APPLICATION ASPECTS OF THE REGENERATION FELLINGS IN PURE STANDS OF UP II ZIMBRU, OS GURAHONT, DS ARAD

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Abstract
The process of regeneration of forest stands is the link of connection between generations that ensures continuity of forest. Regeneration of forest stands raises pure questions of composition and structure respectively. In the UP II Zimbru, OSGurahont, DSArad pure forest stands are the beech stand hill occupying a large area of management unit. Pure forest stands that regenerates the beech forest of the UP II Zimbru will apply group shelterwood system which is recommended by technical standards and which is suitable for environmental conditions. Pure forest stands of beech regeneration success depends on the fruit-body, accessibility and that of the driving of the works.

Key words: pure stand, regeneration, shelterwood, fruit-body, accessibility, enviromental conditions

INTRODUCTION

Beech forest are relatively simplified stand structure, have a rich genetic polymorphism and a high resistant to abiotic and biotic factors unhealthy which gives them a remarkable stability of the ecosystem (from Florescu, Nicolescu 1998, after Giurgiu, 1988, Stanescu was, in 1997) .

Beech species presents a high resistance in the shade of beech and a high sensitivity especially seedlings phase at heat, drought, frosts. This makes regeneration not to produce safe than protective shelter of the massive parent. As we know has ties pivoting beech and numerous lateral roots, which causes the system to perform a role beech stand protective unequal order water and anti-erosion.

Beech which occupies about 30% of forest is also recognized for high production of wood as the many uses of wood. Following the operation and recovery beech forest wood have now been priority concerns for conservation and management and balanced beech forest must become the priority in perspective. By the way have been managed, currently stands meet the most varied structures, pure or mixed pluri even-aged or even-aged (stand), with similar production potential trustworthiness stationed or anthropogenic degraded.

Therefore in the future to make complex issues related to conservation management of natural ecosystems beech forest who have fully preserved the structure and functionality, but also the structural recovery of the course become inadequate but avoiding the mistake committed by substituting one beech stand without ecological analysis and economic thoroughly motivated.

Beech realize abundant at 4-6 years, disseminate easily, but only at small distances due to larger size and weight of seeds. Quality germ seed is high. The seeds are eaten by mice and wild boars. Seedlings installed fine shading support the relatively long periods (20-30 years). Their development is very uncertain in the open grounds.

Following treatments with clear cutting in beech forests are contraindicated. It stressed that the shelter seedling beech grows more active than pine or spruce stands but more intensive thinning from the start can be overcome by the larch or pioneer species

(Populus tremula, Salix caprea, Betula pendula, Carpinus betulus). Beech seedlings injured may recover by cutting-back or self cutting-back. Technical rules in force provide for selection system, gardening works towards transformation of the cvasiselection system, group shelterwood system, uniform shelterwood system.

MATERIAL AND METHODS

Objectives of case study aims to investigate the phenomenon forestry possibilities in structural and functional complexity and technical decisions that are required to be implemented to realize the objectives of forestry household.

Following a diagnosis will be achieved silvotechnics to be justified on the basis of technical measures proposed. Also will examine the possibilities of implementation in current practice of proposed solutions at the realization that the case study and sustaining technologies which can effectively serve current needs.

The case study was done in stand compartment 49A which is engaged in forest exploitation-regeneration process included in the management plan.

Research methods used in conducting the case study:

-Counting statistics of forest stands

-Observations on the itinerary and stationary in regeneration points, and considering the implementation of interventions and improvement cutting .

-Simulation is to use specialized soft - PROARB regeneration fellings in the simulation.

-The comparison was done using tables of production, forest management plans and specialized software – FOND, Excel tool for analysis of objective reality on the ground reported in normal conditions.

Inventory partial (or selective statistics) is based on the consideration that the stand is a population statistic.

In this context all samples plot (SSpi = E) is the sample selection or a community that is extracted from the population.

Statistical-mathematical analysis carried out on observations obtained by sampling is to inform the closeness of the sample and the population in terms of a sample plot and the population.

The main aspects of statistical inventories are:

- the form of the sample plot;
- size of the sample plot;
- number of sample plot;
- module location of the sample plot.

In form of sample plot have experienced a number of forms as follows: square, rectangle, circle. It was found that the most commonly used is the circular.

About the optimal size of the circular sample plot was shown that the value of such areas should be between 100-500 m^2.

In this case study were taken from the sample plot of 500 m^2 (for even aged-stand exploitable consistency between 0,5-0,6), with variable radius, depending on the inclination of the land.

Number of sample plot was determined by the formula:

$$n = \frac{t^2 \times s_{\%}^2 \times F}{F \times \Delta_{\%}^2 + t^2 \times f \times s^2{}_{\%}} \qquad (1)$$

where:

-n- number of surveys;

-d- distance between sampling;
-F- stand area;
-$\Delta_{\%}$- allowable tolerance;
-t-coverage probabilities corresponding coefficient taken into account;
-f- place the sample size;
-$s_{\%}$- coefficient of variation of volumes on the stand (the statistical unit instead of sample).

RESULTS AND DISCUSSION

In table 1 presented aspects of establishing experimental device to collect field data.

Table 1

Data on implementation case study

No.	No. u.a.	Surface u.a. [ha]	Survey form	n d[m]	Area survey [m^2]	No. trees inventoried / surveys
1	49A	48,7	Cerc	19 163	500	255

Following were located a total of 19 sample areas of 500 m^2 on a 163 m distance between the centers of the sample plot, inventory is a total of 255 trees.

Table 2

Track of the number of trees, basal area and volume on categories of diameter and species per hectare in the stand of u.a. 49A

D(cm)	Stand (buc/ha)	G_{stand} (m^2/ha)	V_{stand}(m^3/ha)
10	0	0	0
12	1	0.011	0.053
14	2	0.03	0.178
16	7	0.14	0.952
18	6	0.15	1.17
20	6	0.186	1.608
22	7	0.266	2.478
24	11	0.495	4.994
26	14	0.742	7.952
28	10	0.62	6.96
30	16	1.136	13.424
32	23	1.84	22.908
34	17	1.547	19.839
36	11	1.122	14.894
38	14	1.582	21.77
40	16	2.016	28.352
42	13	1.807	26.039
44	8	1.216	18.008
46	8	1.328	20.104
48	8	1.448	22.336
50	11	2.156	33.946
52	8	1.696	27.168
54	10	2.29	37.23
56	7	1.722	28.462
58	3	0.792	13.278
60	2	0.566	9.604
62	3	0.906	15.588
64	3	0.966	16.818
66	1	0.342	6.035
68	3	1.089	19.44

70	0	0	0
72	4	1.628	29.7
74	0	0	0
76	1	0.454	8.442
78	0	0	0
80	0	0	0
82	0	0	0
84	0	0	0
86	0	0	0
88	1	0.608	11.94
Total	**255**	**32.897**	**491.67**

Results of primary data processing using the general fund and yield- tables are presented in table 2.

Index of density on number of trees has a value of 0.63, the index of the basal area density has a value of 0.80 and the density index has a value of 0.77 as a result studied stand is less dense, the map regeneration felling.

Graphic representation of the number of trees per diameter category is presented in the figure 1.

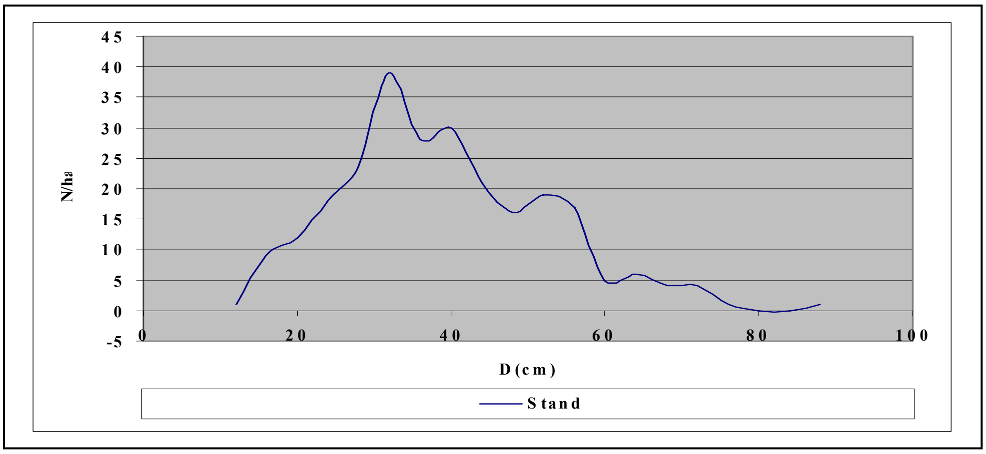


Fig. 1. Distribution of the number of beech trees of the species into categories of diameter, per hectare in the stand of u.a. 49A

Analyzing the diagram in figure 1 note that the stand of beech u have at least three elements of stand structure with its tendency to diversify.

Intensity intervention on number of trees - $I_{N\%}$ proposed for the stand from u.a. 49A is 43%;

$$-I_{N\%} = \frac{109}{255} \times 100 \cong 43\% \,;$$

The intensity of the proposed intervention basel area - $I_{G\%}$ for the stand of u.a. 49A is 38%;

$$-I_{G\%} = \frac{12{,}461}{32{,}897} \times 100 \cong 38\% \,;$$

The intensity of the proposed intervention on the volume - $I_{V\%}$ from de stand u.a. 49A is 38%;

$$-I_{V\%} = \frac{185,984}{491,67} \times 100 \cong 38\%.$$

The analysis of diagrams in figure 2 is observed dynamics on the number of trees in diameter classes of stand u.a. 49A where will be realised group shelterwood system.

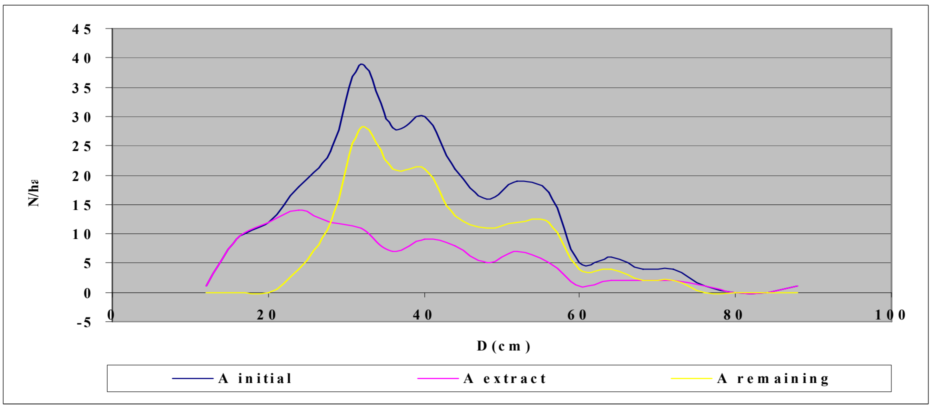


Fig. 2. Dynamic number of trees on the categories of diameter, per hectare in the stand of u.a. 49A, which will be made by groupsfelling

To simulate application in stand regeneration fellings from u.a. 49A was being used PROARB, raw data is presented in the tables 3 and 4.

Table 3

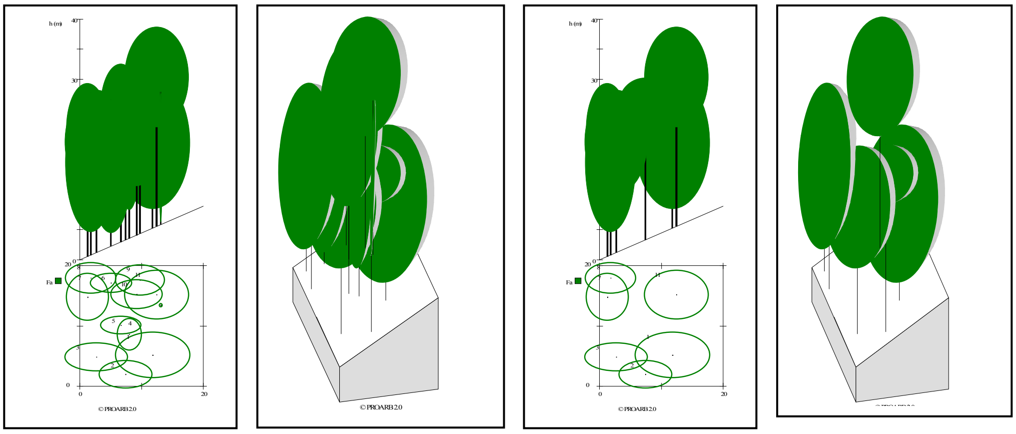
Before intervention

Data on standing trees								
No. crt.	**X (m)**	**Y (m)**	**Dc1 (m)**	**Dc2 (m)**	**H (m)**	**He (m)**	**Species**	**No. trees** 12
1	11.78	5.209	12.04	7.529	25.2	3.2	Fa	
2	7.403	2.01	8.525	4.579	26.9	18.4	Fa	**Slope** 24
3	2.638	4.875	10.13	4.606	27	9.8	Fa	
4	7.979	8.629	3.928	5.27	28.5	4.8	Fa	**Length profile** 20
5	6.624	10.134	6.53	2.93	29.6	15.2	Fa	
6	5.02	17.198	6.68	3.126	24.3	2.3	Fa	**Width profile** 20
7	1.241	14.825	6.82	7.776	28.8	13.6	Fa	
8	1.744	17.999	8.135	5.12	27	3.9	Fa	
9	9.732	17.637	7.955	5.03	29.3	9.1	Fa	
10	9.166	15.297	8.281	4.86	28.9	8.2	Fa	
11	12.433	15.217	10.324	8.11	33.2	16.5	Fa	
12	13.103	13.481	0.5	0.5	22.1	0.5	Fa	

Table 4

After intervention

Data on standing trees								
No. crt.	**X (m)**	**Y (m)**	**Dc1 (m)**	**Dc2 (m)**	**H (m)**	**He (m)**	**Species**	**No. trees** 6
1	11.78	5.209	12.04	7.529	25.2	3.2	Fa	
2	7.403	2.01	8.525	4.579	26.9	18.4	Fa	**Slope** 24
3	2.638	4.875	10.13	4.606	27	9.8	Fa	
7	1.241	14.825	6.82	7.776	28.8	13.6	Fa	**Length profile** 20
8	1.744	17.999	8.135	5.12	27	3.9	Fa	
11	12.433	15.217	10.324	8.11	33.2	16.5	Fa	**Width profile** 20



a.) Stand before the intervention b.) Stand after the intervention

Fig. 3. Simulation of the intervention in stand of u.a. 49A route to groupsfelling in horizontal, vertical and 3D projections

Simulation results in stand regeneration fellings from u.a. 49A are presented graphically in the diagrams of figure 3.

Following is apparent that follow to ensure favorable conditions seedlings beech stand in the fertile seedling by groupsfelling.

CONCLUSIONS

The analysis of data collected during the study investigated forest stands resulting in a series of useful information on the structure, composition, ecosystem stability of forest stands.

The stand of u.a. 49A was found that the current composition is different from the composition recommended by management plans.

If regeneration fellings first intervention other than these indicators means that the degree of intervention in the stands who interview with intensity.

Seedlings usable is found uniformly distributed edge fertile beech stand is composed of species, presenting a state of active vegetation improvement cutting are needed on an area of about 2.5 ha.

Access to these forest stands was facilitated in the past 10 years through the implementation of forest roads, the reason being able if necessary to achieve a number of works with high intensivity.

Regeneration is present in good condition bio-group of seedling of beech species presents an active force development.

Be avoided where possible sudden illumination, the trunk to prevent the canopy process very common among this species.

It further recommends the development of forest roads which serve forest stands involved in the forest explotation-regeneration, the application of very intensive interventions.

Recovery of wood base material will be delivered by service providers, which would bring added benefit Forest District.

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