

ABSTRACT

Hieracium aurantiacum L. is a mountain plant species, which is typically found on the meadows of the Bieszczady Mountains. However, it has recently been observed on the lower areas of the Polish Carpathians. Thus, the aim of the paper is comparison of selected physiological features of *H. aurantiacum* growing on two stands within its range, and on four stands located beyond local northern border of the range.

The research was conducted in the years 2011 to 2013 (mostly by means of non-invasive methods) on the leaves of *H. aurantiacum*, in the blooming phase of the species. The changes in chlorophyll (Chl) and flavonoids (Flav) content, as well as the differences in chemical composition of the leaves have been determined by means of FT-Raman spectroscopy method.

On the basis of the analysis of reflection spectra of photosynthetically active radiation, the ratios indicating the content of anthocyanins, carotenoids, flavonoids and water in leaves have been determined. The research has also pinpointed the photochemical efficiency of photosystem II (PS II) and level of carbon ^{13}C discrimination ($\delta^{13}\text{C}$), which is for the C_3 plants a comprehensive measure of their internal physiological “capacities”, as well as external environmental conditions influencing gas exchange. The chemical composition of soil on the researched stands has also been analyzed in order to estimate the extent to which the differences in its composition may contribute to *H. aurantiacum* spread.

Generally speaking, a vast majority of the differences in the values of studied physiological parameters of *H. aurantiacum* do not point to connecting them with the location of the stand in relation to local northern border of the range. The observed differences seem to stem from the specificity (microclimate) of different habitats.

The data concerning ^{13}C ($\delta^{13}\text{C}$) discrimination in *H. aurantiacum* indicate high capacity for binding CO_2 , in a way other than via Rubisco, and are undoubtedly the most valuable outcome of the research.

The paper is certainly the first in Poland, and presumably in the world, elaboration on the physiology of *Hieracium aurantiacum* L.