

## ABSTRACT

In the United States, the US EPA has the responsibility for the registration of pesticides under the Federal Insecticide, Fungicide, and Rodenticide Act. Prior to registration applicants must demonstrate their product will not adversely affect human health or the environment. The potential adverse effects of unintended pesticide movement to nontarget terrestrial plant communities are a major concern in the registration and re-registration of pesticides. For the protection of nontarget terrestrial plants this requires two simple, single species greenhouse tests with an increasing level of test sophistication required if a compound fails at the preceding level. This culminates in a field test which currently is not well-defined. Our objective was to develop a regional field test that is simple, economical, geographically flexible and with endpoints of ecological significance and compare the results with the standard greenhouse tests. Three plant species native to Oregon: *Clarkia amoena* (Farewell to spring), *Prunella vulgaris* (Self-heal), and *Festuca roemerii* (Roemer's fescue) were grown together along with a fourth introduced species, *Cynosurus echinatus* (Bristly dogtail grass). The experiment was replicated at two Oregon State University farms within the Willamette Valley, Oregon and repeated for three years with glyphosate and two years with aminopyralid treatments. Glyphosate was applied as Roundup Original® [41% active ingredient (a.i.)] at 0, 0.01, 0.1, and 0.2 x FAR (Field Application Rate) of 832 g/ha acid equivalent (a.e.). Aminopyralid was applied as Milestone® (40.6% a.i.) at 0, 0.037, 0.136, and 0.5 x FAR of 123g/ha a.e. Both the glyphosate and aminopyralid treatments included Preference® surfactant. The control was a no spray treatment. Plant height and volume [height x width (in two perpendicular

directions)], were measured every two weeks during the growing season. Total seed production over the growing season was determined for *C. amoena*. Differences in plant response between sites and years were minor. With glyphosate, plant height and volume decreased with increasing herbicide concentration for all four species, and for nearly all farm x year combinations. With aminopyralid, *C. amoena* died at nearly all concentrations, sites and years, while the effects on the other three species were much less pronounced and variable. *C. echinatus* tended to increase in height at the lowest concentration of aminopyralid while decreasing at the highest concentration. *P. vulgaris* had a few significant increases in volume and height at the lowest aminopyralid concentration and decreases at the highest concentration. *F. roemeri* had no significant effects from aminopyralid. *C. amoena* was the only species producing a large amount of seed and exhibited a substantial reduction in total seed weight with both glyphosate and aminopyralid. The relative rank in glyphosate sensitivity among species in the field, based on height, differed from the ranking based on greenhouse studies, while relative responses to aminopyralid were similar in the greenhouse and field. The results indicate that a simple field test can be successfully designed to investigate the ecological effects of herbicides on plant communities and supplement information gained from greenhouse tests performed in controlled environments.

Comment [OD1]: Is this true?