CORRELATIONS BETWEEN OBSERVED CHARACTERS IN COMPARATIVE CULTURE BEECH ALEŞD-POIANA FLORILOR-BIHOR

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Abstract

*Usage of the reproduction forestry materials from the beech's natural populations conduct to an evident genetically earnings. This fact is a result from a very large selection of the genetic variation character (**Enescu, 1973, 1977**).*

Key words: comparative culture, correlations, centesimal degrees

INTRODUCTION

The conservation of valuable populations as genetically resources must be integrated in an adequate genetically management, is very necessary for elimination of any genetically erosion causes and hybridising of natural populations.

MATERIAL AND METHOD

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 being two years old and coming from the nursery of the Institute of Forest Genetics in Schalembeck, Germany. This test it part of a network of comparative cultures, long standing experiments, achieved as part of the European cooperation project "European network of the genetic resources of beech for appropiate use in sustainable forestry management" (AIR 349. 942091).

The experimental appliance for the culture was a 3 x 4 rectangular railing, with three repetitions, completely randomized, each unitary lot covering 10 x10 m, and being made up of 50 plants placed on five rows with a 2 meter distance in between and 1 meter distance within the row (**Holz, 1959; Smith, 1955**).

The area of placement of the comparative culture of Poiana Florilor corresponds to the area G 2 – Mountains Apuseni, Mountains Pădurea climatic conditions are characterized by higher moisture, still pretty hot climate that fosters the spread of mountain beech forests, the under-area G 240 – hill beech forests – the main species in the area: beech, height interval: 500-700 m (**Enescu, Doniță, Bândiu et al., 1998**. **Enescu, Doniță şi colaboratorii, 1976**).

The localization of the beech sources, which are studied for the comparative culture of Poiana Florilor, is shown in (Table 1).

Table 1

Beech sourses (*Fagus sylvatica* L.) wich are testing in comparative culture ALEŞD –POIANA FLORILOR - BIHOR

Number of sourse	Country	Beech sourse	Latitude (N)	Longitude (E)	Altitude (m)
01	Franța	Perche	52°03'	12°25'	140
02	Franta	Bordure Man.	49°32'	00°46'	80
04	Franța	Sud Massif	44°09'	02°35'	850
06	Franta	Plateaux du	46°48'	05°50'	600
11	Luxemburg	Heinerscheid	46°01'	06°07'	1150
13	Belgia	Soignes	50°50'	04°25'	110
14	Olanda	Aarnik	51°56'	06°44'	45
17	Marea Britanie	Westfield (2002)	57°40'	03°25'	10
19	Marea Britanie	BE95 (4010)	50°55'	01°09'	150
23	Suedia	Torup	55°34'	13°12'	40
29	Germania	Dillenburg (RE)	50°42'	08°18'	520
31	Germania	Urach (BW)	48°28'	09°27'	760
34	Elveția	Oberwil	47°10'	07°27'	570
35	Austria	Hinterstader	47°32'	14°06'	1250
36	Austria	Eisenerz	47°32'	14°51"	110
37	Italia	Val di Sella	46°01'	13°30'	1150
39	Polonia	Jaworze 178 F	49°50'	19°10'	450
40	Polonia	Tarnava 81 C	49°28'	22°20'	540
43	Polonia	Jawornik 92 b	49°15'	22°49'	320
48	Cehoslovacia	Jablonec N.N.	50°48'	15°14'	760
49	Cehoslovacia	Brumov- Sidonie	49°03'	18°13'	390
51	Cehoslovacia	Harni Plana-Ce	48°51'	14°00'	990
52	Ungaria	Magyaregregy	46°13'	18°21'	400
53	Slovenia	Postojna Masun.	45°38'	14°23'	1000
54	Slovenia	Idrija – DJ 2, 14	46°00'	13°54'	930
57	Bulgaria	Gramaticovo	42°04'	26°28'	200

* **- standard, PL – local sourse**

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**).

The data was analyzed according to the STATISTICA program (**Complet Statistical System, StatSoft, Inc., 1991**). For the drawing of the graphs, there were used graphic programmes on the computer from the STATISTICS and Excel.

RESULTS AND DISSCUSIONS

Measuring and observations took place 8 years after planting and concerned the following features: 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 (**Ciobanu, 2003; Andra Ienciu, Savatti, 2004**).

We made simple correlations between all characters which was observed or measured and on these we could calculating the correlation coefficients (Table 2).

Table 2

The matrix of simple correlation coefficients between the studied features or observed characters in comparative culture

ALEŞD –POIANA FLORILOR - BIHOR

Character	2	3	4
1. Survival	0,27*	0,39*	0,03
2. Total height	-	-0,23*	0,00
3. Base diameter		-	-0,03
4. Forking			-

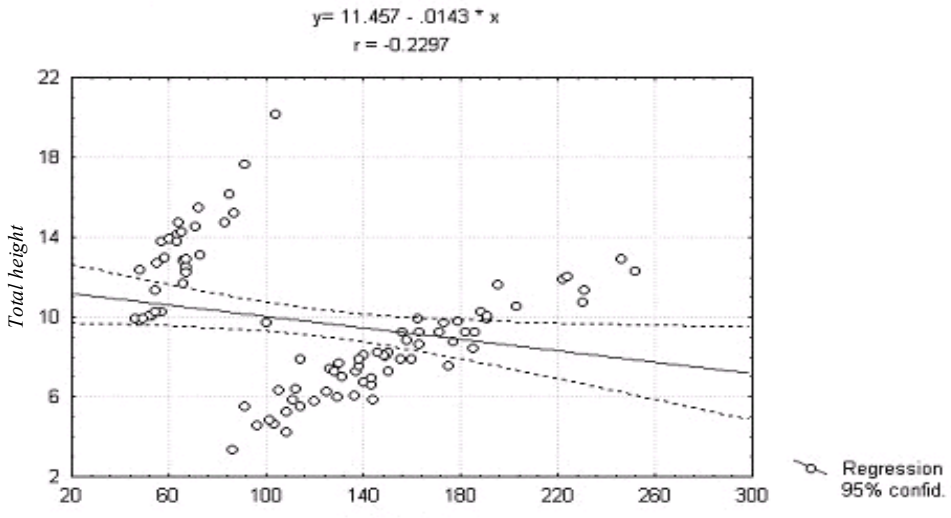

Figure 1. Correlation between total height and survival

We came to the conclusion that survival is significantly and positively correlated to the total height (Figure 1) and basic diameter (Figure 2). So, the origins of which proved better adapted to environmental conditions and higher growth capacity. Also, the total height is significantly and negatively correlated to base diameter (Figure 3).

These characters being both quantitative characters of the trunk, this correlation was natural, but noted that it is negative, so the trees with greater heights will have smaller diameters and vice versa.

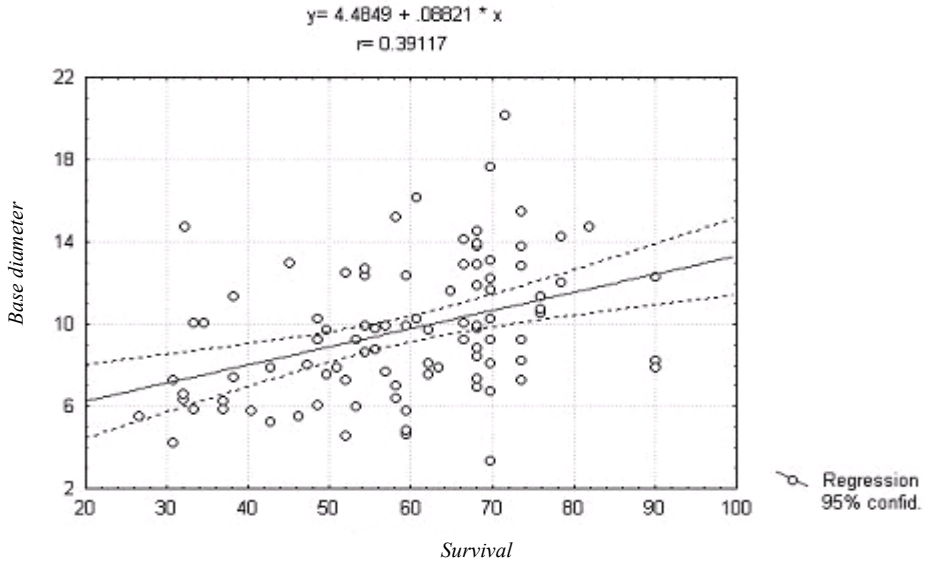

Figure 2. Correlation between base diameter and survival

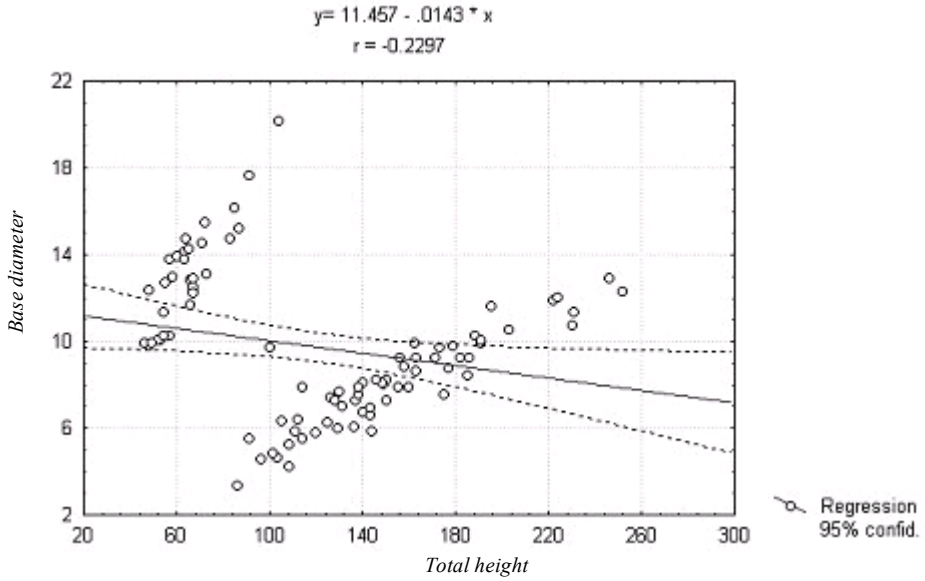

Figure 3. Correlation between base diameter and total height

Also, the correlations were undertaken between the studied features and the geographical coordinates of the place of origin, the aspects taken into account were latitude, longitude, altitude and latitude corrected by altitude. The correction of latitude by altitude was performed by adding 1^g for each 100 m altitude, after latitude was first transformed in centesimal degrees. It was found that between latitude and forking there is a significant negative correlation (Table 3). So as you increase the number of fork trees decreases and vice versa.

Between longitude and forking there is also a significant and positive correlation at latitudes higher degree of forking of the stem being higher.

For the altitude and the corrected elevation there are significant correlations with none of the characters studied in this comparative culture of sourcing of beech.

Table 3

The matrix of simple correlation coefficients between the studied features and the ecological gradients in comparative culture ALEŞD –POIANA FLORILOR - BIHOR

Character	Latitude	Longitude	Altitude	The correction of latitude by altitude
1. Survival	-0,03	0,21	0,02	-0,01
2. Total height	0,08	-0,15	-0,06	0,02
3. Base diameter	0,01	-0,10	-0,05	-0,04
4. Forking	-0,44*	0,36*	0,20	-0,23

CONCLUSIONS

Simple correlations were undertaken among all the studied aspects and it was noticed that there are significant positive or negative correlations among some of them. Among the quantitative aspects of the trunk there are significant direct correlations which emphasize a joint genetic control; among some of them and the other aspects of the trunk there are, also, significant correlations.

In the case of comparative culture of sourcing beech Aleşd-Poiana Florilor were able to calculate the significant correlations between latitude and longitude on one side and forking on the other hand, the first being the second negative and positive. So, at high latitudes and longitudes small trees will be less forks.

Also, it was found that forking has a genetic control, instead the total height is influenced largely by the organic component. In terms of the diameter at the base, it has depended almost 100% organic component in this comparative culture of sourcing of beech.

The classifications of origins were different by the characters and this is not necessarily made by geographic criterion, because the origins from the same geographical zone apart from different groups in many situation. Generally, the Romanian origins are group together with other

origins from Europe south-east, but some of them presents propinquities with some origins from west.

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