THE INTERPOPULATIONAL VARIATION OF DIFFERENT FEATURES OF THE BEECH SOURCES IN THE COMPARATIVE CULTURE ALEŞD-POIANA FLORILOR-BIHOR

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Abstract

One of the consequences of the most valuable populations represents the strategy plan of genetically resources utilization for export. It is known that in Romania exist centres of extremely valuable genes, with remarkable growing performances in different sides from Europe. In this way has creating the premises of reproduction forestry materials for enlarging of export with its. This way is available because these premises counting the environment's conservation and durable development principles al global level, which has promoted national strategies and a substantial growing of forest areas.

Key words: survival, forking, standard deviation, average

INTRODUCTION

The research results made till now conduct to knowing of phenotypes variability between some beech's populations, which permit, based on national and international literature, to be elaborated a strategy and policy which could be utilised in amelioration beech process.

MATERIAL AND METHODS

In the comparative culture of descent installed at Poiana Florilor, Aleşd forest management unit, in the Bihor County, where the study material was composed of 31 descents of beech (*Fagus sylvatica* L.), representative for 17 European countries, from almost the entire natural area of the species, including Romania, the seedling plants used in the setting up of the culture were two years old and came from the nursery of the Institute of Forest Genetics in Schalembeck, Germany.

The culture's area of settlement was in the G2 zone–the Apuseni Mountains, the Pădurea Craiului Mountains, subzone G240-hilly beech woods, while the experimental appliance for the culture was a 3x4 rectangular railing, with three repetitions, completely randomized, each unitary lot covering 10x10 m, and being made up of 50 plants placed on five rows with a 2 meter distancing in between and 1 meter distance within the row (Ienciu, Savatti, 2004).

The data that resulted from measuring and observing a population was processed by using the simple analysis of variation in order to emphasize the influence of the comparative culture on the analyzed features (Ceapoiu, 1968; Hatemer, 1991; Madsen, 1995).

The main statistical parameters were calculated for each of the analyzed features: the average, the standard deflection, maximal and minimal values, the amplitude of variation, the variance and the coefficient of variation. The data was analyzed according to the STATISTICA program (Complet Statistical System, StatSoft, Inc., 1991; Şofletea, 2005).

RESULTS AND DISCUSSION

Measuring and observations were performed 5 years after planting and the following features were taken into account: survival (%), total height (cm), base diameter (cm) and forking (indices). The values measured in percents were transformed in arc sin √x, the rest of the results being processed by means of statistical mathematics (Kleinschmit, 1985).

The statistic parameters were established (Urechiatu, 1988; Enescu, 2002; Lazăr, 2008) for the study of the interpopulational variation of different measured and observed features (table 1).

Table 1

Feature	Average	Minim	Maxim	Standard deviation	Variance	Coefficient of variation
Survival	59,094	26,560	90,000	14,598	213,127	24,703
Total height	122,774	46,000	252,000	52,788	2786,655	42,996
Base diameter	9,697	3,330	20,200	3,292	10,839	33,948
Forking	0,335	0,000	2,000	0,264	0,070	78,805

The statistic parameters regarding the measured and observed features of the beech sources in the comparative culture Aleşd-Poiana Florilor-Bihor was:

Survival. It was noticed that the interpopulational variation of this feature is large, the coefficient of variation exceeding 20%. This feature presents a distribution of the variation classes with deviations from the normal curve with more than 25% of the number of observations made in a single class (fig.1).

This distribution with deviations from the normal is assigned to the different adaptation capacity of the sources to the stationary conditions of the culture, as well as to the development of the environmental factors in the period in which the observations and measurements were carried out.

The statistic indicators have pointed out some sources, that is, the sources 17-Westfield (2002)-Great Britain, 39-Jaworze 178 F-Poland, 52-Magyaregregy-Hungary and 69-Sucha-Poland, which have survival percents around the average, but they have very narrow variation amplitude of the individuals, which means a limited interpopulational genetic variation (fig.2).

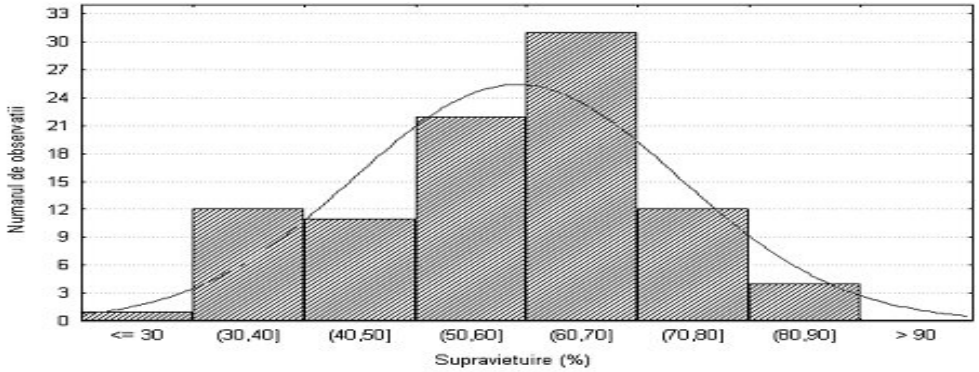

Fig.1 The distribution of the variation classes of the survival in the comparative culture of beech sources Aleşd-Poiana Florilor-Bihor

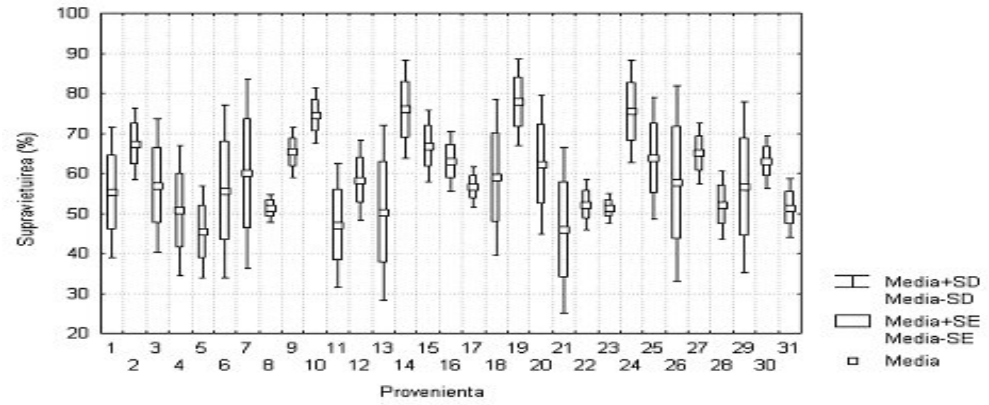

Fig.2 The variation of the survival of the beech sources in the comparative culture Aleşd-Poiana Florilor-Bihor

However, the sources 13-Soignes-Belgium, 14-Aarnik-Netherlands, 34-Oberwil-Switzerland, 40-Tarnava 81 C-Poland, 48-Jablonec N.N.-Czechoslovakia, 49-Brumov-Sidonie- Czechoslovakia, 57-Gramaticovo-Bulgaria and 67-Bilowo 115, 116-Poland presents a very wide interpopulational genetic variation of this feature.

The local population, that is, 72-Bihor-Izbuc-Romania has presented amplitude of average variation of this feature. The highest percents of survival were recorded in the case of the sources 34-Oberwil-Switzerland, 1-Perche-France, 54-Idrija-DJ 2, 14-Slovenia and 37-Val di Sella-Italy. The source 49-Brumov-Sidonie-Czechoslovakia recorded the smallest percents of survival and thus it turned out to be the less adapted to the environmental conditions. Regarding the source 72-Bihor-Izbuc-Romania, although it is a local population, it had survival values under the average of the experiment.

Total height. For this feature it was noticed that the interpopulational genetic variation is very wide, the coefficient of variation being of 2,996%. The distribution of the variation classes for this feature also deviates from the normal curve, the deviation sometimes exceeding 45% of the number of observations of a single class (fig.3).

This distribution with deviations from the normal is due to the different origin of the sources used in the experiment, which cover almost the entire natural area of the beech in Europe, thus their behaviour will be different in certain distinct stationary conditions.

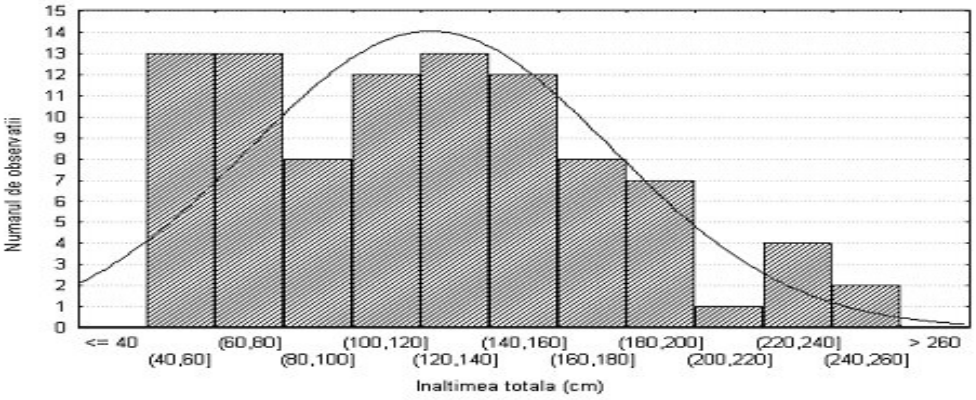

Fig.3 The distribution of the variation classes of the total height in the comparative culture of beech sources Aleşd-Poiana Florilor-Bihor

It was noticed that there are sources, 54-Idrija-DJ 2, 14-Slovenia and 72-Bihor-Izbuc-Romania, which have very narrow amplitude of variation of the individuals, which means a limited interpopulational genetic variation of these sources (fig.4).

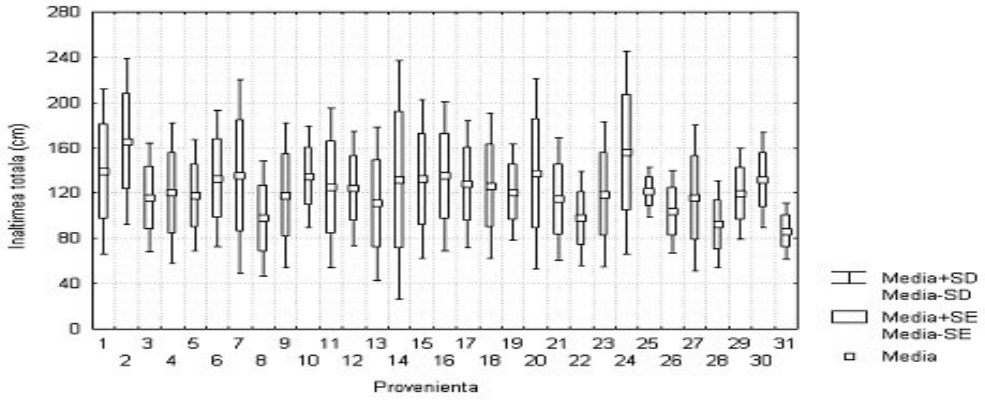

Fig.4 The variation of the total height of the beech sources in the comparative culture Aleşd-Poiana Florilor-Bihor

On the other hand, some sources had wide and very wide amplitude of variation of this feature, like the sources 14-Aarnik-Netherlands, 35-Hinterstader-Austria, 48-Jablonec N.N.-Czechoslovakia and 53-Postojna Masun.-Slovenia. The other tested sources had average amplitude of variation of this feature. The highest total heights were recorded in the case of the sources 39-Jaworze 178 F-Poland and 37-Val di Sella-Italy.

It must be noticed that the source 37-Val di Sella-Italy presented also high percents of survival, thus, this source not only has adapted well to the environmental conditions, but it presents also good growth performances. The local population 72-Bihor-Izbuc-Romania had values of the total height over the average of the experiment.

Base diameter. The variation of this feature was large, the coefficient of variation being of 33,948%. The distribution of the variation classes for this feature is close to the normal one, the deviations from the normal not exceeding 15% of the number of observations in a single class (fig.5).

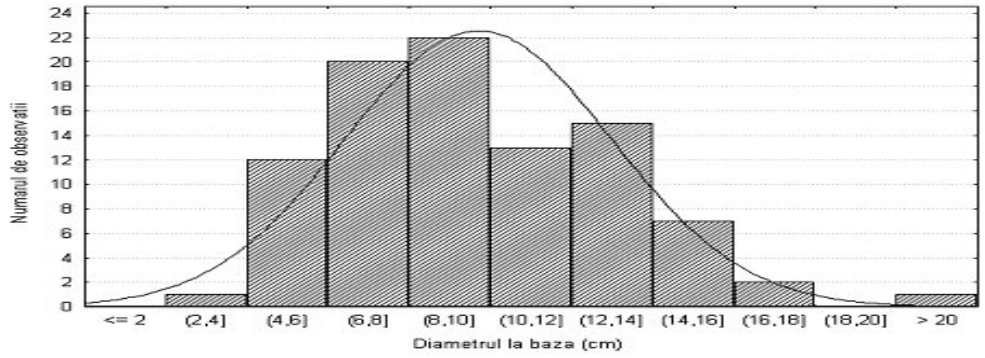

Fig.5 The distribution of the variation classes of the diameter at the base in the comparative culture of beech sources Aleşd-Poiana Florilor-Bihor

It was noticed that the sources 23-Torup-Sweden, 52-Magyaregregy-Hungary and 58-Maglij-Bulgaria have very small amplitude of variation of this feature, which means that the interpopulational variation of this feature is limited (fig.6).

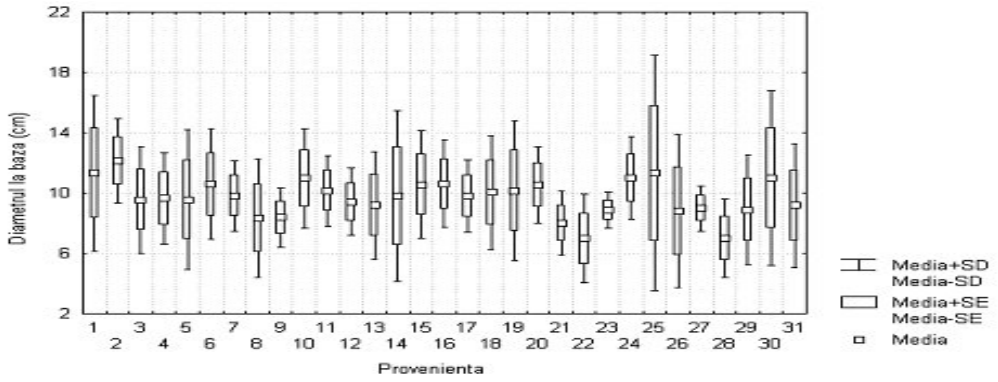

Fig.6 The variation of the diameter of the base of the beech sources in the comparative culture Aleşd-Poiana Florilor-Bihor

Also, there are some sources, like 1-Perche-France, 35-Hinterstader-Austria, 54-Idrija-DJ 2, 14-Slovenia and 69-Sucha-Poland which present wide amplitude of variation of this feature. The Romanian source presented for this feature an average amplitude of variation.

The highest values of the diameter at the base were recorded in the case of the sources 36-Eisenerz-Austria, 39-Jaworze 178 F-Poland, 37-Val di Sella- Italy and 67-Bilowo 115, 116-Poland. Also in this case, the source 37-Val di Sella-Italy had a good behaviour, with high values also for this feature. The source 72-Bihor-Izbuc-Romania had also for this feature values slightly over the average of the experiment.

Forking. It was noticed that the interpopulational variation of this feature was very wide, the coefficient of variation being of 78,805%.

It was also noticed that none of the sources is made up entirely of non-forking trees, most of the forking trees being observed in the case of the population 37-Val di Sella-Italy, half of the trees being forking.

The Romanian source presented values slightly over the average of the experiment for this feature.

CONCLUSION

Regarding the adaptation features, that is, survival, it was noticed that the variation of this feature was wide in the culture Aleşd-Poiana Florilor. The amplitude of variation of the individuals was very different form one source to another, varying from very narrow to very wide, thus, a different interpopulational genetic variation.

For the quantitative features of the trunk, the interpopulational genetic variation was very wide in this comparative culture. Like in the case of survival, the amplitude of variation of the individuals was very different from one source to another, varying from very limited to very wide.

In the case of some qualitative features of the trunk, like the forking, the interpopulational genetic variation was very wide in the studied comparative culture. There was no source made up entirely of non-forking trees.

In conclusion, the local population, that is, 72-Bihor-Izbuc-Romania displayed, generally, values of the studied features over the average of the experiment, being placed together with other local sources in the category of the local populations with possibilities to be used as forest materials for reproduction.

It was noticed that the interpopulational variation at the level of all the studied populations, was very different from one feature to the other, on age groups and production classes, this study being important for the knowledge of the extremely valuable genetic patrimony, which this species of trees has.

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