

CHARACTERISTICS OF FIELD MAPLE STANDS FROM THE MOLDAVIAN PLAIN (ROMANIA)

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ABSTRACT

Acer genus comprises approx. 120 species, mostly trees and rarely shrubs. There are several species of this genus in Romania (8), both forest and ornamental. *Acer campestre* is a tree of the third size and a species of understory. The present study was conducted on field maple stands from the Moldavian Plain, Romania. A series of characteristics were studied, namely: altitude, slope, stand age, crown density, increments and stand volume. The area occupied by field maple in the Moldavian Plain is of 666.4 ha. The maximum altitude at which the studied species is found is 525 m.

INTRODUCTION

Acer genus contains both trees and shrubs, as well as many intraspecific taxa. Due to this cause, opinions are divided regarding the number of species. As such, different authors cite a number of 110 species (Clinovschi, 2005), 150 species (Suh et al., 2000), or 129 species (Bi et al., 2016). A large part of these species appear in China, a country considered to be a „centre of diversification” (Suh et al., 2000).

Acer campestre L. (field maple) is naturally found in almost all Europe (Zecchin et al., 2016). In Romania, the species grows in fields and hills, rarely reaching the mountain area (Șofletea and Curtu, 2007). The species is most frequently found as substand species and does not form pure stands (Chybicki et al., 2014). However, it contributes to creating the vertical structure of stands in which it grows (Nagy and Ducci, 2004).

Usually, field maple is among the first species that occupies unworked agricultural fields situated at low altitudes (Harmer et al., 2001). The species does not present a high commercial value while strict silvicultural management measures are not implemented, leading to a spontaneous apparition in stands (Kvesić et al., 2020).

Furthermore, numerous studies have investigated this species' therapeutical properties. It was proven that field maple sprout extract and bark tincture have healthy benefits on the digestive system, gall bladder and liver, while leaves are a source of phenolic compounds (Atroune et al., 2019). In Turkey, leaf and branch extract is used in threating haemorrhoids and rheumatism, but it also represents an important source of antioxidants (Utsukarçi et al., 2020).

Stands from the Moldavian Plain have numerous economic roles (Blaga et al., 2018; Vechiu et al., 2019; Tudor et al., 2020; Tudor et al., 2021), as well as in the biodiversity of forest species (Dincă et al., 2020; Timiș-Gânsac et al., 2020; Dincă et al., 2020; Cântar et al., 2021), animals (Ciontu et al., 2018; Timiș-Gânsac et al., 2018; Ciontu et al., 2020; Crișan et al., 2020), or soils (Cântar et al., 2018; Enescu et al., 2019; Dincă, 2020; Crișan et al., 2020).

The aim of this paper is to describe field maple species from stands located in the Moldavian Plain by using forest management plans from Romania as a source of information.

MATERIAL AND METHOD

The research is based on data from forest management plans realized during 1990-2006 (**Forest management plans). Investigations were realized in Romania, namely in the Moldavian Plain (fig. 1). We have selected forest districts that managed a forest fund in the studied area, and then narrowed it down to only the ones that had field maple in their composition. As a total, we have studied 11 forest districts. As such, we have analysed a series of characteristics, namely: occupied area, altitude, slope, and age. Furthermore, we have realised a series of correlations by using crown density, increment and stand volume. The data base and statistical processing were realized with Excel and Statistica softwares.

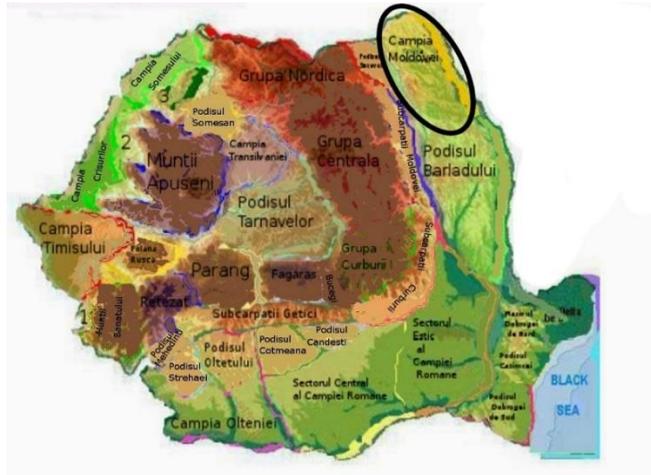


Figure 1. Moldavian Plain (source: www.iabacul.com)

RESULTS AND DISCUSSIONS

Field maple occupies a surface of 666,4 ha in the Moldavian Plain and is present in 11 forest districts, namely: Botoșani, Dărăbani, Dorohoi, Flămânzi, George Enescu, Hârău, Iași, Mihai Eminescu, Podu Iloaiei, Răducăneni and Trușești.

In regard to the distribution of field maple stands on altitude categories (fig. 2), we can see that the largest areas are found on the 200-299 m and 100-199 m altitude categories. This fact proves the specie's field and hill areal (Șofletea and Curtu, 2007). As altitude increases, the occupied area significantly decreases. As such, the occupied area is of 1,6 ha for the 400-499 m interval, and reaches only 0,7 ha over 500 m. The maximum altitude at which field maple is present in the Moldavian Plain is of 525 m. The area occupied at altitudes under 100 m is larger, reaching approximately 82 ha.

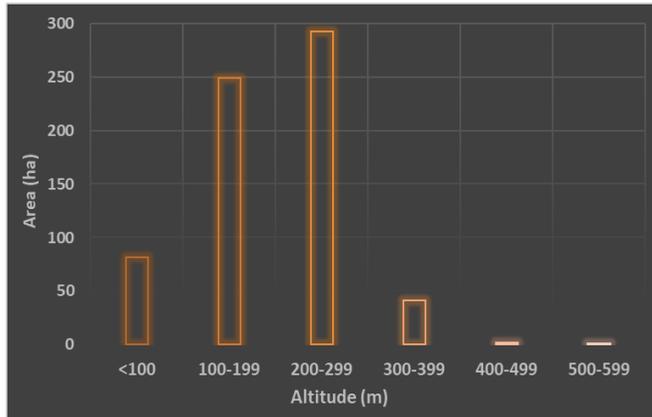


Figure 2. Distribution of field maple stands on altitude categories

In regard to the distribution of the studied species based on a certain relief characteristics, namely slope (fig. 3), we can see that the largest area is occupied by fields with a moderate slope (5-15°), followed by plane fields. Fields with a slight slope and with a very fast slope have the smallest percentages.

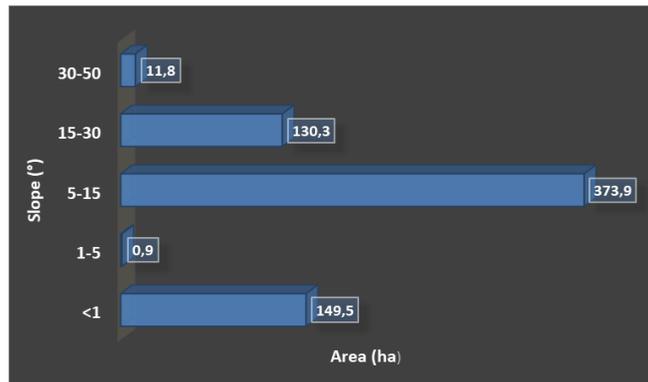


Figure 3. Distribution of field maple stands on slope categories

Figure number 4 represents the distribution of field maple stands on age classes. The largest area is occupied by stands between 40-59 years, namely ≈ 256 ha. As age decreases, the area occupied by these stands also decreases. As such, stands older than 100 years occupy a area of only 12,9 ha. This fact is strongly connected to the specie's longevity which is rather low, rarely exceeding 100 years (Șofletea and Curtu, 2007).

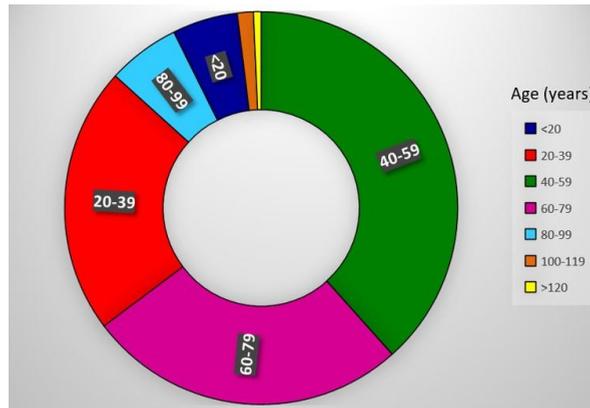


Figure 4. Occupied area of field maple stands on age categories

We have also realized a matrix of correlations between the stand's four characteristics, namely: stand age, crown density, increment and stand volume (table 1). As such, stand age has realized significant correlations with all the other three studied characteristics. Correlations between stand age, on one side, and crown density and increment on the other side are reversed correlations (negative), while correlations between stand age and volume are positive and also record the highest value (0,43). This means that as the stand is older, the volume stand is also higher. Furthermore, another significant correlation (negative) was determined between crown density and stand volume. At more advanced ages, crown density reduces, but stand volume is higher as growths become more active but decrease again when they reach the longevity limit.

Table 1

Correlation between different stand characteristics

Characteristic	Correlation coefficient			
	Age	Crown density	Increment	Volume
Age	1	-0,30	-0,27	0,43
Crown density	-	1	0,20	-0,10
Increment	-	-	1	0,50
Volume	-	-	-	1

CONCLUSIONS

Field maple occupies an area of 666,4 ha in the Moldavian Plain. The largest areas are found in the 200-299 m and 100-199 m altitude categories. As the altitude increases, the occupied area also

decreases significantly. The maximum altitude that is reached in the Moldavian Plain is of 525 m.

The most significant area is occupied by fields with a moderate slope (5-15°), followed by plane fields. The largest area is occupied by stands with ages between 40-59 years. As age decreases, the area occupied by stands also considerably decreases.

Stand age has realized significant correlations with crown density, increment and stand volume. The largest value of the correlation coefficient was between increment and stand volume (0,50).

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