DENDROCHRONOLOGICAL SERIES FOR *MOUNTAIN PINE* FROM PIETROSU MASSIF – RODNA MOUNTAINS

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Abstract

In this paper, master dendrochronological series were elaborated for Mountain Pine from Pietrosu Massif – Rodna Mountains, utilizing 11 washers. Calculations of statistical parameters were obtained with the ARSTAN ver. 41. The index series has 155 years covering the period between 1853 and 2007. Elaboration of dendrochronological series from Mountain Pine in the Pietrosu massif – Rodna Mountains contributes to dating, reconstruction of local a regional climate.

Key words: Mountain pine, tree ring, master dendrochronological, dendrochronological series

INTRODUCTION

The Romanian forest ecosystems have a very high dendrochronological potential, the building of dendrochronological series for the main forest, by ecological areas, being a premise of a better knowledge on the dynamics of environment factors and implicitly of the complex biological system, the forests. Tree growing in an area with seasonal variations of climate (winter-summer alternation or the humid season-dry season) is characterized by a single growth per vegetation period, namely the growth ring. The growth ring varies from one year to another (in the case of annual variation of the climate) or from one vegetation period (season) to another (in the case when the seasonal variation of climate is longer or shorter than a year, as far as both its width and its structure and density of wood are concerned. The annual tree ring constituted an archive a real database, regarding the secular and multi-secular variation of the environment factors at both global and mezzo-and micro scale levels (Popa, 2004).

MATERIAL AND METHOD

The study sites are situated in the Pietrosu Massif – Piatra Neagra at 1600 meter altitude. Because of the small increment and the deformation, the extractions of the *Mountain Pine (Pinus mugo)* cores, is not possible. The washers for the dendrochronological analyses will be taken with the help of a chain saw. In this study were collected 14 washers, near possible to the root.

Each core was numbered and coded as PTRE51, PTRE52 and PTRE11. The samples were measured to the nearest 0.01 mm using digital positiometer.

Cross dating was verified and corrected with computer program COFECHA.

RESULTS AND DISCUSSION

Statistical parameters of dendrochronological series were obtained with the program ARSTAN ver. 41 (table 1).

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Sample	First year	Least year	Number of year	Radial growth	Standard deviation	Sensibility	Autocorrelation
PTRE51	1898	2007	110	0.685	0.49	0.26	0.897
PTRE52	1895	2007	113	0.567	0.4	0.25	0.871
PTRE11	1874	2007	134	0.479	0.27	0.26	0.809
PTRE12	1875	2007	133	0.408	0.19	0.34	0.593
PTRE31	1875	2007	133	0.659	0.4	0.31	0.762
PTRE32	1875	2007	133	0.595	0.27	0.29	0.654
PTRE41	1943	2007	65	0.92	0.34	0.22	0.717
PTRE42	1943	2007	65	0.902	0.41	0.25	0.731
PTRE71	1899	2007	109	0.676	0.38	0.27	0.722
PTRE72	1897	2007	111	0.586	0.39	0.23	0.883
PTRE81	1906	2007	102	0.586	0.33	0.25	0.867
PTRE82	1911	2007	97	0.602	0.39	0.3	0.876
PTRE101	1853	2007	155	0.377	0.41	0.25	0.943
PTRE102	1855	2007	153	0.376	0.31	0.28	0.882
Maximum	1853	2007	115	0.92	0.40	0.34	0.94
Mean	1892	2007	112	0.59	0.38	0.26	0.83
Minimum	1943	2007	65	0.37	0.19	0.22	0.59

The statistical parameters of dendrochronological series of Mountain Pine

Table 1

The dendrochronological time span is of 115 years, the radial growth variation between 0.37-0.92 with a mean 0.59. Sensibility is 0.22-0.34 with mean value 0.205 and the values of autocorrelation are between 0.59-0.94 with a mean 0.83 (minimum value appear at tree PTRE12 and the maximum value at tree PTRE101).

The average growth curve standardization is presented in PTRE51 tree with the help of the Hugershoff function (fig. 1)



 $Fig.1 \ \ The average growth curve standardization \ at \ \ PTRE51 \ tree \ with \ Hugershoff \ function$

Rbar is computed as the average Pearson correlation, of all pairs that share at least 25 years of data, within a given window. Fig. 2 presents coverage of time by the sequences forming the chronology.

The rbar only changes when sample replication changes. The Rbar value obtained was 0,110.



Fig. 2 The sample replication

The dendrochronological series for *Mountain Pine* is presented in the following diagram (fig. 3).



Fig. 3 Dendrochronological series for Mountain Pine

The index series has 155 years covering the period between 1853 and 2007.

CONCLUSIONS

The dendrochronological series for Mountain Pine is realized with a small number of washers that is why for obtained more precision data is necessary extra number of samples.

The researches made by Soran showed that Mountain Pine has the greatest diameter increment compared with other species from the same altitudinal plant belt (Soran, 1985).

At timberline the dominant factor in radial growth is temperature. An important influences upon the tree-ring haves the previous autumn temperature and the may-august period in the same year.

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