Ecophysiological characteristics of *Luzula sylvatica* from arcto-alpine tundra

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Luzula sylvatica belongs to the Juncaceae family which is widespread all around the world. Representatives of the *Juncus* and *Luzula* genera grow in both hemispheres, generally in badly drained soils. The Juncaceae family is known to contain a large variety of phenanthrenoids. The compounds belong to a class of aromatic metabolites which are formed by oxidative coupling of the aromatic rings of stilbene precursors. They have been investigated recently (*e.g.* Bús et al. 2018, Gainche et al. 2020) and their biological activities tested as well. Ecophysiological characteristics of *L. sylvatica*, however, remain rather unknown and the species responses to environmental factors poorly understood. Moreover, recent knowledge of the physiological background of protective mechanisms against cold and high light in *L. sylvatica* from mountainous ecosystems (partly above a tree line) is still fragmentary. Therefore, ecophysiological paramaters of sun and shade populations of *L. sylvatica* were measured and compared in this study. The *L. sylvatica* plants were collected from acrto-alpine tundra (Jeseníky Mts., NE Czech Republic) from the altitudes of 1 420 m a.s.l. (sun plants), and 1 350-1 390 m a.s.l.). The locality is typical by mean annual temperature of 0.9°C and snow cover duration up to 230 days. The thickness of snow cover reaches a up to 250 cm during winter time (Buček 1994). Significant differences were found in the below-specified characteristics when sun and shade leaves were analysed and compared. Majority of results on the content of phenanthrenoids, UV-absorbing compounds, differences in chlorophyll and carotene contents, and leaf anatomical properties have been published (Barták et al. 2020). Therefore, supplementary data are presented and discussed here. Optical properties of sun and shade leaves showed significant differences. Sun leaves from open habitats were yellowish green (compared to deep green shade leaves) and had higher leaf reflectance in the wavelength range of 400-700 nm. The sun leaves were generally thicker than shade ones and had less chlorophyll (approx. 3 times lower total chlorophyll content in sun than shade leaves) when expressed on dry matter and/or area of leaf cross section basis. Follow up study will focus on the seasonality of phenanthrenoid production in the two leaf categories and season-related variation in chlorophyll content in *L. sylvatica* measured *in situ* using spectrometrical approach (SPAD method, *e.g.* Abbasi et al. 2014).

REFERENCES

ABBASI, G. H. et al. (2014): *Plant Growt Regulation*, 75: 115-122.
BARTÁK, M. et al. (2020): *Czech Polar Reports*, 10(2): 263-280.
BUČEK (1994): Charakteristic of the Hrubý Jeseník Mts natural environment, forest regeneration in the extreme air-polluted region of the Hrubý Jeseník Mts. *Seminar proceedings*.
BÚS, C. et al. (2018): *Phytochemistry Reviews*, 17: 833-851.
GAINCHE, M. et al. (2020): *Molecules*, 25: 2372; doi:10.3390/molecules25102372

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