

## PROJECT SUMMARY

**Title:** Efficacy and economics of cultural and mechanical weed control practices for herbicide-resistant weed management.

|                                 |  |
|---------------------------------|--|
| <b>PD:</b> Kniss, Andrew R.     | <b>Institution:</b> University of Wyoming          |
| <b>CO-PD:</b> Ritten, John A.   | <b>Institution:</b> University of Wyoming          |
| <b>CO-PD:</b> Wilson, Robert G. | <b>Institution:</b> University of Nebraska-Lincoln |
| <b>CO-PD:</b> Jha, Prashant     | <b>Institution:</b> Montana State University       |

Cultural and mechanical weed management practices are underused in many cropping systems, particularly for herbicide-resistant weed management. This may be due, in part, to a lack of knowledge on the impact of non-herbicide management practices on herbicide-resistant weed development. Modeling is currently the most common approach for comparing the impact of weed control practices on herbicide-resistant weed evolution. Nearly all modelers recognize the importance of validating assumptions and results of predictive models through field research, yet there is an alarming lack of field studies that quantify the impact of non-herbicide weed management practices on the evolution of herbicide-resistant weed populations. We propose conducting field studies to quantify the impact of tillage and diverse crop rotations on the development of herbicide resistance in a summer annual weed species with relatively short soil life. We will establish a kochia (*Kochia scoparia*) population throughout our study site with a known proportion of ALS-herbicide susceptible (S) and resistant (R) individuals, and monitor the proportion of R:S as well as total weed density in response to tillage intensity, crop rotation, and herbicide use. Based on the results of this study, we will develop biological and economic models that will aid in developing herbicide-resistant weed management recommendations that go beyond herbicide use patterns. By determining the efficacy and economic impacts of non-herbicide practices on development of herbicide resistance, we hope to decrease the reliance on herbicides, thereby reducing the evolution and spread of new herbicide-resistant weed biotypes.