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Understanding the Effects of Herbicide Application on Hoary Alyssum (Berteroa incana L.) Seed Biology

Hoary alyssum (*Berteroa incana* L.), a non-native plant, invasive plant is difficult to manage because of its long flowering period, during which it simultaneously flowers and produces seeds. Consequently, improper herbicide application may kill flowers but not seeds. Since hoary alyssum reproduces exclusively by seed, we examined how different herbicides affect its seed production, viability, and germination. Invasive plant managers treated hoary alyssum with various herbicides on six rangeland sites across southwestern Montana. Managers recorded flower and seed pod development of hoary alyssum. We randomly collected 20-30 hoary alyssum plants from treated and non-treated areas at each site about four weeks post-treatment. We determined seed production and analyzed seed viability using tetrazolium tests. Seed germination was examined for two sites under current and predicted temperatures. At four of six sites, herbicide treatments reduced hoary alyssum seed production by 49-98% compared to non-treated areas. Herbicide treatments significantly reduced seed production at sites sprayed at early developmental stages, or when on average, <50% of a flowering stem had seed pods. All herbicide treatments, except for chlorsulfuron + 2,4-D, significantly decreased seed viability. Seed viability in non-treated areas ranged from 36-73%. Seeds from treated areas, except those treated with chlorsulfuron + 2,4-D, exhibited 0-21% viability. While we are still analyzing germination, we predict that germination will increase with temperature, but the relationship may vary across herbicides. Our research suggests that the application of some herbicides early during hoary alyssum flower and seed pod development can effectively reduce seed production and viability.

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