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## **Alternative methods of controlling Sosnowsky's hogweed *Heracleum sosnowskyi* Manden**

### **SUMMARY**

In agriculture, invasive plants have always been a threat to crops. However, this threat took on a new dimension when one of the potentially highly productive crops revealed its invasive nature. After its intensive, controlled cultivation was stopped, Sosnowsky's hogweed began to invade the entire territory of our country. Unlike other invasive plants, it is a species very dangerous to the health and even life of humans and animals. It is also a species very difficult to eradicate using classic methods used in modern agriculture. Moreover, most standard methods of its control carried out using total herbicides bring more losses than benefits to local phytocoenoses affected by this species invasion.

The aim of the work was to find alternative methods of controlling Sosnowsky's hogweed that are highly effective and selective in relation to the target plant and at the same time least harmful to other plant species present in phytocoenoses affected by Sosnowsky's hogweed invasion. Their use should enable the restoration of areas affected by the invasion of this species to agricultural use by effectively eliminating hogweed, enabling the succession of native plant species. The use of these methods should not deteriorate the quality of soil and water in local watercourses in the areas where they will be used.

During the preliminary and comprehensive field experiments lasting three growing seasons, a total of 18 selected preparations and chemical substances with phytotoxic effects known from the available literature or expected. These were: the mineral preparation "Perlka" used to combat Sosnowsky's hogweed in eight different forms: granulate in commercial form, widely available in retail and wholesale; fine-grained mineral preparation "Perlka" packaged in hard gelatin capsules; fine-grained mineral preparation "Perlka" packaged in hard cellulose capsules; fine-grained mineral preparation "Perlka" packaged in sachets made of tailor's fleece; paste based on the mineral preparation "Perlka" and glycerol; paste based on the mineral preparation "Perlka" and rapeseed oil; and paste based on the mineral preparation "Perlka" and paraffin-vaseline oil. 17 other methods were also tested using alternative preparations/substances. The effects of all forms of the mineral preparation "Perlka" and 17 alternative preparations applied to the cut generative stem of Sosnowsky's hogweed were tested, as well as seven forms of the preparation "Perlka" and also 17 alternative substances dosed to the complete generative shoot of Sosnowsky's hogweed through a hole drilled in it.

The method of combating Sosnowsky's hogweed, selected as the most effective and at the same time least harmful to other plants as a result of the research, consisting in introducing the granulated mineral preparation "Perlka" into the interior of the cut generative stem, turned out to be an innovative pro-ecological method. It should be classified as a mechanical-chemical method. It is completely selective. With its help, with 100% effectiveness, generative specimens of Sosnowsky's hogweed are selectively controlled, resulting from natural selection of seeds and seedlings with other species and intra-species competition, which pose a real risk of spreading the species by producing seeds. Unlike methods using herbicides in the form of sprays, it does not destroy other plant species, and does not create herbicide fallow, which often leads to mass appearance of Sosnowsky's hogweed seedlings or other invasive species. According to most researchers, this method should be used consistently for the next five years - due to the viability of Sosnowsky's hogweed seeds in the soil. In the 5-year period of hogweed control using "Perlka", instead of destroying hundreds of plant species and introducing large amounts of harmful herbicides into the natural environment, the soil will be fertilized with a mineral preparation containing nitrogen at the level of 118 - 133 kg · ha<sup>-1</sup> (approx. 14-16% of the permissible annual nitrogen dose). Additionally, a treatment will introduce calcium into the soil (approx. 60 kg · ha<sup>-1</sup> CaO per year), which should further improve soil productivity, which, as analyses have shown, is not contaminated with mobile forms of heavy metals, arsenic or aluminum during these treatments. This method causes the abundant development of other plants that survived the invasion of Sosnowsky's hogweed. Ultimately, after the complete elimination of Sosnowsky's hogweed, the area occupied by it began to gradually transform into a meadow community that existed before the hogweed appeared, which was proven in this work. There was also no negative impact of this method on the quality of soil and water in local watercourses in the areas where it was used.

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miejsowość i data

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podpis