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OAK COPPICES IN PRYKARPATTJA AND THEIR SPATIAL STRUCTURE

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The oak (*Quercus robur* L.) is one of the most emission species from genus "Oak" (*Quercus* L.). It has very wide natural habitat in European continent owing to high tolerance to humidity and temperature. Oak is good growing in semi humid natural conditions of Western Europe and bearing continental climate in Eastern Europe (Stoyko S., 2009).

Oak coppices were territorial and cenosis undergo changes in flat and low mountain areas. The main problems of its degradation are intensive exploitation last three centuries and insufficiently attention to oak's regeneration. All these were caused to simplification of form, structure and rare of oak stands and oak coppice especially. As result were formed stands with structure, which aren't agree with ecological demands (Smirnova O., 1994).

The modern level of forestry in oak's stands is oriented to receive largest volume of high quality wood with shortest period of growing. Accordingly the ways of increasing of productivity in oak's stands are principal task of foresters. But it caused contrary situations when in oak's area were cultivating low/middle quality wood species with short period of growing. In edge of forest were kept some specific oak's stands (coppices) with exclusive crown and stem forming. These stands are naming oak's coppices, which structure is mostly forming accordingly to influence of agriculture closeness, grazing and recreation site location.

Accordingly to forest data base, at 2011 in Prykarpattja were 108 336 ha of oak's stands, most of them (83%) were high productivity stands. Forestry activities in these stands are oriented mostly for high productivity forest with a lot of stems per ha. So in low productivity with small numbers of stems stands were

excluded from some activities. These stands are mostly located close to settlements and have little rectangular or rounded area (2-3 ha).

The **aim** of research is to evaluate spatial structure and species composition of oak's coppice.

Research methods. Remote sensing data allowed receiving some objective information about spatial structure of oak's coppice in Prykarpattya. In particular were used Landsat-8 data for photointerpretation of 3 research zones with possible growing coppices. Additionally were used cartography materials from forestry.

Based on extracted zones were conducted land investigation and chosen 5 areas (sample plots) for research. For biometrics estimation were measured trees on 3 rectangular (100×100 m) sample plots and calculated main taxation indexes. For this were used common silviculture and taxation techniques (Buzikin A. et al., 2009, Smirnova O. et al., 1994, Danchuk O. et al., 2007, Chirici G. et al., 2012, Commarmot B. et al., 2013, Donnelly K.P., 1978). For obtaining positions of sample plots were used GPS-receivers. The main taxation indexes were obtained with Field-Map technology, in particular stand composition, absolute stand density, volume of growing stock, vertical and horizontal structure et al.

The spatial structure was estimated with Cox index, Angle index and Shannon-Wiener index (diversity index) (Boyko S. et al., 2011, Kudejarov V. et al., 2007, Pretzsch H., 2001).

Results and discussion. It is distinguish 3 components of spatial structure (vertical and horizontal structure, abundance of tree species per ha).

The vertical structure was analyzed using measured trees height for all species on sample plots and divided on different tree levels. According to selected tree levels were calculated percentages of different levels.

Based on trees amount we investigated, that the highest level occupy 15-30%, middle level – 20-40%, lowest level accordingly 30-45%.

The main taxation indexes are presenting in article. The species compositions on sample plots are presented different species, mostly oak (7-10 units in composition). In different level the oak is presented from 3 to 10 units, the lowest level is composed mostly from softwood species, for example asp, willow

and alder. The total volume of oak's coppices are from 100 to 220 cubic meter per ha, where oak makes 70-90%.

Knowledge formation processes of horizontal structure are given possibility to determine the effectiveness of application of forest potential, the level of interspecific competition and space familiarization. The competition for space and resources is important factor in horizontal structure (Boyko S., 2011, Manoylo V., 2011).

Based on calculated different indexes (Angle index, Clark-Evans index and in Donnelly modification) we can affirm, that in oak's coppices are prevailing random location type with big gaps. This type is typical for all diameter groups (all levels), but for group with diameter less than 20 cm (mostly it is lowest level) the location type is contagious, which is more typical for young natural forests.

Additionally were calculated tree differentiation indexes (T_i) and species diversity indexes (M_i). The values of differentiation index (from 0,5 to 0,7) and species diversity index (0,43-0,84) means, that oak's coppices have high level of trees differentiation and species diversity.

Conclusions. It's important to study three different components for forest structure describing: spatial position of variety, species and varieties differentiation. Our research proving, that oak woods (coppices) in this region are natural origin and ecologically stable. The stands are forming multilevel, different ages with diffuse horizontal structure. The species and variety differentiation are quite high. Availability of undergrowth and low stand level (about 15 years old) are indicating, that in these stands were stopped harvesting of minor forest products.

So the horizontal structure is showing the process of stand forming, interconnection between individuals of population (competition and cooperation, dying and survival), estimating the level of anthropogenic influence for forest biocenoses.

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