RESEARCH OF THE MAIN TYPES OF FOREST ECOSYSTEMS ON THE WEST CRIŞANA LOW HILLS

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Abstract

The paper is a contribution to the development of regional ecosystem typology, which should highlight the types of existing forest ecosystems in a natural region and their regional peculiarities, as a basis for distinguishing geographical and ecological management measures.

Key words: forest typology, forest ecosystems, management measures, sustainable forestry.

INTRODUCTION

The forests in this area were managed by the Forest District Tinca from County Forest Administration Oradea. The last management plan for this district, which included all forests, was established in 1999. In the next years a part from these forests were returned, but so far interventions in private forests haven't changed their status.

The Low Hills, situated in the south western part of the study area, have average altitudes of 200-300 m, have reduce vertical fragmentation, with flat or slightly curved interfluves, elongated slopes and mid values inclinations. The valleys are rare, the clay deposits conditioning the formation of heavy soils and on slopes the clay-loam deposits, with alternation of sand and gravel deposits, conditioning the formation of normally hydric soils.

The relief is fragmented by valleys, the slopes being the main relief form but also extended plateaus. On slopes, the sedimentary formations of sand, loam, clay, gravel, caused the formation of basic stagnic luvisoil, at most mid basic, with a well balanced hydric regime and on few areas eutricamcisoils, more fertile and with a well balanced hydric regime.

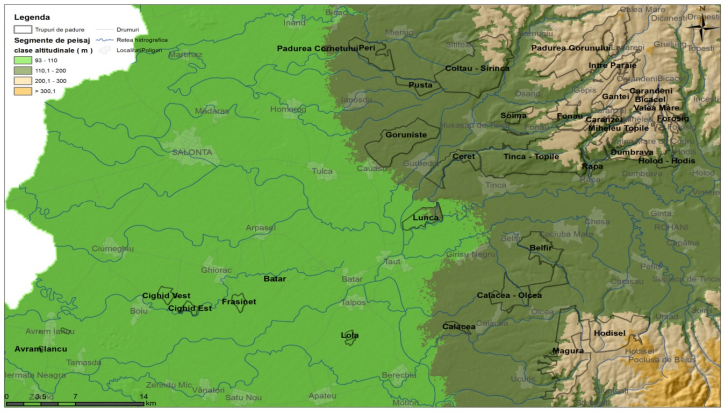

Fig. 1 The map of landscape types (source ArcGis, with modifications)

MATERIAL AND METHOD

The used working method has considered, mainly, forests with autochthonic stands, from natural regeneration (from seed or / and shoots) that can be applied typology ecosystem. These forests are the majority of the territory in case of which research has been done.

In order to establish the types of forest ecosystems were used the methodology proposed and used by N. Doniță and collaborators (1990) based on the following criteria:

- Stand composition, main producer of biomass, which establish through its quality most of the populations of consumers and decomposers and which, through the species of stand components, is an indicator of general and local climate, as well as other stationary features;
- The types of living cover (herbaceous layer), as indicators of the kinds of humus, acidity, trophicity and soil moisture;
- The main characteristics of soils, determined by analyzing samples taken from profile;
- The type of humus, as an indicator of the kind and intensity of the decomposition process of biomass.

As a result of digitized data processing from the descriptions of lots were established compartment with the same natural composition of stands, certified by natural regeneration from seed or sprout. Next, by researching these compartments on the ground, were established the suitable types of living cover and humus and were fixed points for soil sampling. Using these materials and soil characteristics ecosystem types were outlined, which included all ecosystems with the same species or combination of wood species, the same type of humus, ionic regime and soil moisture regime.

The types which were such outlined, were compared with those described in the monograph „Types of forest ecosystems in Romania" (Doniță and collaborators 1990), in order to determine which of the types

are already described, and which may be considered new. These were presented from the cited monograph, establishing their regional peculiarities, too.

RESULTS AND DISSCUSIONS

Through field and laboratory research on soils, phytocenoses and inventories of stands were identified in the segment of low hills landscape 8 types of forest ecosystems:

4236 European beech stand with middle productive common hornbeam, with moder, on brown luvic soils and luvisols, oligomesobasic, hydric balanced, with *Festuca drimeja* (regional variant with Turkey oak)

4636 High and medium productive Sessile oak - European beech mixed stand, with moder (mull-moder), on brown luvic soils and luvisols, oligomesobasic, hydric balanced, with *Festuca drimeja* (regional variant with common hornbeam and Turkey oak)

5135 Middle productive sessile oak stand, with moder, on brown luvic soils, sometimes brown acid too, hydric cvasiechilibrated and alternating on profile, with *Genista-Festuca heterophylla* (regional variant with Turkey oak)

5225 Sessil oak stand with middle productive common hornbeam, with mull-moder, developed on brown luvic pseudogleyied soils, mid and oligomid basic, hydrically well balanced and with alternating profile, with *Carex pilosa* (the regional type with turkey oak and with a highly productive subtype)

5535 Middle and low productive sessile oak- Turkey oak-Hungarian oak mixed stand, with moder, on brown and reddish brown luvic soils, pseudogleyed, oligomesobasic, hydric cvasiechilibrated and alternating on profile, with *Genista-Festuca heterophylla* (regional variant on stagnic luvosols)

5724 Turkey oak- sessile oak mixed stand with common hornbeam, high and medium productive on typical and stagnic luvosols, oligomesobasic, hydric cvasiechilibrated with Glechoma-Geum (regional variant with stagnic luvosols of a new type)

6732 Low productive sessile oak – common oak mixed stand with moder on luvisols and brown luvic, pseudogleyed, oligomesobasic soils, hydric deficit, alternating strong at surface, with *Poa-Carex praecox* (regional variant with Turkey oak and Hungarian oak)

7316 High and medium productive sessile oak – Turkey oak mixed hardwood stand (European white lime, common hornbeam), with mull, on brown typical and brown luvic, eubasic, hydric balanced soils, with *Asperula-Asarum-Stellaria* (regional variant of a new type of ecosystem)

Table 1

Types and surfaces of ecosystems within the study area

Code	Types of ecosystems	Surfaces in ha	Observations
	West Crişana low hills		
4236	European beech stand with common hornbeam with *Festuca drymeja*	456	
4636	Sessile oak - European beech mixed stand with *Festuca drymeja*	116	
5135	Sessile oak stand with *Genista-Festuca heterophylla*	56	
5225	Sessil oak stand with common hornbeam with *Carex pilosa*	787	
5535	Sessile oak- Turkey oak-Hungarian oak mixed stand with *Genista-Festuca heterophylla*	211	
5724	Turkey oak- sessile oak mixed stand with common hornbeam with *Glechoma-Geum*	3357	New type
6732	Sessile oak – common oak mixed stand with *Poa-Carex praecox*	56	
7316	Sessile oak – Turkey oak mixed hardwood stand with *Asperula-Asarum-Stellaria*	79	New type

The most common type is **5724** - Turkey oak- sessile oak mixed stand with *Glechoma-Geum,* on sunny and hemisunny slopes. A quite large area occupies the **5225** type - Sessil oak stand with common hornbeam with *Carex pilosa.* European beech stand with common hornbeam with *Festuca drymeja* (**4236**) and Sessile oak - European beech mixed stand, with *Festuca drymeja* (**4636**) occupies less area.

Table 2

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

Code	Types of ecosystems	The core of presence species
	West Crişana low hills	
4236	European beech stand with common hornbeam with *Festuca drymeja*	*Fagus sylvatica, Carpinus betulus, Rubus hirtus, Festuca drymeja, Lamium galeobdolon, Galium odoratum, Anemone nemorosa, Asarum europaeum, Dryopteris filix-mas*
4636	Sessile oak - European beech mixed stand with *Festuca drymeja*	*Quercus polycarpa, Fagus sylvatica, Carpinus betulus, Crataegus monogyna, Festuca drymeja, Geranium robertianum, Melica uniflora, Carex pilosa, Mycelis muralis, Stellaria holostea, Dactylis polygama*
5135	Sessile oak stand with *Genista-Festuca heterophylla*	*Quercus polycarpa, Ligustrum vulgare, Fragaria vesca, Lysimachia nummularia, Veronica officinalis, Brachypodium sylvaticum, Lapsana communis*
5225	Sessil oak stand with common hornbeam with *Carex pilosa*	*Quercus polycarpa, Carpinus betulus, Rubus hirtus, Carex pilosa, Cruciata laevipes, Dactylis polygama, Mycelis muralis*
5535	Sessile oak- Turkey oak-Hungarian oak mixed stand with *Genista-Festuca heterophylla*	*Quercus cerris, Q. polycarpa, Q. dalechampii, Q. frainetto, Crataegus monogyna, Fragaria vesca, Lysimachia nummularia, Veronica officinalis, Festuca heterophylla, Poa nemoralis, Veronica chamaedris, Chamaecytisus hirsutus, Campanula persicifolia*
5724	Turkey oak- sessile oak mixed stand with common hornbeam with *Glechoma-Geum*	*Quercus cerris, Q. polycarpa, Q. dalechampii, Carpinus betulus, Crataegus monogyna, Rubus hirtus*
6732	Sessile oak – common oak mixed stand with *Poa-Carex praecox*	*Quercus robur, Q. polycarpa, Crataegus monogyna, Fragaria vesca, Lysimachia nummularia, Geum urbanum, Agrostis stolonifera, Festuca heterophylla, Carex sylvatica, Polygonatum latifolium*

The types herbaceous layer, stationed indicators, identified and used in determination of ecosystem types, are: *Festuca drymeja*, *Carex pilosa*, *Asperula-Asarum-Stellaria*, *Agrostis-Carex brizoides* on low hills.

CONCLUSIONS

Based on a temperate climate, with Mediterranean shades, in the territory they have done research (Forest District Tinca), there are three geographical landscape segments which differ in climatic variations different in raining, relief, pedogenetic substrates, soils and biocenosis:

- West Crisana low hills;
- Crisana piedmont plain;
- Crisana alluvial plain.

Each geographical unit, either it is about zones – subzones, levels-sublevels, regions-provinces have distinct features which causes the existence of some inventory of types, with strong regional features.

This moment priority is the tendency to establish types of forests on small geographic units, at the level of landscapes (lands hafts), the typology having thus a strong regional feature.

Regarding forestry measures by type of forest culture have revealed that there were concerns relating to differentiating normal types but not the present state of the as result of more or less proper management methods. Forester practitioner is forced to differentiate on the basis of this action and the current state of forest types that manages them.

That is why we tried, as the research of this paper to establish ecosystem-based forest type principal existing in a territory smaller but representative low western hills within Tinca Forest District, to state the current status of types and propose appropriate management measures this state and designed to bring a type similar to the natural state.

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