

## Project Update: January 2017

The third part of the project was publishing of recommendations for the conservation of rare arctic-alpine plant populations in the Ukrainian Carpathians. Article "Recommendations for the conservation of some rare arctic-alpine plant species in the Chornohora Mountains (Ukrainian Carpathians)" was published in "Scientific Bulletin of Ukrainian National Forestry University" (<http://nv.nltu.edu.ua/en/>) in the issue № 26.8 in December of 2016 year. The full article can be downloaded from this link ([http://nltu.edu.ua/nv/Archive/2016/26\\_8/41.pdf](http://nltu.edu.ua/nv/Archive/2016/26_8/41.pdf)). Also I attached an article in PDF format in the attachment to the letter.

We chose the next model species for analyses in the article: *Anemone narcissiflora* L., *Bartsia alpina* L., *Cerastium lanatum* Lam., *Dryas octopetala* L., *Lloydia serotina* (L.) Reichenb., *Loiseleuria procumbens* (L.) Desv., *Pedicularis oederi* Vahl, *Salix herbacea* L., *Saussurea alpina* (L.) DC. Of these *Anemone narcissifolia*, *Dryas octopetala*, *Lloydia serotina*, *Loiseleuria procumbens*, *Pedicularis oederi*, *Salix herbacea* and *Saussurea alpina* are listed in the Red Book of Ukraine.

We studied the population structure using methods of labelling of individuals. Much attention was paid to demographic aspects, including such parameters as age structure, ontogeny and vitality of individuals, reproduction and sexual structure. Laboratory germination was investigated by germination of seeds for 120 days under room temperature and lighting. Seeds were germinated also after ultraviolet irradiation (wavelength ( $\lambda$ ) – 253, 7 nm), which lasted for 1 minute, and after 60 minutes of irradiation with light red spectrum ( $\lambda$  = 668 nm; density of irradiation  $P = 0.6\text{--}0.8$  mW/cm<sup>2</sup>). Part of seeds were subjected to influence of cold stratification. Seeds were frozen in a freezer for 15 and 30 days at -10° C.

As a result of research it was found that reproductive parameters, in particular, the coefficient of generative reproduction and recovery index can be used as sensitive indicating signs of anthropogenic changes. The results about seeds reproduction of *Cerastium lanatum*, *Dryas octopetala*, *Loiseleuria procumbens* and *Saussurea alpina* can be used for the cultivation of these species in culture and their subsequent reintroduction to natural localities. Information about factors that promote or inhibit the generative reproduction, for example local point disturbances or damages of soil and grass cover, can help managing the ontogenesis of species during their cultivation and conservation.

Considering the fact that a large part of rare arctic-alpine plant species, in particular, *Anemone narcissifolia*, *Dryas octopetala*, *Lloydia serotina*, *Loiseleuria procumbens*, *Pedicularis oederi*, *Salix herbacea*, *Saussurea alpina* are extended on Chornohora array from the Brebeneskul mountain to the Pip Ivan mountain, it is important to expand the surface of protected areas in the south-eastern part of the ridge.

You can find more detailed information about the results of research in the article: [http://nltu.edu.ua/nv/Archive/2016/26\\_8/41.pdf](http://nltu.edu.ua/nv/Archive/2016/26_8/41.pdf).

The next part of the project will be publication of popular-scientific book about arctic-alpine plant species and its dissemination across different institutions.