

USE OF HERBICIDES TO RESTORE NATIVE GRASSLANDS. Thomas G. Barnes and Marvin Ruffner, Extension Professor and Graduate Research Assistant, Department of Forestry, University of Kentucky, Lexington, KY 40546-0073

We implemented two field research studies throughout Kentucky during the spring 2001 and 2003 to determine the efficacy of using herbicides to remove tall fescue (*Festuca arundinacea*) from native grasslands dominated by indiangrass (*Sorghastrum nutans*), little bluestem, big bluestem (*Andropogon gerardii*), switchgrass (*Panicum virgatum*), purple top, Elliott bluestem, splitbeard, broomsedge, and tall dropseed (*Sporobolus asper*). The second objective was to evaluate which broadleaf species resisted the effects of the herbicide. The first study was a randomized-block experiment implemented at 4 sites in the outer bluegrass and Missippian Plateau region of Kentucky.

We evaluated the use of 0.21 kg ai/ha Clethodim and 0.21 kg ai/ha Imazapic against an untreated control in 0.1 ha treatment plots that were approximately 50% native warm season grasses and 50% tall fescue. A methylated seed oil surfactant at 2.3L/ha and 28-0-0 liquid fertilizer were including with all herbicides following manufacturer's recommendations. All herbicides were sprayed with a Demco™ spray unit delivering a spray volume of 187 L/ha at 414 kPa through Tee-Jet 8003 flat fan nozzles attached to an all-terrain vehicle driven at a constant speed of 2 - 3 kph. The herbicides were applied at two different time periods, one in late March and the second spraying in mid-April. The second study evaluated the use of 0.2 kg ai/ha Clethodim, 0.21 kg Imazapic ai/ha, and 0.03 ai/ha sulfosulfuron against an untreated control in a completely randomized experiment at 14 locations representing most of the physiographic regions across Kentucky. Individual treatment plots were 3 x 10m and the herbicide was applied with a backpack sprayer delivering 187 L/ha at 414 kPa through Tee-Jet 11002 flat fan nozzles while walking at a constant rate of 2 - 3 kph. In the first study, both the Clethodim and Imazapic treated plots worked at removing the tall fescue irrespective of the spraying date. The amount of tall fescue was reduced from an average of 42.5% to less than 1% in all the treatment plots irrespective of the herbicide used. By the end of the second year, the percent fescue began increasing in the Clethodim treated plots and not the Imazapic treated plots. The NWSG responded to the herbicide treatments and was increased in all plots except the plots sprayed with Clethodim in April. The Imazapic plots had higher percent NWSG cover than the Clethodim plots irrespective of time of herbicide application and averaged 41.8%, 25.8%, 52.8% and 55% in the early and late Clethodim plots and the early and late Imazapic plots respectively.

The percent tall fescue in the pre-treatment plots from the second study ranged from 25 to 70% and NWSG percent ranged from 40 to 50%. Total vegetative cover averaged across all 14 sites was 92.8% and tall fescue cover averaged 45.9%. The mean cover by the NWSG was 39.6% with an average species richness of 6.1. As expected, all three herbicides provided substantial efficacy in killing tall fescue. The average percent tall fescue was 7.8%, 1.2%, and 3.8% in the Clethodim, Imazapic, and Sulfosulfuron plots respectively. The percent cover in the Imazapic and Sulfosulfuron plots was higher than the Clethodim plots and averaged 74.6%, 60.5%, and 39.2% respectively. The amount of bare ground was similar between treatments and averaged between 20.5 to 29.4%. Species richness was also similar although the Clethodim plots had a higher average number of species. Typical groups of broadleaf plants or wildflowers that appeared to resist the effectiveness of the herbicides were typically in the composite or legume family. Managers should proceed with caution because in some cases, invasive exotic species like crown vetch or sweet clover invaded plots where the fescue was eliminated. This information shows that herbicides can be used to restore native grasslands but more information is needed to determine which additional species of broadleaf plants or wildflowers resist the effects of various herbicides.