

2. ЕКОЛОГІЯ ДОВКІЛЛЯ

УДК 581.526.42

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BIOECOLOGICAL FEATURES OF VEGETATION IN THE BEECH STANDS

In this study, it was investigated the amount and structure of the herbaceous species vegetation in beech stands in Lviv green zone. Learned how the quantitative and qualitative indicators of herbal plants, depend of management and lighting intensity. It was made comparative floristic analysis of the vegetation in parks and forest groups in beech phytocoenoses.

Keywords: beech stand, vegetation, management intensity, species classification, light

Forest is an ecological biogeocoenotic system, in which all parts are connected and can interact with each other; in which they are closely interrelated, so forest can not be considered by some of its separate elements. Neither, we can determine the status of stands only by energy of growth and development of aerial parts, disregarding the features of root systems, soil and climatic conditions, in which plants are growing.

An integral component of forest biogeocoenose is herb vegetation (vascular plants, soil cover plants). However, the productivity of the forests depends on many factors, e.g.: forest conditions, species composition, the age structure of forests, forest management systems, types of substrate, the intensity of human impact (*Alekseeva, Vahrameeva, Denisova, Nikitin, 1988*).

Thus, to understand the formation of the vegetation, we need to make a deeper analysis of the major floral representatives of vegetation in beech stands at different by management gradient areas (natural reserve, management forest and parks) of green zone of Lviv.

Methods and materials.

All sample areas are established in pure beech stands of different age, exposure and lighting of living herb cover. The type of substrate is distinctive for all sample areas – light gray forest podzolic soil on noncarbonated loam. The type of forest-vegetation conditions is also usual for all 10 sample areas – D₃ (wet grud).

Five different sites were selected in Vynnykivske Forestry, three areas in natural reserve "Roztochchya", one in the forest-park "Pogulyanka" and park "Zalizna voda" in Lviv city. In each sample area trees diameter was measured and registered in 4-cm classes (materials used: calliper, measuring tape). The light conditions of the stand were measured by illuminometer Z-116. Characteristic of the sample areas is presented in the *table 1*.

Recording vegetation on the each sample area was carried out in August and September 2009, by accounting plots. For this plots of 1 m² (1x1 m), was layed out along diagonals, distance between plots was 1 m. For the plots was recorded relative density and species composition of vegetation, the dominant species. Approximate number of plots was near 100 st.

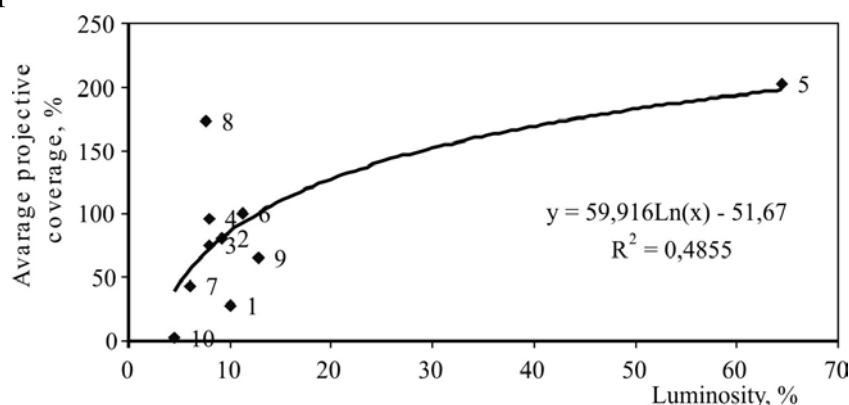
Table 1. Characteristics of the sample areas

№	Average diameter, cm	Average height, m	Exposition of the slop	Luminosity		Average projective coverage of vegetation, %	Average frequency of herbal species, %	No of families, st.	Typical species in beech stands	Untypical species in beech stands
				lux	%				%	%
Vynykivske Forestry										
1	50,7	30,2	eastern (15 °)	5,1	10,1	27,3	14,4	10	73	27
2	42,6	29,3	eastern (15 °)	4,6	9,2	81,3	31,4	9	33	67
3	31,2	28,6	north (20 °)	3,4	8,0	75,8	15,2	5	40	60
4	39,6	29,5	south – east (25 °)	3,6	7,9	96,1	30,8	12	69	31
5	38,4	28,1	north (30 °)	38,5	64,5	202,7	11,7	20	55	45
Natural reserve "Roztochchya"										
6	31,2	28,3	western (10 °)	6,5	11,2	100,0	28,4	8	50	50
7	20,3	23,7	north- west (10 °)	3,5	6,0	43,6	49,1	8	67	33
8	17,4	19,8	plain	3,3	7,6	173,7	39,6	9	75	25
Parks										
9	72,5	36,5	south – east (15 °)	7,6	12,8	65,9	12,5	16	46	54
10	42,3	26,5	western (30 °)	3,0	4,5	3,0	4,2	8	40	60

Results

1. Influence of light intensity on the projective cover of vegetation

The coefficient of the intensity of illumination under the shelter of the trees is ranged from 1.1 % to 64.5 % of full illumination (direct sunlight), which in absolute terms equal to 3,0-38,5 thousand lux (*figure 1*). The highest quantitative index of species in vegetation with sufficient light on the 5th and 8th sample areas, but distribution of species types is different. On sample area № 5 is dominated by typical forest vegetation, than on sample area № 8 is a significant number of meadow grass species.


Figure 1. Luminosity and projective coverage of vegetation

2. Influence of direction of the slope on a vegetation

There is greater correlation with the exposure of the slope (*figure 2*). At approximately the same intensity of light, in time of measuring, the bigger amount of species was presented on the south-eastern, eastern and western slopes of the

hills (sample areas – 4, 6, 2) and the lowest – on the northern (sample area – 3, 5). It obviously can be explained by the fact that on the southern and south-eastern exposition in the day time angle of incidence of light is close to straight. The northern slopes, however, receive less total dose of light through more reflection of surface and self shading.

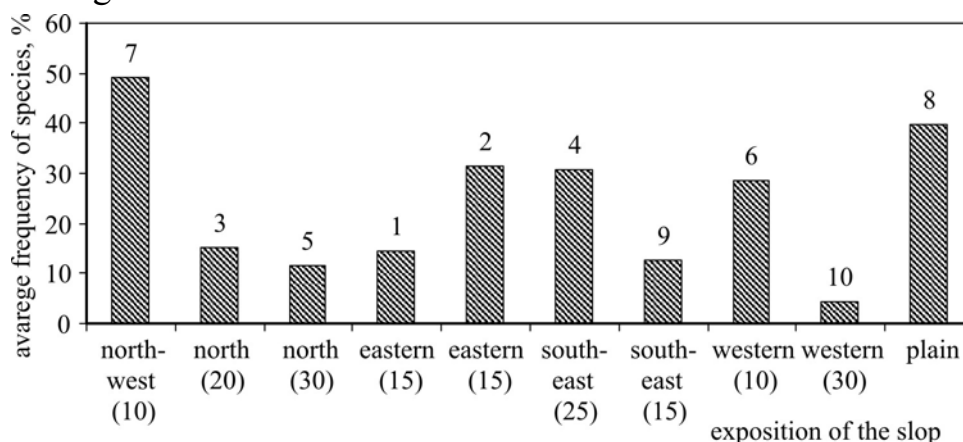


Figure 2. Changes in vegetation comparing to the exposition of the slop

Discussion

In this investigation was made calculation of light conditions under the shelter of the beech stand and on the open space territory. Percentage that equalled luminosity in the stand shows that the most powerful determinant of qualitative and quantitative characteristics of vegetation is lighting under the shelter. At the places where the density of the stand is lower and especially in gaps the occurrence of herb species and its richness is higher (*Galhiby, Mihok, at al., 2005*). Despite on the highest quantity of herbaceous plants with the sufficient luminosity on different sample areas, species diversity of this area has a different nature. At the same time, when on sample areas in the managed forest, there is presence of typical beech forest species of vegetation, on the plots of parks area is a significant admixture of meadow herbs. It clearly shows the impact of not only light influence, but also recreational and digression processes.

Comparing the sample areas at different levels of forest use, was studied, that on the flat territory – the number of projective cover is higher. This is primarily due to low stand density and low luminosity under the shelter of the trees. Also, this area is characterized by different layers of vegetation cover, where first layer belongs for typical shade-enduring species of vegetation, and the second for blueberries (the projective cover of the area is more than 100 %).

Conclusions

Thus, deeply analysing specific composition of the soil-cover plants, its distribution, quantitative and high-quality state, it is possible to make a conclusion, that in a high density stands of the Beech forests on the eastern border of its natural habitat is forming a wide spectrum of vegetation, which substantially enriches the diversity of these phytocenosis and carries out considerable co-influence on it.

The dispersal of different species is very much influenced by the local disturbances, special characteristics of the border between older forest and recent plantations, and light conditions.

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Павлюк Н.В., Чаплик О.А., Костецька Н.Л. Біоекологічні особливості вегетації букових насаджень

Досліджено кількість та структуру надґрунтового трав'яного вкриття букових насаджень у зеленій зоні Львова. Встановлено залежність кількісних та якісних показників трав'яної рослинності від освітлення та типу лісокористування. Здійснено порівняльний флористичний аналіз рослинності міських парків та лісових угруповань букових фітоценозів.

Ключові слова: букові насадження, рослинність, тип лісокористування, видова класифікація, освітленість

Павлюк Н.В., Чаплык О.А., Костецкая Н.Л. Биэкологические особенности вегетации буковых насаждений

Исследованы количество и структура напочвенного травянистого покрова буковых насаждений в зеленой зоне Львова. Установлена зависимость количественных и качественных показателей травянистой растительности от освещения и типа лесопользования. Проведен сравнительный флористический анализ растительности городских парков и лесных группировок буковых фитоценозов.

Ключевые слова: буковые насаждения, растительность, тип лесопользования, видовая классификация, освещенность.

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ПИТАННЯ КОНВЕРГЕНЦІЇ ВУГЛЕЦЕВИХ ВИКИДІВ

Розглянуто питання конвергенції вуглецевих викидів країн світу. Наведено порівняльні дані про викиди CO₂ у різні епохи розвитку людства, а також про його вплив на довкілля. Встановлено, що вуглецевий слід одного мільярда бідних людей на планеті оцінюється спеціалістами в 3 % загального сліду людства. Проживаючи в