SILVICULTURE CONTRIBUTIONS TOWARDS THE ENHANCEMENT OF RECREATIONAL VALUES OF A CHESTNUT GROVE

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Introduction

Nowadays the fact that our planet is facing many ecological problems, the forest's beneficial contribution, through soil protection, recreation and its healthy and hydrological role is of greater importance. The contribution of such multifunctional forest ecosystems presupposes the creation of ecologically healthy stands with desirable structure that can be achieved through the application of appropriate silvicultural treatments. The framework within which silvicultural measures are taken and the forests' potential for cultivation for the fulfillment of the above purposes, are determined by the properties of the tree species, the composition of the stands as well as the site conditions. One of the priorities of silvicultural treatments in many cases is the suitable formation of stands in order to enhance the landscape value of forests for recreation so as the functions of the forest can satisfy as many social needs as possible.

The aim

The aim of this project is to study the qualitative and the quantitative silvicultural characteristics of the stands in the perennial chestnut grove of Mount Menoikio. The main pursuit is to identify the appropriate silvicultural treatments for the rational management of this ecosystem, in order to maintain its identity and protect its regeneration, which will eventually enhance the recreational value of the area and simultaneously create an economic forest with mixed chestnut-beech stands, ecologically managed for a multipurpose usage.

Materials and Methods

As a research area there has been the 30 ha perennial chestnut grove selected, which is located on the northeastern slope of Mount Menoikio. The grove is composed of mixed chestnut-beech stands with chestnut constituting the dominating species. The climate is of Mediterranean type with cold winters and a high precipitation rate.
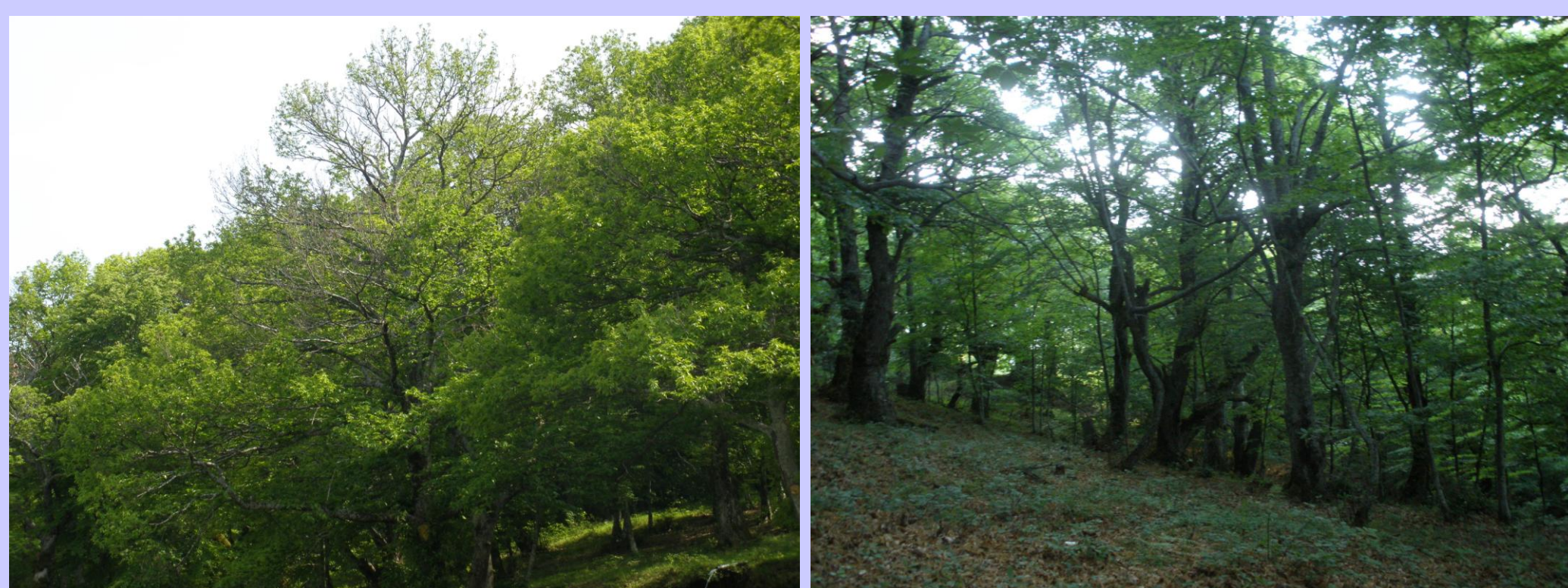
Data collection was accomplished in spring 2008. The selection of the sample plots was based on stratified random sampling.

There were 20 circular shaped plots taken, 10 eastern and 10 northern exposed, as the aspect of the area is mainly NE, E, N, each covering 500 m2 (circle radius r=12.62 m). The sample plots were randomly distributed in the forested area of the stands and were representative as far as the vegetation of the study area is concerned. In all sample plots the silvicultural data measured or calculated for all individuals, were: the number of all individuals, stem density (N/ha), diameter (DBH, cm) at breast height for trees with diameter >4cm, total height (H, m), crown length (C L, m), basal area (G, cm2) and crown diameter in two directions (EW and NS) for the imprinting of the crown projection. Also tree vitality (V) and developmental tendency (DT) were recorded according to IUFRO classification. Tree vitality (V) is classified in three classes: grade 10 for trees of vigorous growth, grade 20 for trees of normal growth and grade 30 for trees of declining growth. Developmental tendency (DT) is classified also in three classes: grade 1 for trees with "upward" tendency, grade 2 for trees with medium growth tendency and grade 3 for trees with descendant future growth. Stem distribution in diameter classes of 6 cm and in height classes of 2 cm was carried out.

The relationship among the number of individuals, diameter, height and the other parameters on the one hand and the aspect effect on the other was tested by t-test at p<0.05 level of significance. Data analysis was carried out using SPSS version 15.0 statistical program soft-ware.

Results

Table 1.

Castanea sativa								
Aspect	N/ha	DBH (cm)	Height (m)	Crown Length (m)	Basal Area (m³)	Develop-mental Tendency	Vitality	Stem quality
Northern	130 *	50,2 (0,4)	26,5 (0,9)	20,8 (0,9)	50,4 (0,4)	2,6 (0,9)	22,5 (0,9)	47,9 (0,9)
Eastern	180*	49,9 (0,3)	23,5 (0,4)	19,9 (0,4)	75,7 (0,3)	2,3 (0,9)	22,1 (0,8)	48,2 (0,9)

Fagus sylvatica								
Aspect	N/ha	DBH (cm)	Height (m)	Crown Length (m)	Crown Diameter	Develop-mental Tendency	Vitality	Stem quality
Northern	73	20,7 (0,1)	19,0 (0,8)	16,1 (0,8)	2,3 (0,3)	1,0 (0,0)	10,0 (0,0)	40,0 (0,0)
Eastern	73	21,0 (0,1)	17,3 (0,7)	15,9 (0,8)	2,9 (0,2)	1,0 (0,0)	10,0 (0,0)	40,0 (0,0)

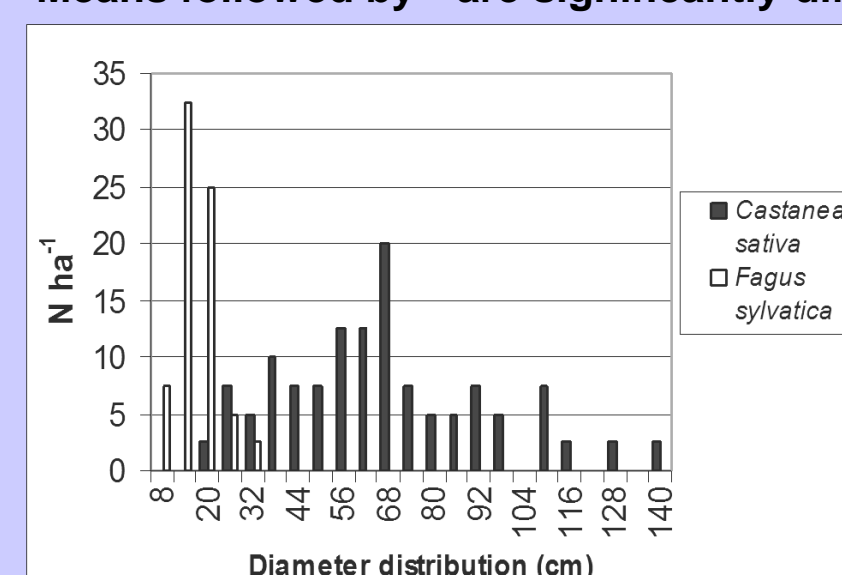Means followed by * are significantly different (P<0.05).

Figure 1: Diameter distribution in the northern aspects of the perennial chestnut forest
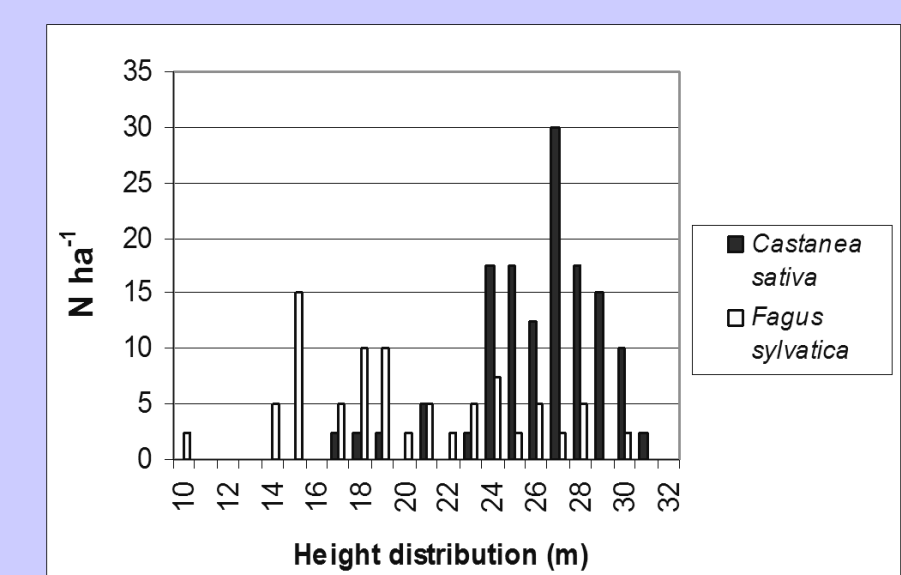

Figure 2: Height distribution in northern aspects of the perennial chestnut forest
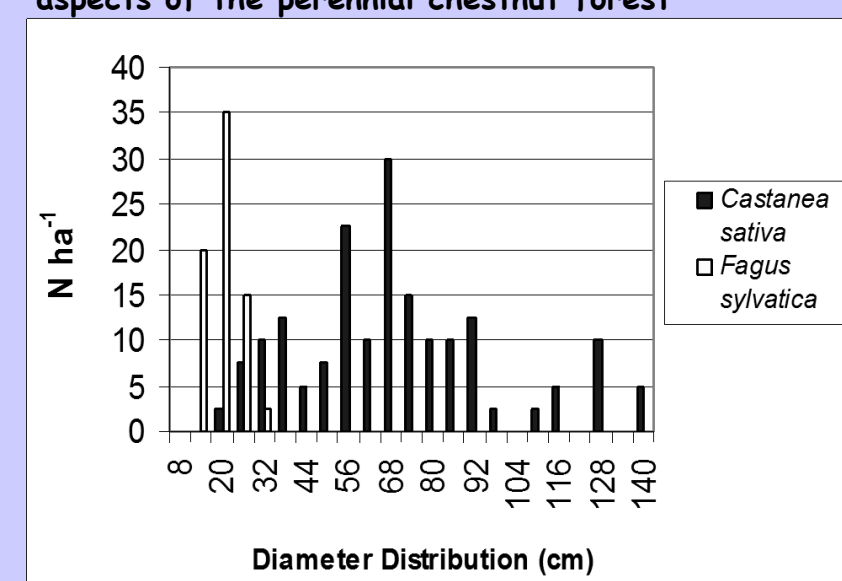

Figure 3: Diameter distribution in the eastern aspects of the perennial chestnut forest
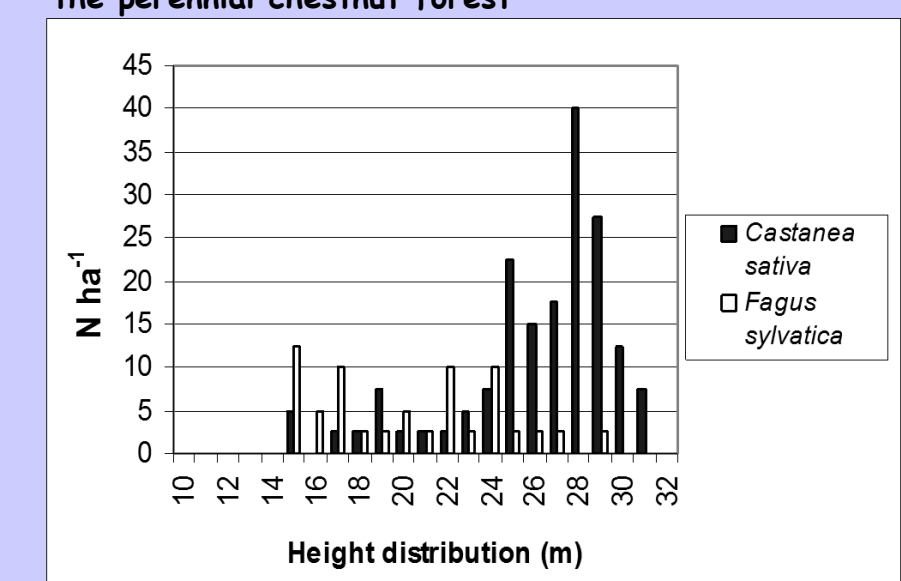

4: Height distribution in eastern aspects of the perennial chestnut forest
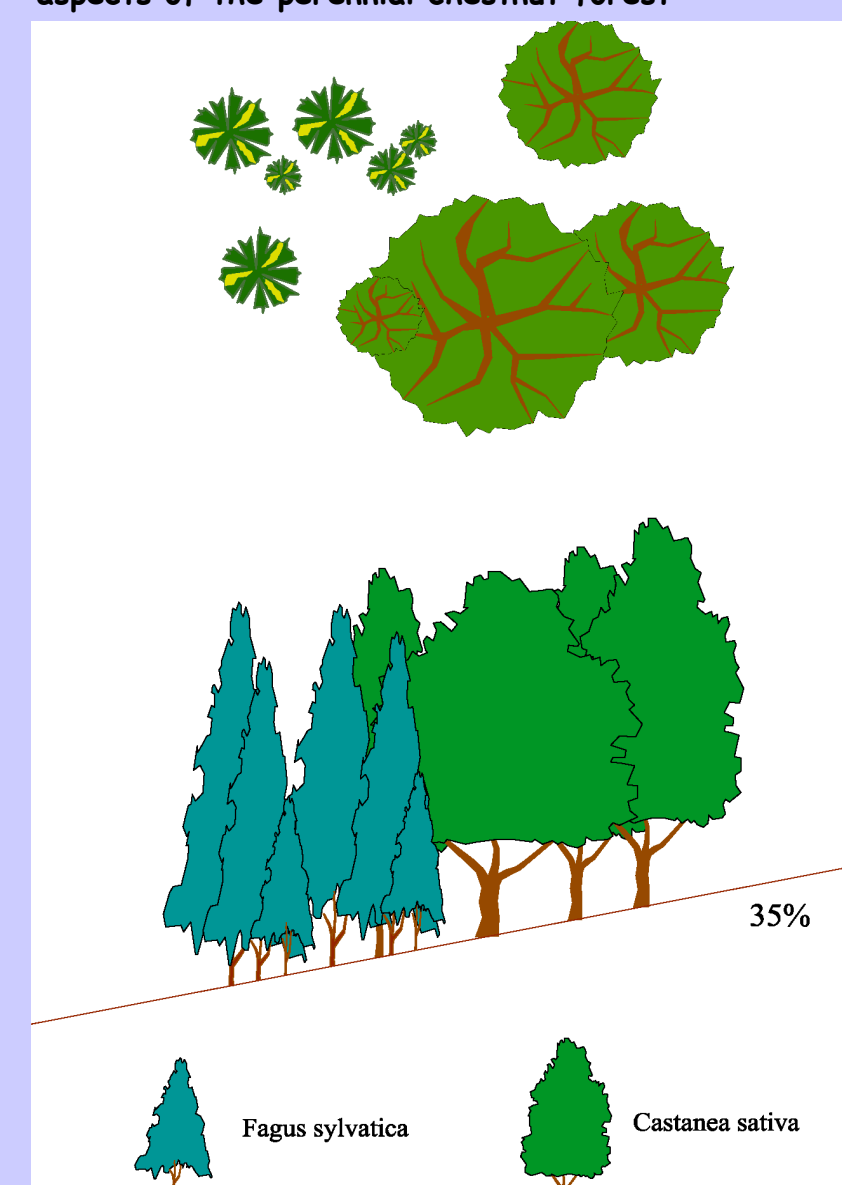

Figure 5: Vertical and horizontal profile on northern exposure
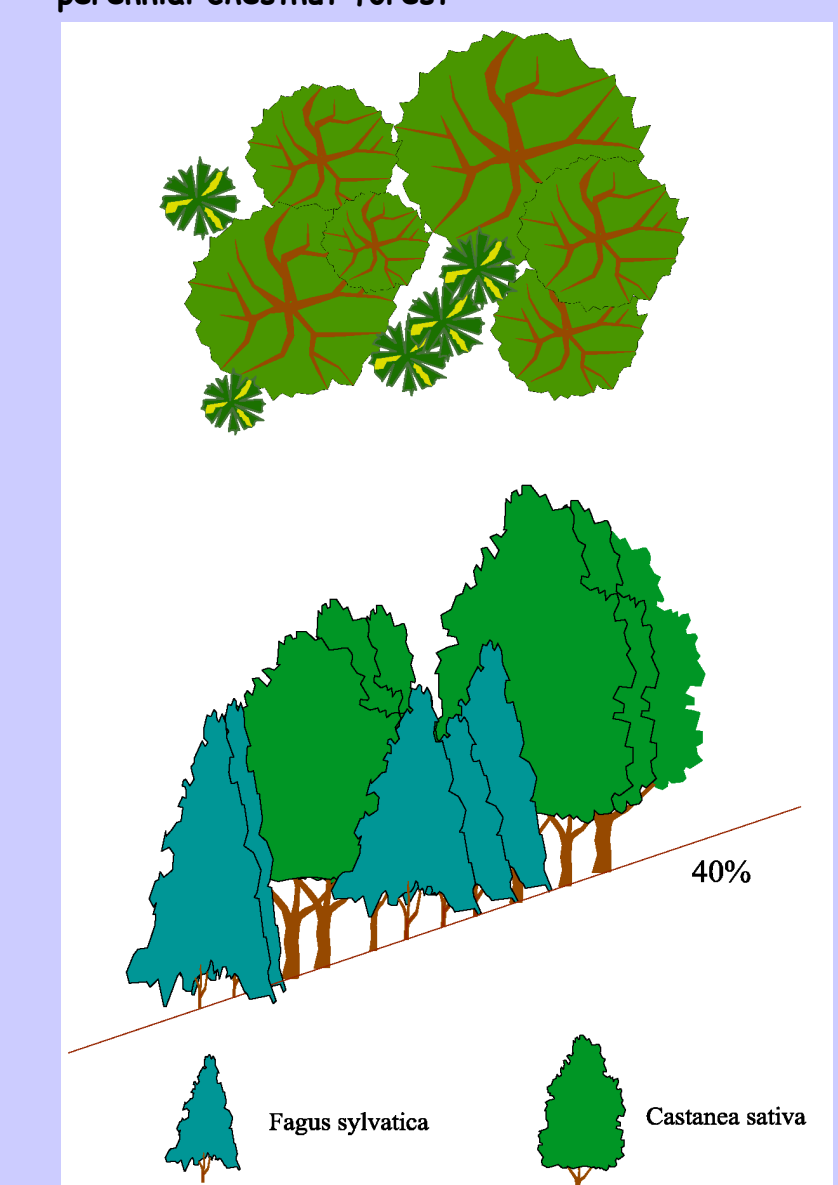

Figure 6: Vertical and horizontal profile on eastern exposure

Conclusions

The silvicultural target in the study area is the creation of a forest that fulfils more than one purpose by covering sustainably social needs such as providing recreational areas for visitors in combination with nut production. For the fulfilment of this target it is necessary to inhibit the intense spread of beech with the following appropriate silvicultural measures that must be applied in the area, which are:

-To protect and maintain the perennial chestnut trees, which create an aesthetical landscape and thus raise the recreational value of the area, and which simultaneously provide a source of nuts.

-To favor the natural regeneration of chestnut against beech. This can be achieved with the regulation of the mixture grade, which in this case is suggested at 70% chestnut and 30% beech. For this purpose, as far as beech is concerned, which is managed as coppice, the silvicultural treatments that are applied depend on the development stage of the beech trees. In the late pole stage, in which they are exclusively found in the study area, the cultivation is accomplished with intense positive thinning with ultimate purpose to provide growing space for the regeneration and consolidation of chestnut.