

MORISHITA, D.W.\*, KYLE G. FRANDBSEN, and KELLI M. BELMONT. University of Idaho, Kimberly Research and Extension Center, 3806 N. 3600 E., Kimberly, ID 83341. **Effect of sprinkler incorporation timing on the activity of soil-active herbicides applied with glyphosate.**

Soil-active herbicides applied in combination with glyphosate can effectively control a broad-spectrum of weeds, reducing the added selection pressure for glyphosate resistant weeds when using glyphosate alone. Growers have asked how long a soil-applied herbicide can remain on the soil surface before it's incorporated and still be effective. Growing sugar beet in a desert affords the opportunity to explore the effects of overhead irrigation application timing or rainfall has on soil-applied herbicide activity. A field experiment was conducted at the UI Kimberly Research and Extension Center in 2012, 2013, and 2014 to determine how soon sprinkler incorporation is needed following glyphosate plus soil-active herbicide applications for weed control before the soil-applied herbicides become ineffective. The experimental design was a 4 by 5 factorial RCB with four replications. Incorporation timing treatments were established by waiting 0, 3, 6, or 9 days before incorporation (DBI). All treatments except the untreated control were sprayed with 0.86 kg ha<sup>-1</sup> glyphosate at the 2-leaf sugar beet growth stage. At the 4- to 6-leaf stage, glyphosate at 0.86 kg ha<sup>-1</sup> was applied in combination with five soil-active herbicides: *s*-metolachlor at 1.42 kg ha<sup>-1</sup>, EPTC at 3.36 kg ha<sup>-1</sup>, ethofumesate at 1.12 kg ha<sup>-1</sup>, dimethenamid-P at 0.94 kg ha<sup>-1</sup>, and acetochlor at 1.26 kg ha<sup>-1</sup>. To incorporate the herbicides, 1.25 cm of water was applied over the entire study site. Analysis of the data after combining years showed a significant year effect. Also, there was no DBI by herbicide treatment interaction so the data are presented as main effects by year. The number of DBI varied by weed species. For all weed species averaged across all herbicides, waiting up to 9 DBI, is too long. Weed counts were highest in the 9 DBI treatment. For common lambsquarters, it was best not to wait more than 3 DBI. However, the DBI for green foxtail, wild oats, kochia, annual sowthistle and hairy nightshade was 6 days. When comparing all of the weeds together, delaying incorporation more than 3 days resulted in more weed escapes. For the herbicide main effect, weed densities in response to EPTC averaged across all incorporation dates were highest with common lambsquarters and green foxtail. However, EPTC was surprisingly more stable than originally thought because the weed densities were equal between waiting 3 DBI and 0 DBI. Sugar beet root and ERS yields were very similar in response to DBI and herbicides. When the data were compared within each year, there were no yield differences among the herbicide treatments.