STAND REGENERATION TRAITS FROM PRODUCTION UNIT I SÂNIOB, FORESTRY DISTRICT SACUENI, BIHOR FORESTRY DEPARTMENT

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Abstract

Regeneration of stands is an important issue in forest management strategies now and in the future related to state authority (public) for forests.

Within U.P. I Sâniob, O.S. Săcuieni, D.S. Bihor, regeneration of stands has some peculiarities that correlate with their structural, qualitative and synthesis elements , as well as the type of property and the mode of administration.

Stands in the U.P. I Sâniob are grown, created mixed semiartificial having a mixed provenance of the seed and from sprouts. As a result, given the aspects mentioned previously, their regeneration is relatively complex.

To obtain valuable stands from a cultural and economical standpoint, which has a high ecosystem stability, it is necessary to promote regeneration from seed under shelter (where possible) namely promoting high-forest system and in the stands that have been treated (managed) in coppice-system. It is also preferable to promote into culture of indigenous species to the detriment of exotic, which often could become very invasive, with negative repercussions on agricultural lands and forest fund.

A particularly important aspect is the realization of cultivation a natural and/or artificial regenerations down to achievement of close crop. Of these interventions depends largely on the success of regeneration, and respectively the future structure stands.

Currently in U.P. I Sâniob, regeneration of the stands is achieved mixed, the highest proportion having a seed regenerations.

Key words: natural regeneration, seed regeneration, vegetative regeneration, mixed regeneration, high-forest system, coppice-system

INTRODUCTION

Achieving regeneration of stands must complete the process of exploitation-regeneration characteristic appearance and enlightening for exploitable stands.

Currently, considerations of ecological it is desirable and promotion of natural regeneration from seed, especially under shelter at the expense of vegetative regeneration from the stump sprouts or root-shoot (Florescu, Nicolescu, 1996; Florescu, Nicolescu, 1998). In the extreme situation where conditions are not bio-ecologic to achieve natural regeneration (seed) under shelter, may be used the artificial regeneration from seeds, respectively direct sowing and/or plantation of forestry seedlings produced in forest nurseries, bare-root or protected as required (Crainic, 2016).

A necessary condition for receiving natural or artificial regeneration from seed is the presence of abundant fructifications at species of main base and/or mixted, aspect which usually in the current activity of the forestry units it is known (identified) as a fructifications forecast (Nicolescu, 2007).

Therefore, to assess in advance the level of fructification of the stands there are known several methods (opportunities) that are based on the evaluation sprouts with buds of flowering sprouts and of mature seeds, able to germinate. The seed quantity can be measured using special boxes called seminometre or special nets, both of known size, to be able to extrapolate to the unit area-ha (Crainic, 2016; Nicolescu, 1995).

Photo. 1. Specimens of Turkey oak (*Quercus cerris* L.) from the stump sprouts

The stands from the management unit I Sâniob, that have in composition as main basic species a Turkey oak (*Quercus cerris* L.) in 65% they are regenerated from stump sprouts, most of them being the third generation of sprouts on the same stump - photo. 1. Therefore, it is imperative the regeneration from seeds for these stands, by regeneration under shelter and by plantations in those areas where it is not found in proper conditions.

Fundamental natural forest type or axial adequate type established during the management plan provides information on the composition of the

stands which are going to be obtained from natural, artificial or mixed regeneration.

MATERIAL AND METHOD

The case study was performed in a management unit I Sâniob of the range Săcueni Forest District belonging to Bihor County Forest Administration between 2015-2016, and it had as objective the research and analysis of peculiarities of the stands regeneration process.

Photo. 2. Locating study (http://saniob-bh.pe-harta.ro/)

Objectives of the case study refer to study ways of regeneration from seed in the exploitable stands within the management unit I Sâniob, Săcueni Forest District belonging to Bihor County Forest Administration.

For the case study it were used as research methods bibliographic documentation, inpatient observation in stationary, observation on itinerary, statistical and mathematical inventory, integral inventory, experiment, simulation and comparison (Crainic, 2016).

The materials used for the case study are represented by the management plan, forest management map, technical norms, yield tables, tapes graduated millimeter, caliper, dendrometer, telescopic rod graduated millimeter, forms for recording field data and software processing raw data (field data).

For the research, study and analysis of the natural regeneration from seed in the stands involved in the exploitation-regeneration process of the

management unit I Sâniob (***Amenajamentelul unităţii de producţie I Sâniob) were carried out integral, statistical and mathematical inventories in the stands of compartments (u.a.) 36A, 40A, and 46A%.

During inventories, it was measured breast height diameter $d_{1,30}$ (at a height of 1.30 to collar - Giurgiu, Decei, Armăşescu, 1972) with caliper , it was established the species, quality class, state of vegetation. Also it was assessed and was recorded in digital format and usable seedling situation that is installed in the regenerated portions.

For the simulation structure in horizontal, vertical and perspectives (3D) section of the studied stands using the PROARB 2.1 program (Popa, 1999), were made rectangular sample plots, which have materialized the corners with wood bornes. It was established a corner as a center rectangular system of coordinates in local plan a sample plot and the two axes - respectively OX and OY. As a result, for each exemplary of the sample plot were recorded in field sheet the following: X and Y coordinates, crown diameters on direction OX and OY, total height, pruned height and species.

Also it was measured the length and width of the sample plot and the average slope of it to, while being then entered the total number of trees from the sample plot.

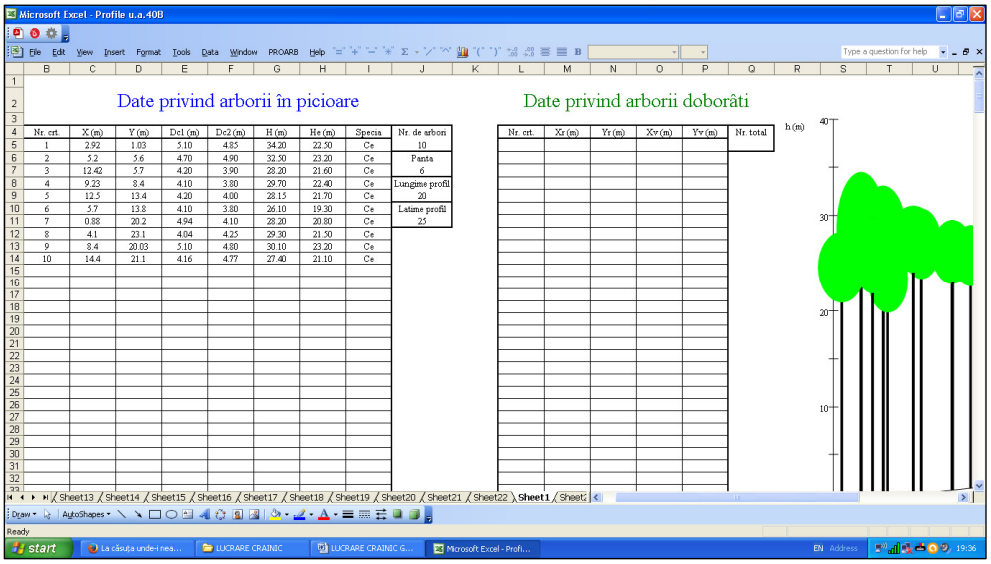

Photo. 3. The program interface PROARB 2.1

Achieving experimental distributions of the trees number on diameter-class and species per hectare and preliminary calculations was performed with EXCEL (Crainic, 2016).

RESULTS AND DISCUSSION

Data recorded in the field, after inventories in the stands involved in the process of exploitation-regeneration, were primarily processed, on the stand and species. The obtained results were extrapolated per hectare, and are presented in tabular and summarized in the form of diagrams in order to achieve an appropriate silvicultural analysis.

Table 1

Record of the trees number on diameter-class and species from the stand of u.a. 36A

D (cm)	Species (pcs/ hectare)			Stand (pcs/ hectare)
	Ce	Go	Ca	
0	*1*	*2*	*3*	*4*
12	3	0	20	**23**
16	14	0	20	**34**
20	43	6	3	**52**
24	53	0	3	**56**
28	162	3	3	**168**
32	110	10	0	**120**
36	70	9	0	**79**
40	64	0	0	**64**
44	21	0	0	**21**
48	23	0	0	**23**
52	3	0	0	**3**
Total	**566**	**28**	**49**	**643**

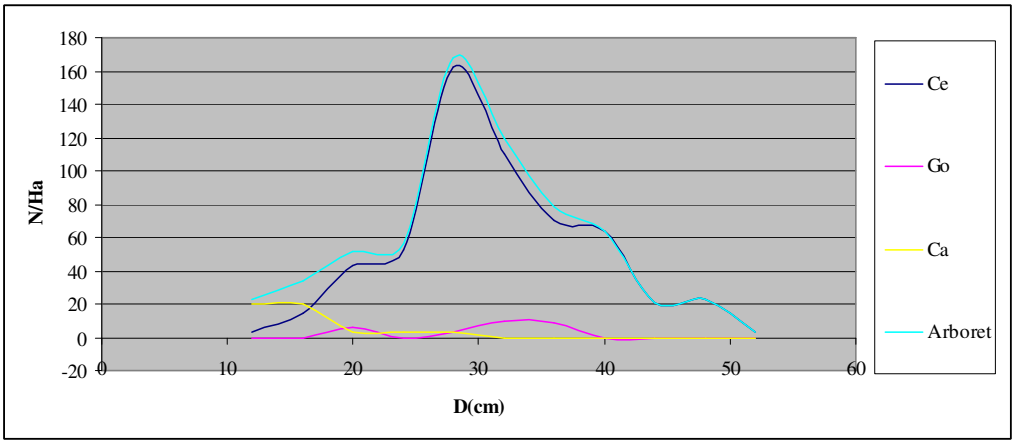

Fig. 1. Distribution of the trees number on diameter-class and species from the stand of u.a. 36A

Analyzing the data in Table 1 and diagrams of Figure 1 can be observed that the stand of u.a. 36A has a composition 9Ce1Ca and disseminated sessile oak, are highlighted several elements for stand.

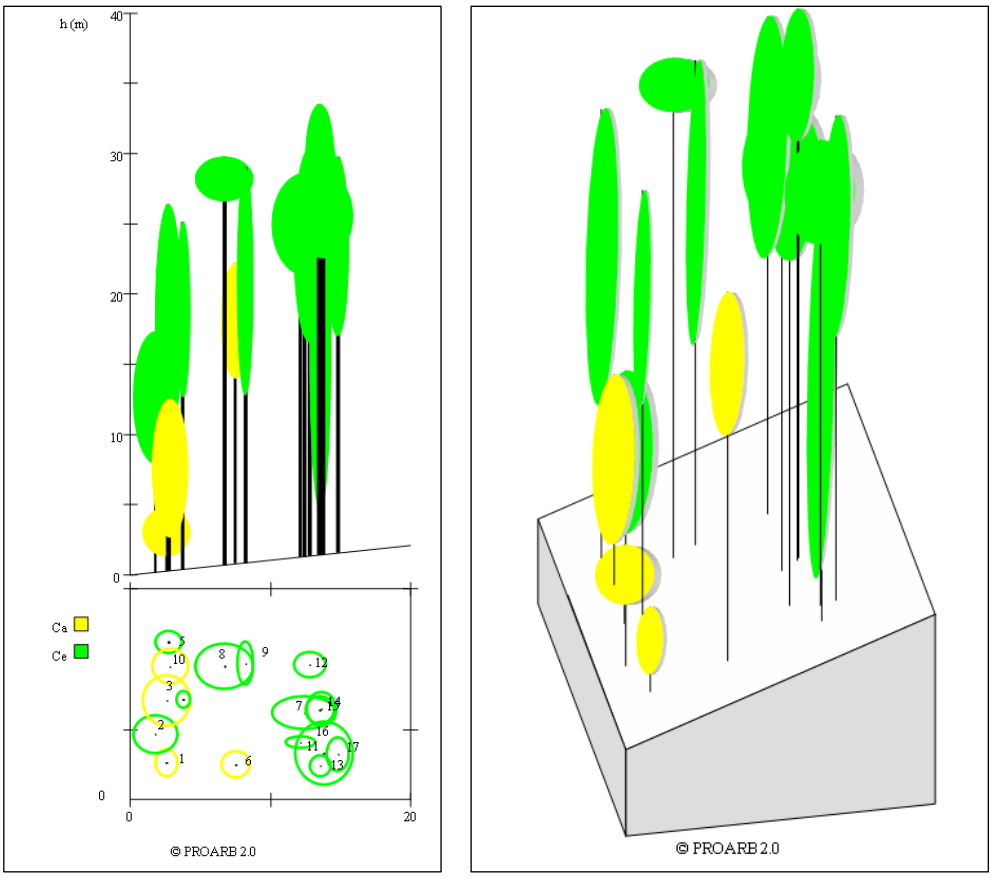

Photo. 4. The horizontal, vertical and 3D profil of the stand in u.a. 36A

Table 2

Record of the trees number on diameter-class and species from the stand of u.a. 40A

D(cm)	**Species (pcs/ hectare)**
	Ce
0	***1***
28	12
32	48
36	56
40	36
44	12
48	4
Total	**168**

Analyzing the profiles from Photo. 4 it is found that the stand of u.a. 36A although it has a relatively high density there are areas where crown

density is low and are optimal conditions for the installation, growth and development of natural regeneration.

Analyzing the data from Table 2 it is found that the stand from u.a. 40A is pure and has the composition10Ce, being evidenced the presence of a single element by stand (Figure 2). The number of trees per hectare when carrying out inventory is 168 pieces, stand density is relatively low.

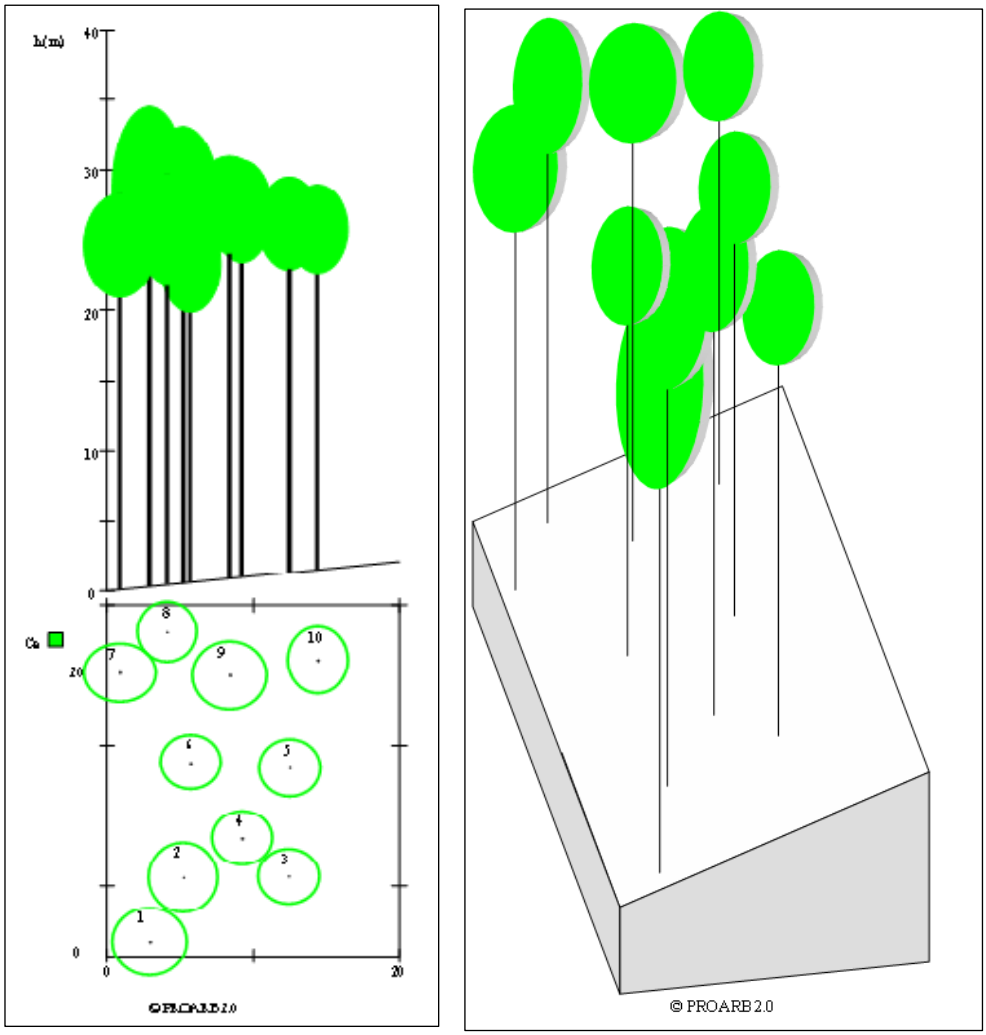

Photo. 5. The horizontal, vertical and 3D profil of the stand in u.a. 40A

From the analysis profiles in Photo. 5 it is found that the stand of u.a. 40A presents a low crown density as a result the seedlings installed naturally benefits from optimal conditions for installation, growth and development.

Analyzing the data in Table 3 and diagrams of Figure 3 it is found that the stand in u.a. 46A has the composition 9Ce1Go and disseminated

European sweet cherry and common hornbeam and has several elements for stand.

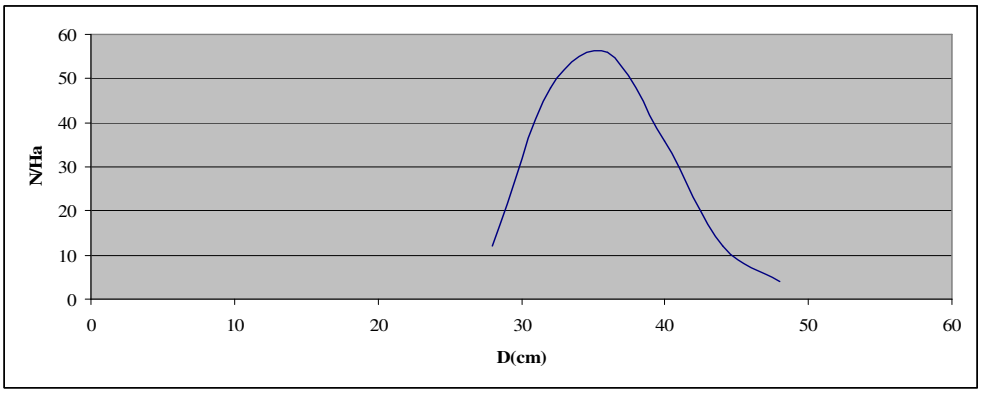

Fig. 2. Distribution of the trees number on diameter-class from the stand of u.a. 40A

Table 3

Record of the trees number on diameter-class and species from the stand of u.a. 46A

D (cm)	Species (pcs/ hectare)				Stand (pcs/ hectare)
	Ce	Go	Ca	Ci	
0	*1*	*2*	*3*	*4*	*5*
20	4	4	8	0	**16**
24	4	0	0	0	**4**
28	36	4	0	4	**44**
32	56	4	0	0	**60**
36	20	0	0	0	**20**
40	28	4	0	0	**32**
44	24	0	0	0	**24**
Total	**172**	**16**	**8**	**4**	**200**

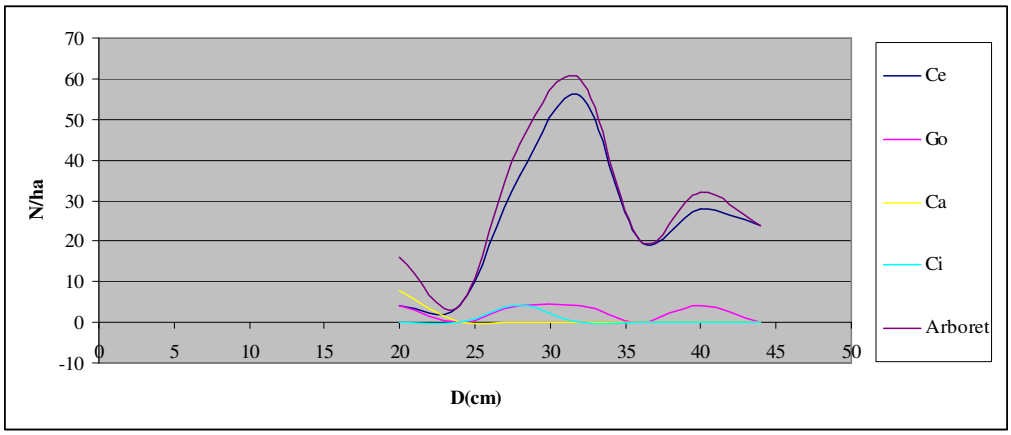

Fig. 3. Distribution of the trees number on diameter-class and species from the stand of u.a. 46A

Analyzing profiles presented in photo. 6 it is found that the stand in u.a. 46A% has in some parts with regeneration a low crown density as a result the seedlings installed naturally benefits from optimal conditions for installation, growth and development.

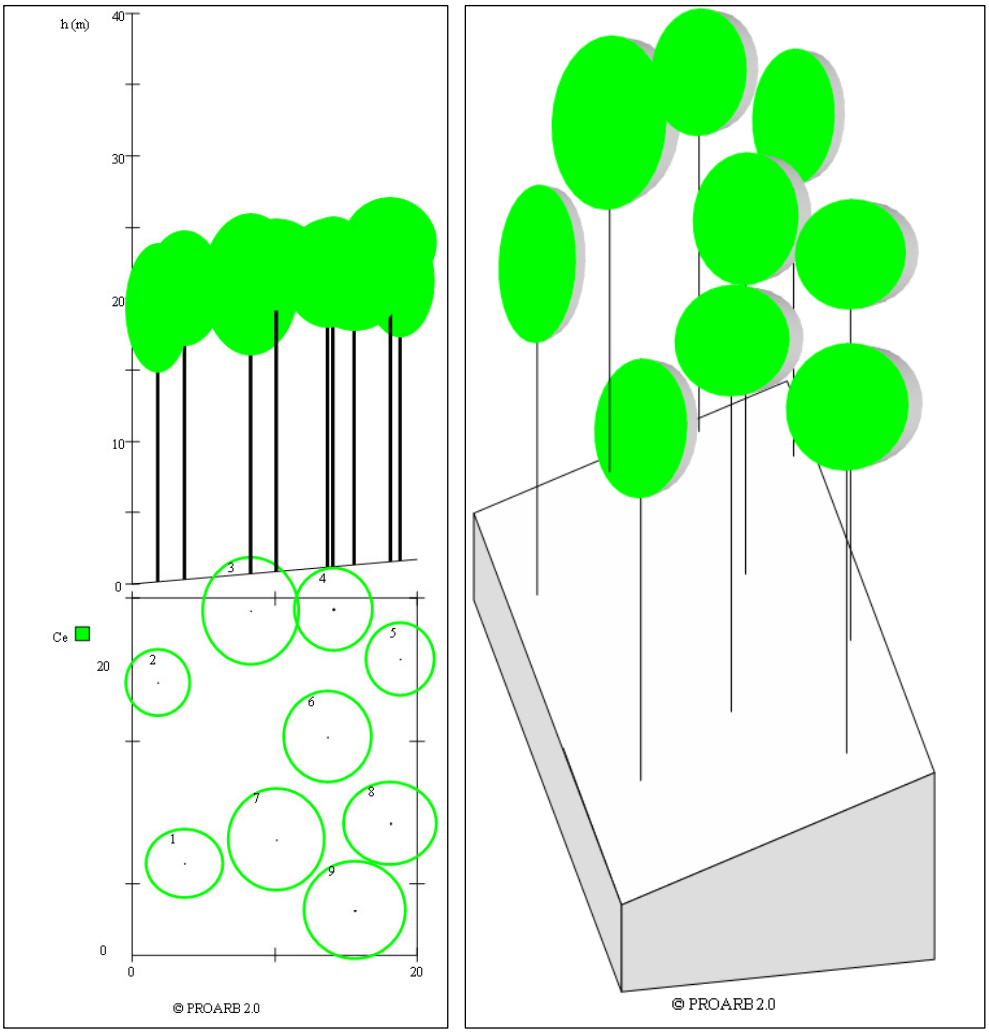

Photo. 6. The horizontal, vertical and 3D profil of the stand in u.a. 46A%

From the data analysis presented above is found that stands which carry out regeneration fellings in the three studied compartments present natural regeneration from seed, usable, on surfaces differentiated by dynamics specific by conducting of specific interventions to each compartment in part.

Also is found to be present of the abundant fructifications at Turkey oak (*Quercus cerris* L.) species, aspects which is an important condition for obtaining a natural regeneration from seed - photo.7 and photo.8.

Photo.7 - Natural regeneration from seed of the Turkey oak (*Quercus cerris* L.) species in the stand of u.a. 46 A% (Photo. Crainic, 2016)

Photo.8 - Natural regeneration from seed of the Turkey oak (*Quercus cerris* L.) species in the stand of u.a. 40 A (Photo. Crainic, 2016)

The presence of undergrowth and an unusable advance growth requires a carrying out of some specific works for fostering the installation and proper development of usable seedlings - photo.7.

For obtaining valuable stands of culturally with high ecosystem stability is necessary to conduct an appropriate composition, in accordance with fundamental natural forest type. In this context it is necessary to introduce species of sessile oak, Hungarian oak and common oak in the future composition of stands in suitable proportions, something which can be achieved by direct sowing and/or beating up.

CONCLUSIONS

Natural regeneration from seed is the most effective method for obtaining valuable stands of oaks, thus promoting *in situ* local provenance.

Conversion by aging represents an effective solution to restore the high-forest system of stands of Turkey oak that were regenerating vegetation (in the stump and root sprouts) for several generations in a row.

For the incorporation in optimal conditions of the seed (acorn) in forest land is necessary an execution of the works of removing an undergrowth and unusable advance growth at the appropriate time, respectively in the vegetate season that is highlighted in an appropriate fructification at species of oaks.

The amelioration of natural regenerations composition of Turkey oak by introducing other native species of oaks is necessary for a superior valorization of silvoproductive potential of the station and maintenance fundamental natural forest type.

The introduction in composition of future stands of species of oaks can be achieved according to practical possibilities, the actual realization of this activity by carrying out direct sowing, achieved grouped in the portions where not found regeneration of the Turkey oak species or it does not present an appropriate density (in optimal period of year in all aspects) and/or by beating up works a natural regeneration of seedlings plantations (with bare-root or protected) obtained from authorized forest nurseries, using consecrated technology work.

Conducting in natural regeneration of oaks an improvement cutting and cultivation, respectively removal of invasion vegetation, cutting-back, is urgently necessary to ensure the realization the close crop in an optimal period.

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