PROSPECTS FOR BEECH GENETIC RESOURCES ADMINISTRATION IN *FĂGETUL SECULAR STUHOASA* NATURAL AREA

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Abstract: The evolutionary study (1965-2005) in *Făgetul Secular Stuhoasa*, Botoşani county, Romania, classified the beech arboretum in the first quality production class with 51,4% proportion of beech *plus* trees. An efficient *in situ* conservation of the beech genetic resources require the elimination of all risk factors which might disturb the genetic integrity in the natural area and then to make ample observations on fructifying regime and studies to estimate the phenotypic or genotypic diversity. The valuable biological material (seeds or cuttings) can be used in afforestation activity and seed orchards establishment in a complex forestry improvement programme.

INTRODUCTION

Beech arboreta in natural area are the most important source for the genetic forestry improvement, providing the most valuable biological material (seeds or cuttings) for seed orchards establishment or afforestation / reforestation activities (3).

In genetic conservation activity, as priority are the marginal or isolated beech arboreta (e.g. in National Park *Munţii Măcinului*,Tulcea county- Romania), also those which are in the extreme north eastern bound of the natural area in our country (1).

The concept *forest genetic administration* comprise the sustainable conservation and utilization words in forest genetic resources field (5).

In this respect, the paper present the evolutionary study of a beech arboretum delimited in the north-east district of Romania and *plus* trees proportion in sustainable administration expectation of beech genetic resources (2).

MATERIALS AND METHODS

The evolutionary study (between 1965-2005) in *Făgetul Secular Stuhoasa*, natural area delimited in north of Botoşani county, Romania, with two forestry units (38C şi 39), contain typical elements to beech proportion evolution, pruning and production class (4).

The proportion of beech *plus* trees in the studied area (number of *plus* beech trees related to the total number of beech trees) has been achieved during October 2013 in 4 testing areas (each one of 500 m^2). The suitable averages on each testing area were generalized on forestry units and whole natural area. The *plus* beech trees were identified and selected based on general criteria as growth rapidity, axle and crown height, pest and disease resistance, abundant fructification and good quality of seeds (6). We have also measured the diameter and height as defining elements of the quality class.

RESULTS AND DISCUSSIONS

Evolution of quality class

According to the *Amenajamentele U.P. VII Suharău 1965-2005*, in 1965 the beech arboreta were classified in the third production class, beech trees having 70 years old and 23m as height average (7). Since 1995 – 2000 period, both beech arboreta (100 -110 years old) are classified in the first quality production class, the beech trees measuring 33 m on an average (fig.1). This is a spectacular evolution of the production class registered in a beech arboretum situated in the extreme north eastern bound of it natural area. Owing to the exceptional genetic potential, since 2005, these forestry units turned into the *Făgetul secular Stuhoasa* natural area.

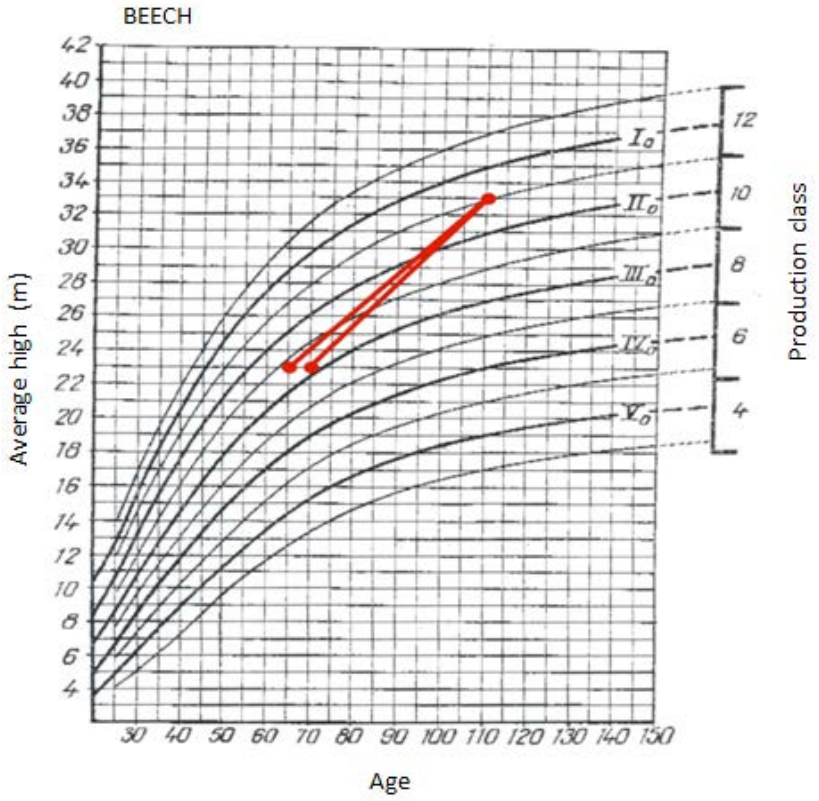

Fig. 1 The quality class evolution of the *Făgetul secular Stuhoasa* natural area between 1965-2005

Proportion of beech *plus* trees

Related to the proportion of beech plus trees, data registered in table 1 indicate 62,5% and 45,5% on an average in the two testing areas, respectively 52,6% for the first forestry unit (38C) and 50,0% for the second forestry unit (39). In the whole natural area we estimated 51,4% as general average of the proportion of beech *plus* trees. As measured characteristics we notice that the general average of diameter and height - 69,8 cm, respectively 35,3 m – represent an exceptional evolution for a beech arboretum growing in the extreme north eastern conditions.

Table 1 Field notebook with results of the beech *plus* trees study

Forestry unit - f.u.	Testing area	Beech trees total nr.	Beech *plus* trees	Proportion of beech *plus* trees (%)	Diameter (cm)	Height (m)
1	2	3	4	5	6	7
38C	1	8	1		74	37,0

Forestry unit - f.u.	Testing area	Beech trees total nr.	Beech *plus* trees	Proportion of beech *plus* trees (%)	Diameter (cm)	Height (m)
			2		68	36,0
			3		66	35,5
			4		70	35,0
			5		66	35,0
	Total nr./average	**8**	**5**	**62.5**	**68,8**	**35,7**
	2	11	1		64	34,5
			2		70	36,5
			3		72	36,0
			4		66	34,5
			5		62	34,0
	Total nr./average	**11**	**5**	**45,5**	**66,8**	**35.1**
Total nr./average on f.u 1		**19**	**10**	**52.6**	**67.8**	**35.4**
39	3	8	1		76	36,5
			2		70	35,0
			3		72	35,0
			4		66	34,5
	Total nr./average	**8**	**4**	**50.0**	**71,0**	**35,2**
	4	8	1		74	35,5
			2		76	35,5
			3		72	36,0
			4		68	35,0
	Total nr./average	**8**	**4**	**50.0**	**72,5**	**35,5**
Total nr./average on f.u. 2		**16**	**8**	**50.0**	**71,8**	**35,3**
Total nr./average on nat. area		**35**	**18**	**51,4**	**69,8**	**35,3**

Administration of beech genetic resources

Threats to genetic diversity

Some risk factors as surface erosion, intense drought which cause the trees drying, illegal trees cuttings or an intensive seeds harvesting, might disturb the genetic integrity in the natural area *Făgetul Stuhoasa – Suharău* , all above mentioned factors hindering a normal natural regeneration evolution.

Conservation of beech genetic resources

First of all, it is necessary to eliminate the risk factors mentioned already to efficiently use some immediate and permanent measures to protect and conserve the beech genetic resources in natural area *Făgetul Stuhoasa – Suharău*. In this respect, it is necessary to prohibit animals access (especially during the natural regeneration period), to stop the intensive beech nut harvesting and no trees cuttings. For long term conservation it is necessary to make ample observations on fructifying regime and studies to estimate the phenotypic diversity (observations and measurements) or genotypic diversity (electrophoresis analyses).

Utilizations of beech genetic resources

After the evaluation of the genetic diversity in beech arboretum of the natural area *Făgetul Stuhoasa – Suharău* and taking the appropriate measures to protect the beech germplasm stock we can for long term to use a valuable biological material (seeds or cuttings) for afforestations and seed orchards establishment in a complex forestry improvement programme.

CONCLUSIONS

The quality class registered in 35 years a meaningful evolution for a beech arboretum situated in the extreme north eastern bound of it natural area in Roamania, respectively from the third to the first production class.

The proportion of beech *plus* trees estimated in the two forest units of the natural area *Făgetul Stuhoasa – Suharău* is over 52% (in the first surface/38C) and 50% (in the second surface/39) and about 51, 4% in the whole natural area.

The conservation of the beech genetic resources include immediate measures/ ban of the animals access or the intensive beech nut harvesting, no trees cuttings and for long term complex measures/ studies on fructifying regime and quality seeds control or studies to estimate the phenotypic and genotypic diversity.

The utilization of the beech genetic resources in the studied natural area include the capitalization beech seeds and cuttings for afforestation and forestry genetic improvement.

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