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Stand Structure Analysis in the Context of the Diversification of Social Demand for Forest Products and Services in "Podu Iloaiei" Forest District ("Iaşi County" Forest Administration)

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Abstract. One of the basic principles of forest management underlines that any type of silvicultural intervention must serve the end purpose of creating stand structures able to fulfill productive or productive and protective functions, established in detail through management planning. Although wood production is still the main focus, depending on the region, forests are also expected to cover society's growing demand for non-wood products and services such as landscape services, carbon storage, biodiversity protection or supporting community livelihood in rural areas. This multifunctional approach in forest management raises the challenge of creating the suitable structure that can cover, in a sustainable way, all the demands of local or regional populations. Starting from the above mentioned issues, the present paper considers the structure of a natural, uneven aged stand, indicated through biometric parameter analysis, as a pattern for multifunctional forestry. The study refers to specific conditions in a forest area administrated by "Podu Iloaiei" Forest District, part of "Iaşi" County Forest Administration.

Keywords: forest goods and services, multifunctionality, social demand, sustainability

Introduction. Uneven-aged forest structures, close to the selection system pattern, able to produce high grade timber and ensure maximum protection for the environment are considered ideal in forest management (Bandiu *et al.*, 1995; Cenusa, 1996; Giurgiu, 1999). These structures become even more important in areas where the forestry industry is considered secondary and a strong demand for forest products, other than wood, exists. Such is the case of Iasi County, mainly an agricultural region, forest cover representing less than 20% of county territory (Barbir, 2012).

Aims and objectives. The paper's aim is to reflect the structure of a natural uneven-aged stand using data from an experimental plot, the natural structural pattern being the most suitable for covering, among other, forest related social demands. The objectives include the representation of the spatial structure and stand analysis in relation to the main biometric characteristics.

Materials and methods. For data collection in the field, the first phase of the research, a rectangular 1 ha (100x100m) experimental plot was materialized inside compartment 31B, part of a natural reservation, "Ghiorghitoaia Forest", the placement aiming to reflect in the best way possible the stand's structure and to be easy accessible. For each tree inside the experimental plot, the following characteristics were registered: tree number, specie, d_{bh}- measured on two perpendicular directions, height, Kraft class, quality, crown shape, defects, crown diameter and Cartesian coordinates (x, y) using a grid of 10x10m quadrates, following the methodology of forestry ecosystem studies using structural profiles. (Cenusa, 1996, 2002; Giurgiu, 1979) In the second phase Microsoft Excel was used for processing field data. Graphic representations of stand profile were generated using the "Surfer 8" software.

Results and Discussion. In relation to the above mentioned objective of stand analysis using main biometric characteristics, data collected in the field was processed using categories of certain size. As the results show (Tab. 1) stand variability is high with regard to all the considered characteristics, the variation coefficient for the experimental distributions ranging from 51.23 % to 132.29 %.

Tab. 1

Indicators of stand variability

Indicator	No. of trees per ... categories		
	Diameter	Height	Volume
Mean (average)	30.22	20.44	1.98
Variance	464.48	109.65	6.89
Standard deviation	21.55	10.47	2.63
Variation coefficient	71.31	51.23	132.29

A total volume of 623.04 m^3/ha was calculated which is approximately 20% more than the volume indicated in the management plans. Individual standing volume reached values up to 16 m^3, at heights up to 42 meters (Fig. 1), representing high accumulations of wood biomass. Above and underground wood biomass stores roughly 219 t C/ha (Barbir, 2012) and the volume of dead wood on the ground, was evaluated at around 10 m^3/ha.

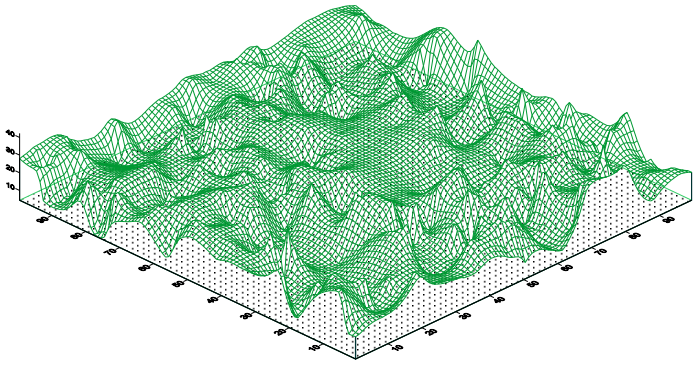

Figure 1.Top level profile of stand's canopy

Conclusion. The future of forest management in areas without a strong wood industry will have to consider the most suitable forest structures for covering demands from timber production to the visual effect needed to enchant a hiker's eye. As the above results indicate, natural structures are the most suitable to achieve simultaneously functions like timber production, carbon storage, biodiversity protection, recreation.

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