

RESEARCH OF THE MAIN TYPES OF FOREST ECOSYSTEMS ON THE WEST CRIȘANA PIEDMONT PLAIN

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Abstract

Forestry typology, founded over a century ago, has evolved differently according to concepts and criteria, based on which the types were established. It was outlined a typology of forests and a typology of resorts. In the last half of the 20th century it was created a complex typology of ecosystems, promoted in Romania too. Currently, drawing up the typology of regional ecosystems is topical. The way of typology determination within this typology has been used in the research too, undertaken by the author.

Key words: forest typology, forest ecosystems, management measures, sustainable forestry, ecological ambience of landscape.

INTRODUCTION

Forests from this territory were managed by the Forest District from Tinca, part of Forestry Directorate Oradea.

Piedmont plain situated in the center of the study area, with average altitudes of 100-200 m, with increasing values eastward, is a Pleistocene plain unit, largely folded, resulted from the connection of the alluvial cones of the river flowing from the mountains and hills situated eastward.

The connection between the plain and the hills is marked by a morphological threshold of about 40-60 m.

The proluvial deposits from the plain are consisted of clay and silt deposits. On these materials heavy and alternant hydric soils forms.

The relief is dominantly a plateau, slightly folded and fragmented by some shallow, temporary brooks. The clays (red clays) are the base of stagnic luvisols on the slopes, planic and whitish soils on the plateau, with a well-balanced hydric regime.

The climate is warm, less humid as in the low hill unit (mean average temperatures of 10°C, average rainfall quantities of 614.7 mm).

Within these natural conditions the plateau ecosystem is consisted of turkey oak, pedunculate oak, sessile oak, Hungarian oak, usually the mix of two even three species, with the presence of the common hornbeam along the small brooks. The soil indicators herbaceous and shrub layer is consisted of *Agrostis-Carexbrizoides*, *Genista-Festucaheterophylla* on the plateaus, *Glechoma-Geum* and *Arum-Brachypodium* along the brooks.

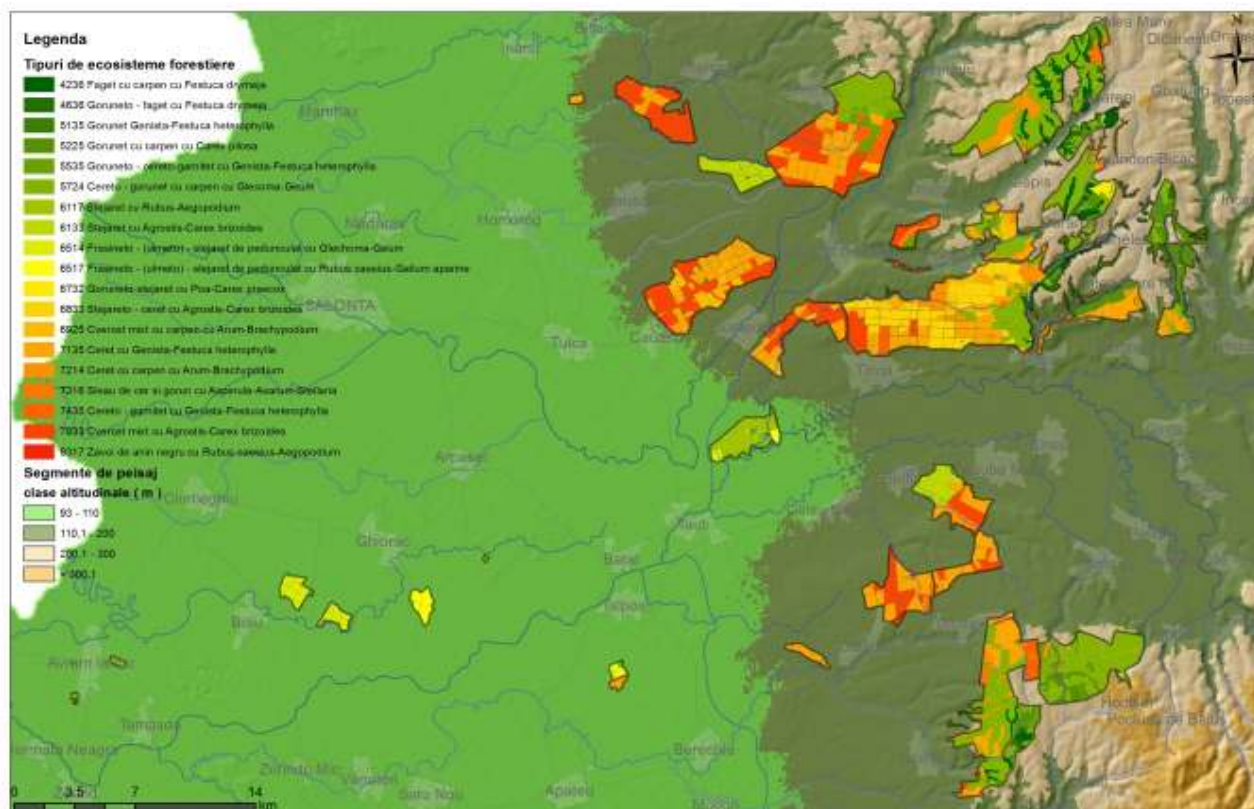


Fig. 1. The map of geographical landscape segments
(source: ArcGis, with modifications)

MATERIAL AND METHODS

First of all, it was made an ample documentation regarding the principles and methods of forest typification. We insisted on the method of determination of forest ecosystems types, proposed and used in our country (Doniță N. et al., 1990), based on the following criteria:

- The composition of stand, the main producer of biomass, which determines through its quality the most populations of users and decomposers, and which through the component tree species, represents a general and local climate indicator, as well as other stationary features;
- The types of living blanket (herbaceous layer), as indicators of humus nature, of acidity, trophicity and soil's humidity;
- The main characteristics of soils, determined by analyzing the samples collected from the profiles;
- The humus type, as indicator of nature and the intensity of decomposition process of necromass.

By processing the digitized data, from the parceling descriptions, there were determined the landscape planner units with the same natural composition as in stands, evidenced by natural regeneration from seeds or sprouts. Through the further research of these landscape planner units on the field, there were determined the types of living blanket and the corresponding humus types, there were set the soil sampling points too. Using these materials and soil characteristics, there were outlined the types of ecosystems, which include all ecosystems with the same species or combination of woody species, the same type of humus, ionic regime and soil moisture regime.

The types outlined in this way were compared to those described in the monograph „Types of forest ecosystems in Romania” (Doniță N. et al., 1990), in order to determine which types are already described and which may be considered new. These were presented as the model in the cited monograph, determining their regional characteristics too.

RESULTS AND DISCUSSION

Based on field and laboratory research on soils, phytocoenoses, as well as based on stands inventory, there were identified in the segment of low hills 8 types of forest ecosystems:

Types of ecosystems on the piedmont plain:

6133 Weak productive pedunculate oak stand, with moder, on pseudogley-luvic soils, oligomesobasic, hydric alternating on the surface with *Agrostis-Carexbrizoides* (regional variant with Turkey oak, Hungarian oak and sessile oak)

6833 Middle – and low productive common oak-Turkey-oak mixed stand, with moder, on stagnic luvisols and albic-stagnic and luvic stagnosols, oligobasic, hydric quasi-balanced and alternating on surface with *Agrostis-Carexbrizoides* (regional variant of a new type of ecosystem)

6925 Mixed oak with common hornbeam, high- and middle productive, with mull-moder, on typical luvisols and stagnic oligomesobasic, hydric quasi-balanced, alternating on profile with *Arum-Brachypodium* (regional variant on luvisols of a new type of ecosystem with stands edified by four species from *Quercus* and common hornbeam genus).

7135 Middle productive Turkey-oak stand, with moder, on brown luvic soils and luvisols, pseudogley, oligomesobasic, hydric quasi-balanced, alternating on profile with *Genista-Festucaheterophylla* (regional variant with mixed oak, Hungarian oak, sessile oak)

7214 Turkey-oak with common hornbeam stand, high- and middle productive, with mull, on brown- and reddish brown luvic soils, pseudogley, eu- and mesobasic, hydric quasi-balanced with *Arum-Brachypodium* (regional variant on stagnic luvisols)

7435 Middle productive Turkey oak – Hungarian oak mixed stand, with moder, on brown- and reddish brown luvic soils and pseudogley luvisols, oligomesobasic, hydric quasi-balanced and alternating on profile with *Genista-Festucaheterophylla* (regional variant of mixed common oak and sessile oak)

7833 Mixed oak, middle – and low productive, with moder, on stagnic luvisols, albic-and planicstagnic, oligomesobasic, hydric strongly alternating, with *Agrostis-Carexbrizoides* (regional variant of a new type of ecosystem, with 4 species from *Quercus* genus)

Table 1

Types and surfaces of ecosystems within the study area

Code	Type of ecosystem	Surface in ha	Observations
	West – Crisana Piedmont plain		
6133	<i>Pedunculate oak stand with Agrostis-Carexbrizoides</i>	414	
6833	<i>Common oak-turkey oak mixed stand with Carexbrizoides</i>	700	New type
6925	<i>Mixed oak with common hornbeam with Arum-Brachypodium</i>	323	New type
7135	<i>Turkey oak stand with Genista-Festucaheterophylla</i>	2631	
7214	<i>Turkey oak with common hornbeam stand with Arum-Brachypodium</i>	655	
7435	<i>Turkey oak-Hungarian oak mixed stand with Genista-Festucaheterophylla</i>	339	
7833	<i>Mixed oak with Agrostis stolonifera-Carex brizoides</i>	1887	New type

Table 2

The core of species with high presence (classes V, IV) on different ecosystem types

Code	Type of ecosystem	The core of constant species
	West – Crisana Piedmont plain	
6133	<i>Ppedunculate oak stand with Agrostis-Carexbrizoides</i>	<i>Quercusrobur, Rubuscaesius, Crataegusmonogyna, C. laevigata, Rosa canina, Prunusspinosa, Frangulaalnus, Carexbrizoides, Agrostisstolonifera, Polygonumhydropiper, Calamagrostisepigeios, Campanula patula, Myosotisscorpoides, Hieraciumumbellatum, Lychnisflos-cuculi, Galiumpalustre</i>
6833	<i>Common oak-turkey oak mixed stand with Carexbrizoides</i>	<i>Quercuscerris, Q. robur, Crataegusmonogyna, Agrostisstolonifera, Veronica officinalis</i>
6925	<i>Mixed oak with common hornbeam with Arum-Brachypodium</i>	<i>Quercusrobur, Q. cerris, Carpinusbetulus, Crataegusmonogyna, Fragariavesca</i>
7135	<i>Turkey oak stand with Genista-Festucaheterophylla</i>	<i>Quercuscerris, Crataegusmonogyna, Ligustrumvulgare, Genistatinctoria, Fragariavesca, Lysimachianumularia, Geumurbanum, Veronica officinalis, Agrostisstolonifera, Festucaheterophylla, Calamagrostisepigeios, Lapsanacommunis</i>
7214	<i>Turkey oak with common hornbeam stand with Arum-Brachypodium</i>	<i>Quercuscerris, Q. polycarpa, Carpinusbetulus, Acer tataricum, Crataegusmonogyna, Ligustrumvulgare, Rubushirtus, Genistatinctoria, Lysimachianumularia, Fragariavesca, Geumurbanum, Dactylispolygama, Brachypodiumsylvaticum, Melicauniflora, Viola reichenbachiana, Carexpilosa, Scrophularianodosa, Polygonatumlatifolium, Galiummollugo, Vincetoxicumhirundinaria</i>
7435	<i>Turkey oak-Hungarian oak mixed stand with Genista-Festucaheterophylla</i>	<i>Quercuscerris, Q. frainetto, Q. polycarpa, Crataegusmonogyna, Rubussulcatus, Lysimachianumularia, Dactylispolygama, Veronica officinalis, Festucaheterophylla, Lychniscoronaria, Carex praecox, C. divulsa, Hieraciumumbellatum, Genistaovata, Poaangustifolia</i>
7833	<i>Mixed oak with Agrostis stolonifera-Carex brizoides</i>	<i>Quercus cerris, Q. robur, Ligustrum vulgare, Crataegus monogyna, Rubus caesius, Fragaria vesca, Geum urbanum, Agrostis stolonifera, Dactylis polygama, Veronica officinalis, Geranium robertianum, Calamagrostis epigeios, Lapsana communis, Ajuga reptans, Lychnis coronaria</i>

CONCLUSIONS

Amid a temperate climate with Mediterranean shades, on the territory in which research was made (Forest District from Tinca), there are distinguished three types of geographical landscape segments, which differ

in different climatic variables as pluviosity, relief, pedogenetical substrates, soils and biocenoses:

- West Crisana low hills;
- Piedmont Crisana plains;
- Alluvial Crisana Plain.

Each of this segment has a certain environmental ambiance, decisive for the formation of biocenoses and constitution of ecosystems.

It was defined the notion of ecological ambiance, and it is expected that the regional typological studies to be performed on landscapes or landscape segments, thus explaining the causes of ecosystem nature and the presence of certain ecosystem types in the landscape.

On the piedmont plain landscape segment there were identified and described, in a complex way, 4 regional variants of ecosystem types, which are already known (Doniță N. et al., 1990) and there were determined and described 3 regional variants of new types. The predominant types are: **7135** –Turkey oak stand with *Genista-Festucaheterophylla* and **7833** –Mixed oak with *Agrostis-Carexbrizoides*.

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