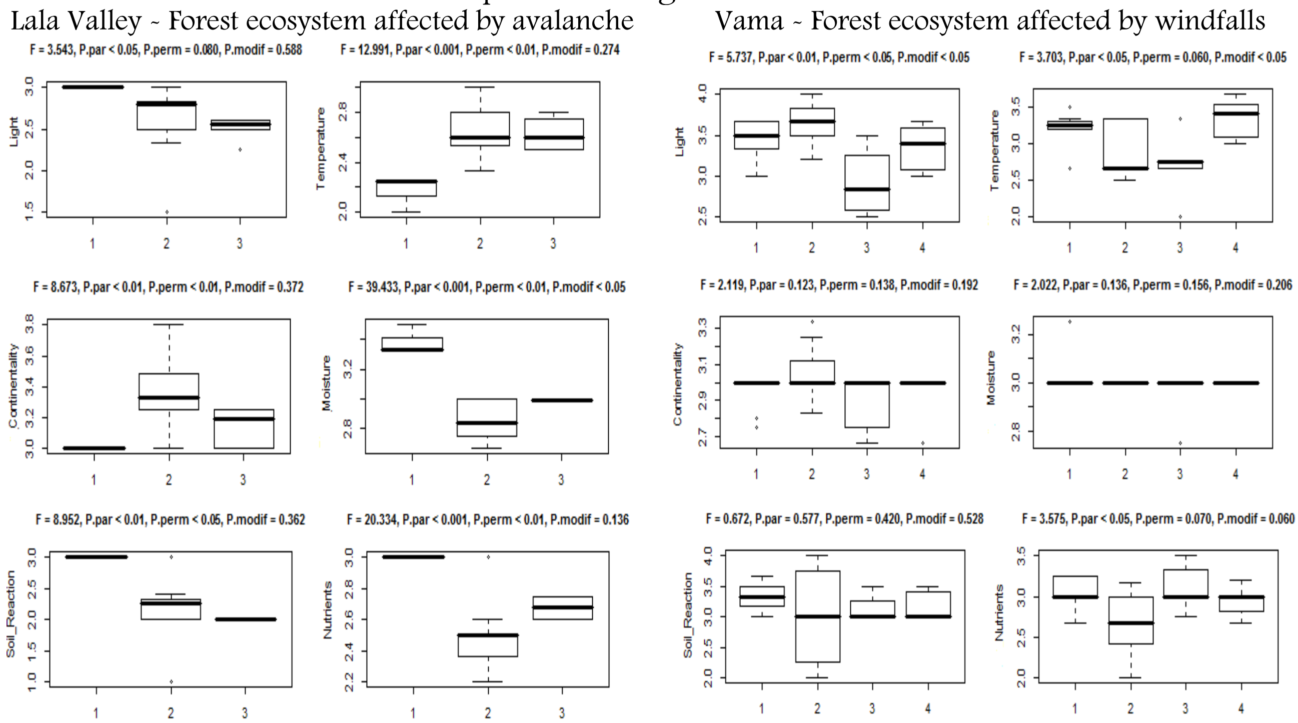

Figure 2. Ecologic indexes and vegetation classes

The distribution of the vegetation classes by the light preference indicates a resemblance between the *Salix, Populus-Sorbus, Populus-Salix* classes, while the *Picea-Coryllus* class indicates the presence of main half shadow and shadow species which grow up under the cover of pioneer species and which shall eliminate them by competition during the evolution of the succession. The distribution of the species depending on the soil's fertility results in the formation of vegetal communities, differentiated in terms of composition and diversity. Although the differences between classes are not significant, we can still conclude that the soil's fertility in some areas of the habitat leads to the formation of more developed vegetal structures.

5. CONCLUSIONS

In the present research, we studied the stational conditions and their influence upon the wood vegetation in the two ecosystems in pioneer stage of the secondary succession located in the northern group of the Oriental Carpathian Mountains. The two studied ecosystems are distinct by the nature of the disturbances determining the appearance of this type of succession but also by the environmental conditions. The content of the vegetation in a habitat is generally modified due to the variation of the ecological factors (Klanderud, Vandvik & Goldberg, 2015). Thus, in the two ecosystems a pattern of the environment variables' variations and of the measure in which it influences the distribution of the vegetation was identified.

The ecological conditions led to the formation of some vegetal communities (vegetation classes). They are distinct by the presence of the diagnostic species (Chytrý & Tichý, 2003) and offer important information concerning the variability of the stational conditions. In the Vama ecosystem, 4 vegetation classes (*Salix, Populus-Sorbus, Picea Coryllus* and *Populus-Salix*), and in the Lala Valley - 3 classes (*Pinus m, Vaccinium 1, Vaccinium 2*) were identified. It appears that in both habitats, the micro-stational conditions lead to the formation of a distinct vegetal community. The nutrients quantity makes the difference between the two similar classes in the Lala Valley. Moreover, the soil's fertility influences also the vegetation classes in the Vama area, along with the competition for light, which has a significant contribution to their formation.
According to the researches in the field (Klanderud et al., 2015) our research has also confirmed the modifications in the content of vegetation, depending on the environment variables in the pioneer stage of secondary succession. Their knowledge and of interactions with the biotic factors leads to a better understanding of the way in which vegetal communities form in a habitat, aspect which might supply useful information for the ecological reconstruction works in the ecosystems affected by various types of disturbances. To conclude with, we can state that the stational conditions have a greater importance in the ecosystems strongly affected by disturbances in comparison with the more developed ecosystems, where the competition is the main factor governing the formation of the vegetal groups.

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