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Effect of Herbicide Mixtures on *Heracleum sosnowskyi* Control †

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Abstract: Sosnowsky's hogweed (*Heracleum sosnowskyi*) is a dangerous perennial invasive alien plant spreading across Lithuania as well as in other European nations. The control of this plant is complicated due to well-developed biological characteristics that impact chemical management and reproductive potential. In order to achieve effective control of this species, it is critical to select effective herbicides or their mixtures. Field experiments, designed to compare the efficacy of different herbicide mixtures used to control Heracleum sosnowskyi, were conducted in 2017–2018 in Lithuania, Marijampolė district, Varnupiai (coordinates 54°29'19.54" N latitude, 23°30'45.9" E longitude). The most rapid control was provided by an herbicide mixture of fluroxypyr 360 g ha^{-1} + metsulfuron-methyl 4.0 g ha^{-1} + tribenuron-methyl 7.5 g ha^{-1}. Two weeks after spraying, the amount of Sosnowsky's hogweed decreased by 2.1 fold. Significant control (reduction of hogweed stands by 1.3 and 1.5 fold) was also identified with mixtures of fluroxypyr 360 g ha^{-1} + metsulfuron-methyl 4.0 g ha^{-1} and fluroxypyr 360 g ha^{-1} + tribenuron-methyl 7.5 g ha^{-1}. A mixture of metsulfuron-methyl + tribenuron-methyl at both lower and higher rates substantially reduced the amount of Sosnowsky's hogweed plants at four weeks after spraying. Six weeks later, the efficacy of herbicide mixtures ranged from 44 percent with fluroxypyr 360 g ha^{-1} + metsulfuron-methyl 4.0 g ha^{-1} to 59.3 percent with fluroxypyr 360 g ha^{-1} + metsulfuron-methyl 4.0 g ha^{-1} + tribenuron-methyl 7.5 g ha^{-1}. In the spring of 2018, control was evaluated and the plant stand in infested fields sprayed with herbicide mixtures fluctuated from 1.0 to 3.6 plants/m^2 and was significant lower (by 6.4 to 23.0 fold) in contrast to control fields that were not treated. Herbicide efficacy observed was as high as 86.2–96.2%. Most efficacious herbicide mixtures included fluroxypyr 360 g ha^{-1} + metsulfuron-methyl 4.0 g ha^{-1} + tribenuron-methyl 7.5 g ha^{-1} and metsulfuron-methyl 6.0 g ha^{-1} + tribenuron-methyl 11.3 g ha^{-1}.

Keywords: *Heracleum sosnowskyi*; fluroxypyr; metsulfuron-methyl; tribenuron-methyl; efficiency of herbicides

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