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Comparison of Herbicide Mixtures for Exotic Shrub Suppression in Wildland Settings.

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Desired characteristics of herbicides for use in wildland settings include broad species spectrum, reduced soil activity, and aquatic labeling. The combination of glyphosate plus triclopyr meets these criteria, and is a standard treatment in state parks in Pennsylvania. Another desired trait would be safety to grasses to increase selectivity. Glyphosate-free foliar herbicide combinations were evaluated against burning bush (*Euonymus alata*) and privet (*Ligustrum obtusifolium*) at Gifford Pinchot State Park, Lewisberry, PA; and Morrow's honeysuckle (*Lonicera morrowii*), autumn olive (*Elaeagnus umbellata*), and Japanese barberry (*Berberis thunbergii*) at Bald Eagle State Park, Howard, PA. Candidate herbicides to combine with triclopyr were 2,4-D (aquatic labeling, reduced soil activity), and the pre-mixed herbicides aminopyralid plus metsulfuron methyl and aminocyclopyrachlor plus metsulfuron methyl. The pre-mixed herbicides are broad spectrum, and have useful, but terrestrial-only labeling. They are also soil-active and will require low application rates for widespread adoption. Glyphosate plus triclopyr at 3.4 plus 1.7 kg ae/ha was used as a standard. Alternate treatments included triclopyr alone at 3.4. kg ae/ha, or in combination with 2,4-D at 2.2 kg ae/ha, and triclopyr at 1.7 and 3.4 kg ae/ha combined with a pre-mix of aminopyralid plus metsulfuron methyl at 0.12 kg ae/ha plus 0.021 kg/ha, or a pre-mix of aminocyclopyrachlor plus metsulfuron methyl at 0.13 plus 0.042 kg/ha, respectively. Treatments were applied individually to five plants each at 700 L/ha, based on canopy basal area, with an oil-based surfactant included at 1.0 percent, v/v. Treatments were applied September 1 and September 16, 2011, and final evaluations recorded September 12 and September 7, 2012, at the Gifford Pinchot and Bald Eagle sites, respectively. The glyphosate plus triclopyr standard averaged 98 to 100 percent reduction across the five species. There was no significant treatment effect for autumn olive and privet, with reduction ranging from 98 to 100 percent and 93 to 100 percent, respectively. Differences in Japanese barberry were numerically small, but significant. Triclopyr plus 2,4-D was rated at 95 percent reduction, compared to 98 to 100 percent for the remaining combinations. Triclopyr plus 2,4-D was rated significantly lower than the other combinations for honeysuckle as well, 92 percent compared to 97 to 100 percent. Triclopyr alone performed better than expected against honeysuckle at 97 percent reduction. This treatment has historically not been operationally acceptable. The greatest differences were observed on burning bush. Triclopyr alone or with 2,4-D was rated at 76 or 81 percent reduction, compared to 96 to 99 percent for the other combinations. The combinations including the aminopyralid or aminocyclopyrachlor pre-mixes with metsulfuron were highly effective, regardless of triclopyr rate, suggesting there is latitude to investigate further dosage reduction.