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FIELD ELM *(ULMUS MINOR* MILL.*)* STANDS THE MOLDAVIAN PLAIN

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Abstract

Field elm is a tree species widespread in many areas from Europe, including the Moldavian Plain. Due to its multiple qualities, field elm represents a valuable wood resource even though it has a reduced areal. The present article describes the environment and stand conditions for this species in the Moldavian Plain and is based on an inventory of all stand elements from this area that were extracted from forest management plans dating from the last decades.
Field elm is present in all forest districts from the Moldavian Plain, occupying a total surface of 369 ha. From an altitudinal perspective, the species is widespread from 25 m up to 440 m. The largest percentage is found between 100 and 200 m. The stands' age ranges between 5 and 100 years, with the largest percentage at 21-40 years. The stands have an average productivity, a relatively even-aged structure and a crown density of 0.8-0.9 with a current average growth of 0.5-0.7 m^3/ha. The characteristic soils are cambic chernozem and stagnic luvisol, while the forest types are represented by tug forests and tug holm.

Key words*: age, altitude, field elm, productivity class, soils.*

INTRODUCTION

Field elm is widespread in almost all Europe, including Romania (Figure 1). Filed elm stands have a high morphologic variability (Santini et al., 2012; Zebec et al., 2014) and genetic diversity (Buiteveld et al., 2016), even though it is highly affected by Dutch elm disease (O'callaghan et al., 1980; Ricard et al., 1983; Scheffer, 1989) or elm leaf beetle (Doane et al., 1973; Dreistadt et al., 1990; Meiners et al., 2005; Bosu et al., 2007; Ryall et al., 2010). As all other elm species, field elm has also been studied from a genetic perspective (Solla et al., 2002; Aleksic et al., 2004; Oyama, 2008).

Figure 1. Distribution of field elm in Europe (https://en.wikipedia.org/wiki/Ulmus_minor#/media/Fil: Ulmus_minor_range.svg)

Field elm is a valuable species, especially in the context of current climatic conditions (Ducci et al., 2021; Kutnar et al., 2021).
Field elm stands help in fixing landslides (Dincă et al., 2019), in regulating the water circuit (Tudose et al., 2020; Dincă et al., 2020), in the ecological reconstruction of degraded fields (Silvestru-Grigore et al., 2018; Vlad et al., 2019), and in providing non-wood forest products (Cazacu et al., 2014; Vasile et al., 2017; Vasile et al., 2018; Tiwary et al., 2020; Fedorca et al., 2020).
Moldavia Plain is situated in north-east Romania. From a climatic perspective, the area is characterised by average annual temperatures of 8-10°C and average annual precipitations of 400-500 mm (Apostol et al., 2011; Iordache, 2015; Ilie et al., 2016).
The main altitude is of approximately 200 metres while the characteristic soils for this region are chernozem, phaeozem and luvisol. These soils have a good biologic activity (Ailincai et al., 2015; Onet et al., 2019), being well supplied in nutritive elements (Sparchez et al., 2017; Crisan et al., 2021), but presenting a humidity deficit during summer (Dinca et al., 2018).

MATERIALS AND METHODS

The data used for the present article is represented by descriptions and inventories realised between 1995-2006 during the forest management activity from the Moldavian Plain (Anonymus).

The complete description of stands and environment factors from this database has allowed us to extract the data regarding field elm (381 data lines in an Excel table), namely: spreading, altitude, age, production class, structure, crown density, current growth, soil types and forest types. The large number of data ensures a good statistical representation of results.

The surfaces considered are the surfaces occupied by elm. For example, a stand with a composition of 8 Norway spruce - 2 field elm (the composition is appreciated based on the participation percentage of different tree species in the respective silvicultural parcel), with a surface of 10 ha, from which field elm occupies 2 ha. The corresponding calculations and graphics were obtained by using Excel and CorelDraw.

RESULTS AND DISCUSSIONS

Spreading of field elm in the Moldavian Plain: field elm is currently disseminated in stands from all the forest districts located in the Moldavian Plain. However, it has a more significant presence in Trușești (110 ha), Iași (71 ha), Botoșani (52 ha), and Darabani forest districts (39 ha) (Figure 2). Together, they occupy a total surface of 369 ha.

The altitude where field elm stands appear corresponds to the plain area; the species is distributed relatively homogenous on all altitude categories from the Moldavian Plain (Figure 3). The lowest altitude is of 25 m and was recorded in Raducaneni, while the highest one of 440 m was found in Flămânzi. Most stands belonging to this species are distributed at altitudes of 100-200 m.

The age of field elm stands from the Moldavian Plain ranges between 5 and 100 years. The oldest stands are found in Iași and Darabani forest district. Most of the stands are situated in the 21-40 year's age category (Figure 4).

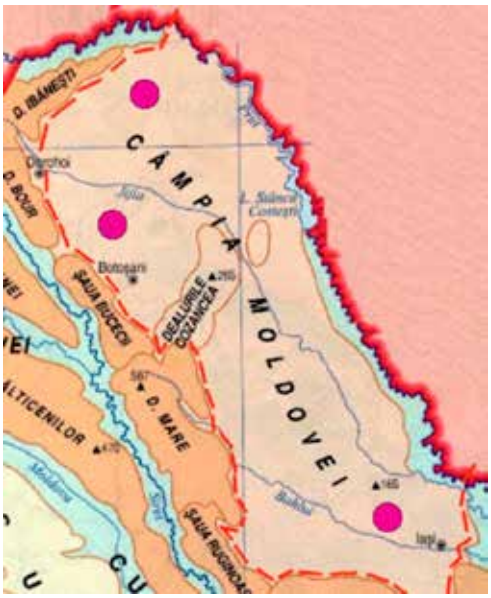

Figure 2. Distribution of field elm in the Moldavian Plain (https://sites.google.com/site/podisulmoldovei/relieful/hidrografie)

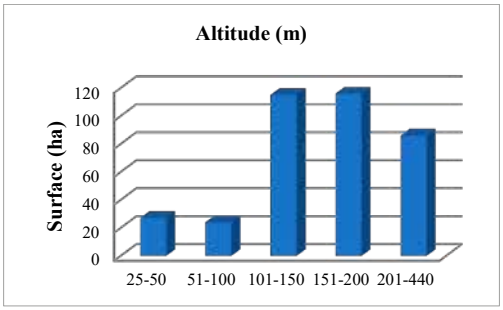

Figure 3. Altitude of field elm stands from the Moldavian Plain

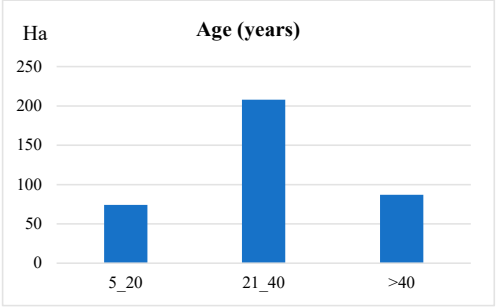

Figure 4. Age of field elm stands from the Moldavian Plain

Field elm stands from this area have in general an average **production class** (64%). Stands with a superior production class (1+2) occupy 12% of the total surface, while those in the inferior production classes (4+5) occupy 24% (Figure 5).

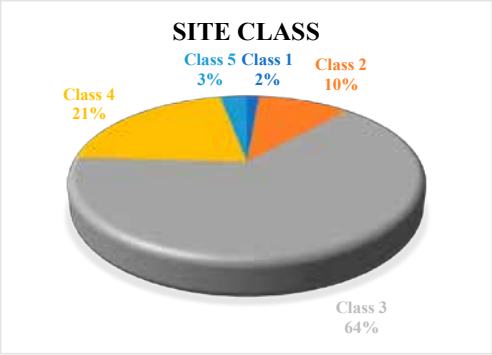

Figure 5. Site class of field elm stands from the Moldavian Plain

Stand structure is predominantly relatively even-aged (292 ha), with few stands having an even-aged (67 ha) or relatively uneven-aged structure (10 ha).
Stand crown density is appropriate, with the majority having a full consistency (0.9 = 128 ha; 0.8= 157 ha) or almost full (0.7 = 62 ha).
Current growth of field elm stands from the Moldavian Plain ranges between 0.1 m^3/ha and 7.8 m^3/ha, with a higher percentage between 0.5-0.7 m^3/ha (Figure 6).

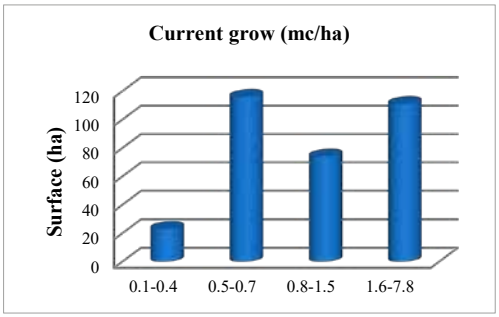

Figure 6. Current grow of field elm stands from the Moldavian Plain

The characteristic soils of field elm stand from the Moldavian Plain are: cambic chernozem (87 ha), stagnic luvisol (76 ha), luvisol (40 ha) and stagnic preluvisol (30 ha). These soils are rich in humus (Crișan et al., 2021) and nutritive elements (Spârchez et al., 2017), being well supplied with water (Dincă et al., 2018), and having a rich biologic activity (Oneț et al., 2019).
The forest types (a classification of stands based on tree species, soils and representative flora) characteristic for the field elms located in this area are: hill tug with superior productivity holm (22 ha), tug holm of average productivity (43 ha), hill tug with average productivity holm (33 ha), hill tug with holm and pedunculate oak of average productivity (40 ha), hill tug with average productivity oak (48 ha).

CONCLUSIONS

Romania has in its forests numerous tree species, including field elm. This species is also present in all forest districts from the Moldavian Plain, having a wider presence in Trusesti, Iasi and Darabani forest districts. Field elm is characterised in this area by varied ages, mainly between 21 and 40 years, and by average productivity classes. The stands have a full consistency, are relatively even-aged, with current low growths, in mixtures of holm and oak. The stational conditions are characterised by altitudes between 100-220 m and soil characteristic for the field area (chernozem and luvisol).

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