Cercetări Agronomice în Moldova
Vol. XLIII , No. 1 (141) / 2010

PERCENTAGE OF ELITE (*PLUS*) TREES IN NORWAY SPRUCE AND SILVER FIR SEED RESERVATION

L. FĂRTĂIŞ[*], I.M. RÎŞCA, D. TEODOROVICI

"Ştefan cel Mare" University of Suceava

Received October 2, 2009

ABSTRACT- Following some studies concerning the importance of the elite trees in the activity of genetic forestry improvement, in this scientific paper we have studied the percentage of the elite (*plus*) trees in Norway Spruce and Silver fir seed reservations. Such samples are usually found in the dominant forestry floor, exceeding the neighbouring trees by rapidity of growth, trunk straightness and increased resistance against pests and diseases. The total number of elite (*plus*) trees in the three testing areas was of 19 samples, 16 of them belonging to Norway Spruce and three to Silver fir trees. The total number of inventoried trees was 66 (57 Norway Spruce and nine Silver fir trees). All the elite trees belonged to the first quality class. The results of this study have shown that the analysed arboretum could be considered as an important seeds and cuttings purveyor in the afforestation activity, as well as for the conservation of the most valuable forest genetic resources.

Key words: seed reservation, *in situ* conservation, forest genetic resources (FGR)

REZUMAT - Ponderea arborilor *plus* în cadrul unei rezervaţii de seminţe de molid şi brad. Pornind de la unele studii privind importanţa pe care o au arborii *plus* în cadrul procesului de ameliorare genetică forestieră, în această lucrare s-a luat în studiu şi s-a precizat ponderea pe care o deţin arborii *plus* de molid şi brad în cadrul unui arboret natural, cu statut de rezervaţie de seminţe. Astfel de exemplare de arbori se găsesc, de regulă, în etajul forestier dominant, depăşind celelalte exemplare vecine prin rapiditatea de creştere, rectitudinea tulpinii şi printr-o crescută rezistenţă la boli şi dăunători. Numărul total de arbori *plus* în cadrul celor trei suprafeţe de probă luate în studiu a fost de 16, din care 13 la molid şi trei la brad. Numărul total de arbori inventariaţi a fost de 66, din care 57 molizi, respectiv nouă de brad. De remarcat faptul că toate exemplarele de arbori *plus* aparţin clasei I de calitate. Rezultatele acestui studiu demonstrează faptul că arboretul analizat constituie un important furnizor de seminţe şi butaşi de calitate pentru activităţile de reîmpădurire şi conservare a unui fond valoros de germoplasmă forestieră.

[*] E-mail: fartaisliviu@yahoo.com

Cuvinte cheie: rezervație de semințe, conservare *in situ*, fond de germoplasmă forestieră (FGR)

INTRODUCTION

The elite (*plus*) trees are very important for the genetic forestry improvement, providing the most valuable biological material (seeds or cuttings) for afforestation. These samples are usually situated in the dominant forestry floor and exceed their neighbours by growth rapidity, trunk straightness, cylinder-like trunks, and an increased resistance in pests and diseases (Nanson, 2005).

General criteria for the identification and selection of elite (*plus*) trees are growth rapidity, axle and crown shape, wood quality, pest and disease resistance, abundant fructification and good quality of seeds (Stănescu, 1983; Stănescu and Şofletea, 1998).

This tree type is the essential element of the 2,313 arboreta – seed reservations that have the function of conserving forest genetic resources (Enescu, 1997). The plus trees are the most important purveyors of high quality biological material (seeds, cuttings and grafts) for the creation of populations (orchards) for seed or cutting production in the process of forest genetic improvement (Fărtăiş 2007; Fărtăiş, 2008).

MATERIALS AND METHODS

For this trial, we have delimited three circular testing areas (each one of 500 m^2) in a seed reservation, represented by a mixed arboretum of Norway Spruce and Silver fir trees (MO-A212-14 Iacobeni, Suceava County, of 51.7 ha). For identifying the elite (*plus*) trees, we have used general criteria (above-mentioned) and some special criteria, like crown type and resistance to wind, snow and frost for Norway Spruce, growth rapidity and phytosanitary condition for Silver fir trees. In each testing area, we have identified and recorded the elite (*plus*) trees, which were reported to the total number of trees. We have also drawn the proportion of the elite trees among the mentioned species.

RESULTS AND DISCUSSION

In the first testing area (situated at the slope base of 500 m^2), made of 22 Norway Spruce trees, we have identified four elite trees. Unlike the other two testing areas, only Norway Spruce trees were found in this area. The elite Norway Spruce tree percentage in the testing area was of 18%, of the total number of evaluated trees (22) (*Figure 1*).

The second testing area was delimited in the middle of the slope, five plus Norway Spruce and one Silver fir trees (50 cm diameter and 32.5 height) being identified of the total of 18 trees found in this area. The percentage of the elite trees in this testing area was of 28% for Norway Spruce and of 5% for Silver fir trees (*Figure 2*).

In the third testing area (situated on the upper limit of the slope), we have inventoried 26 trees, seven of them being marked as elite Norway Spruce trees and two of them being elite Silver fir trees. The percentage of

plus trees in this testing area was of 35%.

Figure 4 shows that the percentage of elite trees reported on species was of 84% in Norway spruce and 16% in Silver fir trees.

In all the three testing areas, we have identified a total number of 19 elite (*plus*) trees, of which 13 belonging to Norway spruce and three to Silver fir trees. The highest percentage of plus trees was recorded on the upper side of the slope. The total number of the inventoried trees in the three testing areas was 66 (57 Norway spruce and nine Silver fir trees) (*Table 1*).

We noticed that all the plus trees belonged to the first quality class.

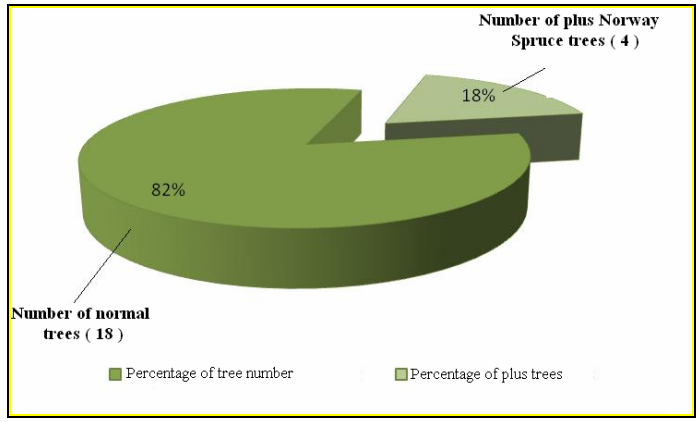

Figure 1 - Percentage of elite Norway Spruce trees in the testing area at the slope base

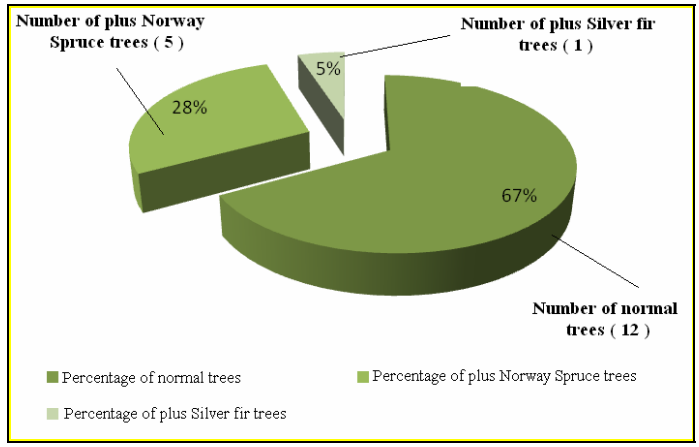

Figure 2 - Percentage of *plus* Norway Spruce and Silver fir trees in the testing area from the middle slope

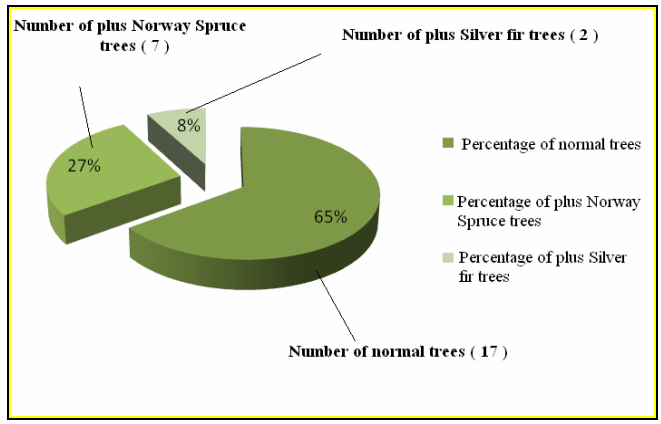

Figure 3 - The percentage of *plus* Norway Spruce and Silver fir trees in the third testing area from the upper side of the slope

Table 1 – Number of trees in the testing areas

Testing area	Tree number			*Plus* trees					
				Total		Norway Spruce		Silver fir	
	Total	Norway Spruce	Silver fir	No.	%	No.	%	No.	%
At the slope base	22	19	3	4	18	4	18	-	-
In the middle of the slope	18	16	2	6	33	5	28	1	5
On the upper side of the slope	26	22	4	9	35	7	27	2	8
General Total	**66**	**57**	**9**	**19**	**100**	**16**	**84**	**3**	**16**

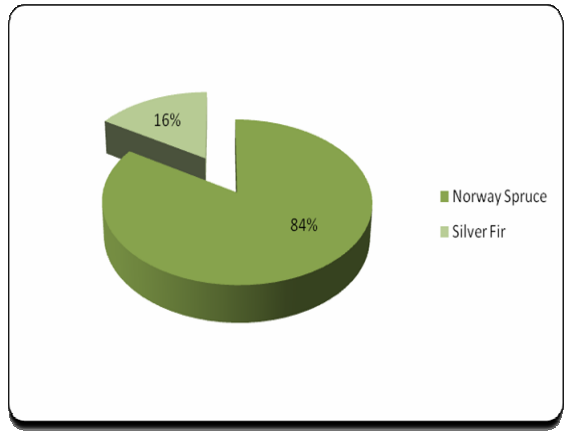

Figure 4 -The percentage of the elite trees on species

CONCLUSIONS

The results of this scientific study have shown that the analysed arboretum was an important purveyor of high quality seeds and cuttings for the afforestation.

This seed reservation is a very efficient way of conservation of the most valuable forest genetic resources.

REFERENCES

Enescu V. et al., 1997 – *Conservarea biodiversității şi a resurselor genetice forestiere (Conservation of biodiversity and forest genetic resources*). S.C. Agris, Red. Rev. Agric., Bucureşti

Fărtăiş L., 2007 – *Conservarea şi utilizarea durabilă a resurselor genetice forestiere (Sustainable usage and conservation of forest genetic resources*). Edit.Univ."Ştefan cel Mare" Suceava

Fărtăiş L., 2008 – *Ameliorarea genetică a speciilor forestiere (Genetic improvement of forest species)*. Edit."Univ.Şt.cel Mare" Suceava

Nanson A., 2004 – *Génétique et amélioration des arbres forestiers*. Les Press Agron. Gembloux

Stănescu V., 1983 – *Genetica şi ameliorarea speciilor forestiere (Genetics and improvement of forest species)*. Edit. Did. şi Ped. Bucureşti

Stănescu V., Şofletea N., 1998– *Silvicultura cu bazele geneticii forestiere (Forestry and forest genetic bases)*. Edit. Ceres, Bucureşti