THE COMPOSITION VARIABILITY OF THE NUMBER OF TREES, BASE AREA AND VOLUME IN RELATION TO INTERVENTION INTENSITIES IN GORUNETO-FĂGETELE OF U.P. III VÂRCIOROG O.S. DOBREŞTI

Dorog Lucian Sorin*

* University of Oradea, Faculty of Environmental Protection, 26 Gen. Magheru St., 410048, Oradea, Romania, e-mail: dorogs@yahoo.com

Abstract

The composition is a feature variable stand and is closely linked to the evolution of the structure of the stand. The structure of forest stands is offering the most comprehensive information about the Arboretum and its subsequent evolution about whether on not unforeseen changes occur.

Stand's compositions number variability of trees, base area and volume in U.P. III Vârciorog is sharp enough and as a result it is necessary an assessment of interventions targeting the stand structure and composition to the goal. Silvotehnical intervention which should be applied to the main forest stands take increasing proportion of oak. This is achieved by extracting of specimens of other species that impede oak growth exemplares.

This work has led to the evolution of the compositions on the number of trees, base area and volume in relation to various silvotehnical intervention (thinning) in order to stand for compositions the composition guidance purpose. It was also correlations were established between changes in the compositions with the intensity of interventions by type of thinning. In the studied stands for oak main competing species is hornbeam due mainly to it will have the highest poderea in terms of the intensity of interventions. Were presented and some solutions regarding the application of care in order to promote, in particular oak, which occurs in forest stands in compositions share so small though the area under study belongs to oak-beech stands. Increase the proportion of the oak in the compositions of the stands is beneficial in terms of increasing the value of the forest stands in the area.

Key words: stand composition, thinning, silvotehnical intervention, correlation.

INTRODUCTION

The composition expresses the share of synthetic components in a stand (Florescu, Nicolescu, 1998). The composition is a feature variable stand, the dynamics of which it is part is closely linked to the evolution of the structure of the stand. A defining characteristic of the structure of the stand is the composition, which is amended in relation to the silviculture that apply to interventions in the stands. The structure of forest stands is offering the most comprehensive information about the Arboretum and its subsequent developments about if not the essential changes occur (not provided) that can change the whole program initially (Giurgiu, 1979). In this regard the knowledge of the structure of forest stands becomes extremely important in terms of interventions that will be run.

In relation to the composition of pure and mixed stands, the present paper is aimed at mixed forest stands because in relation to compositional

changes may enlarge or shrink the economic and cultural value of forest stands. In mixed stands after Florescu et al. (Florescu I., Nicolescu N.V., 1998) in relation to the cultural and economic value of the existing species mixed stands may consist of the main species, the species mix and help. The first of the species referred to as wood production role of great value while others have a role to help improve the conditions stand and mainly the trophicity of soil (Giurgiu, 2004).

Determination of the layer comps is done on the basis of measurements of partial inventories, land in areas of the sample and the total inventory over the stand (Giurgiu, 1972).

A stand composition may change over time with a dynamic influenced the nature of the species, the growth, the suitability of the conditions and character of silvotehnical intervention (Leahu I., 1998, 2001). If the nature of the species and growth conditions of silvotehnical intervention has the minimum capacity to improve, remain the only silvotehnical through interventions that can be routed to a composition evolution stand dynamics.

Application of different systems of silvotehnical measures affect not only the size of growth and wood quality of production as well as compositional diversity (Leahu, 1993, 2001).

Imagining interventions on the degrees of intensity in the oak-beech mixt stands offers precious information analyzed in terms of the dynamics (Kevin, 1998) of the composition, structure, optimal exercise of the functions assigned to targeting and economic goals laid down in the forest.

MATERIAL AND METHODS

As regards the composition of forest stands that are observed in the U.P. III Vârciorog O.S. Dobreşti *Fagus sylvatica* are predominant (60%), *Quercus petraea* (11%) and *Quercus cerris* (7%) grow in good conditions (Dorog, 2004).

The proportions of beech over the decades has remained approximately constant, this is due to a natural regeneration of the species. *Quercus cerris* also in areas with compact grow soils in good conditions and as a result his percentage has remained almost constant over the years (Dorog, 2005).

It is noted that since the percentage decreased by 3% due to operation of mixed stands of beech with sessile oak. On some of these stands regenerated incomplete surfaces were introduced species of hardwood, so explain the high percentage of evergreens. There is also a slight decrease in the percentage of hornbeam from 8% to 7% in the last decade. Decreased in recent decades have occurred in higher percentages because of the parameters of appropriate techniques of care.

Table 1

Dynamic composition of forest stands in the U.P. III Vârciorog O.S. Dobreşti

Arrangement of year	The proportion of species						
	Fa	**Go**	**Ca**	**Ce**	**Dr**	**Dt**	**Dm**
1961	59	11	11	7	-	8	4
1971	56	12	11	7	4	6	3
1981	57	13	8	6	9	4	2
1991	60	14	8	7	7	3	1
2003	60	11	7	7	12	3	2

Further it will resort to the introduction of the natural species of mixt regeneration: cherry, maple, linden and ash. Will be promoted also the main species, aiming to increasing the percentage of sessile oak up to 15-20% from current compositions. This objective can be achieved through the promotion of the oak in natural regeneration the expense of beech and also his introduction to supplement natural regeneration at the expense of evergreens.

To assess the dynamics of compositional forest stands of sessile oak mixed with beech stands were selected that grow under appropriate conditions in terms of stand conditions for the two species mentioned above.

The trees were chosen so as to avoid situations in which they should be partially or totally derived therefrom. On the ground were placed rectangular sample surfaces of 2,500 sq.m. The location of the surfaces was chosen so as to reflect as closely as possible the composition of the stand.

Within each area, the diameters were measured for all trees by species and the heights of trees around the central diameter for each species. After the data has been process to calculate the number of trees on composites, base area and volume. After that was done the simulation application of various types of thinning. There has been an analysis of the percentage growth of different broad-leafed elements after the simulation application of various types of thinning. Finally it was determined the correlation coefficients between the intensities of interventions on the one hand and the Hart-Becking respectively increase the proportions of the elements of the stand on the other side.

RESULTS AND DISCUSSION

As a result of data processing of intervention intensities and percentage increases of Hart-Becking coefficient were obtained the following values shown in the table 2.

The results presented in table shows regardless of the type of thinning that there is a direct correlation between high intensity of intervention on the number of trees and the percentage increase in the

coefficient Hart-Becking. The strongest correlation is achieved in relation to the values obtained in the table for thinning.

Table 2

Correlation between the intensity of response and increase the percentage of Hart-Becking coefficient

Correlation coefficient between:			
The intensity of response and increase the percentage of Hart-Becking	**Values of each type of thinning**		
	The combined thinning	**Lower thinning**	**Upper thinning**
The number of trees intensity and S%	0.972	0.952	0.987
The intensity on the surface of base şi S%	0.449	0.291	-0.659
The intensity on volum şi S%	0.377	0.150	-0.423

In terms of the coefficient of correlation (Chițea Gh., 1997) between the intensity on the surface of the base and the percentage increase in the coefficient Hart-Becking correlative values are modest and low-intensity and the combined thinning and medium intensity indirect correlation to the thinning. For the correlation coefficient between the intensity and volume percentage increase of Hart-Becking correlative values are similar to those of the basic surface that are about two tenths values close to zero. It is interesting to note that at the bottom thinning correlation on the number of trees is very strong which means that with how many trees are extracted from the ceiling below the higher coefficient of Hart-Becking.

Table 3

The correlation between the intensity of intervention and increasing proportions of participation on stand

The correlation between the intensity of intervention on trees number and increasing proportions of participation of :		
Beech	Sessile oak	Hornbeam
-0.19	0.84	-0.45
The correlation between the intensity of intervention on the volume and increase the proportion of:		
Beech	Sessile oak	Hornbeam
0.004	-0.04	0.24

The correlation between the intensity of intervention on the number of trees and increase the proportion of participation is significant for sessile oak and distinctly average reverse correlated with the decrease of the proportion of the participation of another species in the stands. Distinctly significant correlation for sessile oak suggests that, in the work of care-thinning has put emphasis on the promotion of the oak. This was done largely by extracting of specimens of hornbeam which impede the cenotical position of sessile oak or beech. The most powerful species competing for

sessile oak is hornbeam which is quite active increases in height and over time lead to the elimination of oaks through shading. With regard to the correlation between the intensity of intervention on the volume and increase the proportion of participation there are significant correlations for the three elements of the stand.

CONCLUSIONS

Stand's compositions number variability of trees, base area and volume in U.P. III Vârciorog is quite evident. Silvotehnical intervention which should be applied to the main forest stands take increasing proportion of oaks mainly of sessile oak. This is achieved by extracting of specimens of other species that impede sessile oak growth.

Intervention intensities on the number of trees are generally between 20-40% thanks mainly to the undesirable species of trees found in fairly large proportion but with diameters ranging from 10 to 18 centimetres. This makes the differences between the compositions on the number of trees and the base area and volume to be fairly accented ranging between 20-40%. This, combined with the rather large density of forest stands (index of density 1,1-1,2) leads to the conclusion that they have to be completed as soon as possible with special care in the thinning. Thinning type most recommended in situations where forest stands is lower thinning analyzed from the bottom that will extract the trees in the lower ceiling of sessile species dry or drying beech and hornbeam respectively. Predominantly and codominantly inheritance copies will be stimulated to accumulate increases in diameter. In the studied often were stocky zvelt coefficient above 100 indicating stands more or less instable.

The composition of the stands can be changed in favor of or against a species with up to 1-2 units which makes achieving the goal composition operation is carried out in 2 or even 3 interventions from now on.

Knowledge of variability of compositions on the number of trees, base area and volume are very important in making decisions about intervention intensities. Interventions will have intensities in conjunction with Hart-Becking factor because it does not increase values after application of interventions with more than 5-6% because it comes down to dismantling of the stands.

In conclusion it can be said that the implementation of thinning in sessile oak stands will have to take into account the variability of the compositions, the means of promotion of the oak and the conditions for the preservation of the forest stands for integral.

REFERENCES

1. Chițea Gh., 1997, Biostatistică, Editura Universității Transilvania, Braşov
2. Dorog S., 2004, Influența modului de gospodărire asupra structurii pe categorii de diametre a câtorva arborete din cadrul O.S. Dobreşti U.P. III Vârciorog, Analele Universității din Oradea, Fascicula Silvicultură, vol. IX :57-64
3. Dorog S., 2005, Simularea aplicării răriturilor în câteva goruneto-făgete din U.P. III Vârciorog, Ocolul Silvic Dobreşti Proceedings of the Symposium „Forest and Sustainable Development". Analele Universității din Braşov: 143-148
4. Florescu I., Nicolescu N., 1998, Silvicultura, vol. I – Silvobiologia, Editura Universității Transilvania, Braşov
5. Florescu I., Nicolescu N., 1998, Silvicultura, vol. II – Silvotehnica, Editura Universității Transilvania, Braşov
6. Giurgiu V., 1972, Metode ale statisticii matematice aplicate în silvicultură, Editura Ceres, Bucureşti
7. Giurgiu V., 1979, Dendrometrie şi auxologie forestieră, Editura Ceres, Bucureşti
8. Giurgiu V., 2004, Silvologie III B, Gestionarea durabilă a pădurilor României, Editura Academiei Române
9. Kevin O. L., 1998, Silviculture for Structural Diversity: A New Look at Multiaged Systems, Journal of Forestry, Vol. 96, Number 7 , p. 4-10, 1998
10. Leahu I., 1993, Un model matematic adaptativ al producției pe număr de arbori în codru regulat, Comunicare ASAS, Bucureşti
11. Leahu I., 1998, O expresie matematică a legăturii dintre valorile relative ale unor caracteristici biometrice în arboretele echiene, Revista de silvicultură a studentului Transilvaniei nr. 2(8) anul III
12. Leahu I., 2000, Un model de simulare pentru determinarea efectului măsurilor silvotehnice aplicate, Buletinul Ştiințific, Universitatea din Oradea
13. Leahu I., 2001, Amenajarea pădurilor, Editura Didactică şi Pedagogică, Bucureşti