

Integrating common control methods for wild parsnip (*Pastinaca sativa*) near roads with imazapic + metsulfuron for grass height suppression.

Roadside rights-of-way (ROW) provide important ecosystem functions, but they also are dispersal corridors for invasive plants. While ROW land managers actively control invasive plant infestations, budget constraints and limited information on effective control techniques often prevent management. To address these limitations, we conducted experiments at two locations in Wisconsin to demonstrate control of wild parsnip (*Pastinaca sativa* (L)). Wild parsnip is one of the most common invasive plants in Wisconsin ROW with over 12,000 populations reported throughout Wisconsin. We tested the effectiveness of nine herbicide-based and five mechanical management methods for controlling and preventing seed production of wild parsnip. Because ROW vegetation is typically mowed two to five times per year in Wisconsin, we also compared the effectiveness of imazapic + metsulfuron alone and in combination with aforementioned methods. Imazapic + metsulfuron has been shown to reduce grass height, allowing for a reduction in mowing frequency, potentially saving money while providing invasive plant control.

Herbicides broadcasted in May 2019 included aminopyralid (87 g ai ha⁻¹) + metsulfuron (13 g ai ha⁻¹), aminopyralid (142 g ai ha⁻¹) + florypyrauxifen (12 g ai ha⁻¹), aminopyralid (199 g ai ha⁻¹), metsulfuron (21 g ai ha⁻¹), aminocyclopyrachlor (140 g ai ha⁻¹), 2,4-D (529 g ai ha⁻¹) + dicamba (326 g ai ha⁻¹), and indaziflam (40 g ai ha⁻¹). Two treatments were applied as individual plant treatments (IPT), including 2,4-D (0.5% v/v) + dicamba (0.5% v/v), and glyphosate (1% v/v). Mowing and individual plant removal treatments were also included as well as an untreated control. All treatments were replicated three times. Imazapic (66 g ai ha⁻¹) + metsulfuron (32 g ai ha⁻¹) was applied to ½ of each treatment to compare the effectiveness of this application alone or in combination with other methods.

Aminopyralid + metsulfuron, aminopyralid + florypyrauxifen, metsulfuron, and aminocyclopyrachlor treatments provided greater than 90% control of target species at 1.5 and 4 months after treatment (MAT) and prevented the production of any viable seed. Mowing reduced viable seed production (> 70% reduction in flowering plants) if conducted multiple times or at the appropriate timing, but control was low by 4 MAT (<50%). IPT resulted in variable control, providing 76 – 81% control at 1.5 MAT and 12–28% control at 4 MAT. However, IPT did reduce viable seed production to similar levels as in mowing treatments. Including imazapic + metsulfuron suppressed grass height by 44% at 1 MAT and by 34% at 3 MAT, and when applied alone, provided comparable control (>90%) to other high-performing herbicide treatments. Results demonstrate that a range of tools exist to control wild parsnip. Of effective methods demonstrated, imazapic + metsulfuron treatment shows promise as a tool for managers with limited budgets, as it provides effective control of wild parsnip while reducing mowing frequency. This would result in a reduction in ROW vegetation management costs compared to mowing alone.

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