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**The influence of altitude on selected physiological properties of leaves of green alder (*Alnus viridis* DC.) in the Bieszczady**

*Alnus viridis* (Chaix) DC. – green alder – it's east – Carpathian species of the family (Betulaceae), which in the Western Bieszczady reaches the northern and north – western limit. Naturally occurs primarily on the Bieszczady mountain pastures – above the upper limit of the forest. However, changes at the turn of the century in land use cause that descends into the valley of the mountain, descends in a mountain valley, on areas previously used for agricultural purposes, by creating anthropogenic position. Thus, – expansion of the range of *A. viridis* north and west indicates that the species may become expansive also in Poland. Therefore, understanding the physiology of the species at different heights above the sea level may, in correlation with other environmental factors help to clarify the problems chorology. Therefore – in this paper we attempt to know the influence of height above the sea level on selected physiological properties of *A. viridis*.

The study was carried out (mostly by non–invasive methods) on the leaves of *A. viridis* in the years 2012 – 2014 at the beginning and end of the growing season (July and September) at four positions of different heights above the sea level. The position of the lowest was located in Łobozew (568 m above sea – level), and another – on the Bieszczady National Park are: – Przełęcz Wyzna (980 m above sea – level), Połonina Wetlińska (1215 m above sea – level) and the highest peak Tarnica (1320 m above sea – level). Examined were morphological properties of leaves, content of chlorophyll (Chl) and flavonoids (Flav) and differences in the chemical composition of the leaves using the FT – Raman spectroscopy method. By measuring the parameters of fast chlorophyll *a* fluorescence induction kinetics and imaging of Chl *a* fluorescence, photochemical efficiency of photosystem II (PS II) was specified. Degree of discrimination  $^{13}\text{C}$  ( $\delta^{13}\text{C}$ ), which for  $\text{C}_3$  plants is an integrated measure of the internal physiological "opportunities" of plant and external conditions affecting the gas exchange was also investigated.  $^{15}\text{N}$  content in the leaves was also tested, which value describes the ability of the plants, symbiotic  $\text{N}_2$  binding, to fractionation N isotope. Based on the analysis of reflection spectra of radiation from the leaves were determined coefficients indicating the content of anthocyanins (ARI1), carotenoids (CRI1), flavonoids (FRI) and water (WBI) in the leaves of *A. viridis*. They were also independent of the structure of the photosynthetic rate (SIPI) and photochemical reflection index (PRI). Based on the fluorescence emission spectra of the leaves was estimated changes in the content of phenolic compounds.

Generally it can be said that the vast majority of the observed differences in the values of the physiological parameters studied plants *A. viridis* could be associated with the position of the views expressed in m a.s.l. However, the impact of habitat conditions, especially such as proximity to other – higher plants, has been very clearly defined. The good condition of the plant, probably introduced accidentally to a lower position, indicates a real danger that the test species can play an important role in the overgrowing of abandoned agricultural land.

The present work is probably the first such comprehensive study of the physiology of *A. viridis* in Poland.