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2015 Processing Onion Weed Control Trial

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Introduction: Onions are one of the more difficult crops for achieving satisfactory weed control. They are slow to emerge and grow and require frequent irrigation during establishment. These conditions create optimal conditions for weed establishment and early season weed competition. Herbicides and hand-weeding are the primary weed control methods used in onions grown in Tulelake. A weed control study was conducted at the Intermountain Research and Extension Center (IREC) in 2013 to evaluate rates of DCPA (Dacthal) alone and combined with pendamethalin (Prowl H20) applied at loop stage for control of kochia in onions grown on silty clay soil with high organic matter. Sulfentrazone (Zeus) was tested at various rates as a preemergence and postemergence herbicide on the same soil type. Prowl H20 application timing was evaluated by comparing applications immediately after planting and at the loop stage. ***Sulfentrazone (ZEUS) is not labeled for use in onions. Please consult herbicide labels for use instructions.***

IREC Trial Site and Herbicide Application Information

Location: Tulelake, CA
Irrigation: Solid-set sprinklers
Plot Size: 9 X 19 ft treatment area, 3 x 19 ft harvest area
Row Spacing: 36 inches; 4 seed-lines spaced 6 inches apart per bed
Trt Replication: 4 replications in a RCB design
Soil Type: Tulebasin mucky silty clay loam; 6.46% OM
Planting Date: May 1, 2015
Harvest Date: October 7, 2015

IREC Site Herbicide Application Times							
Onion Growth Stage	**Post 1st Irrigation**	**75% Radical Emergence**	**Loop**	**1 leaf**	**1.5 Leaf**	**2-3 leaf**	**5-6 leaf**
Application Date	**5/4/15**	**5/9/15**	**5/24/15**	**5/29/15**	**6/3/15**	**6/9/15**	**6/29/15**
Weed Size at Application	Pre	Pre-to seedling	Pre- to seedling	1-3"	1-5"	3-4"	

Herbicide Application Methods:
Pre-germination herbicides were broadcast applied at 30 GPA post-plant, and incorporated via irrigation water within 24 hours after application. All other post-germination treatments were broadcast at 30 GPA the rest of the season. See application table for timing and irrigation incorporation quantities. A hand weeding event throughout the trial occurred on June 26th. On June 29th Prowl H20 was applied to plots to prevent weed germination after the hand weeding event.

Weed Density Counts and % Control Rating:
Weed density was calculated by counting the number of live weeds growing on the top of the center bed (3 bed plots). Percent weed control was visually estimated over the entire plot area (9'x19' area).

Onion Stand, Onion Injury, and Yield:
Onion stand was measured by counting the number of onions in the center two seed lines of the middle bed. Counts were taken on May 29 and June 17. Onion injury (stunting, curling, and chlorosis) was visually evaluated in each plot using a 0 -10 scale with 10 = highest injury (plant death). Injury was evaluated at the 1-leaf, 2-leaf and 3-leaf growth stage. Yield calculations are based on harvesting all onions from the center bed of each plot.

Results
Weed control, crop injury, and onion yield results from 2013 are presented in the Table. Treatments highlighted in green provided the best control of kochia. Treatments highlighted in red caused unacceptable crop injury as determined by reductions in onion stand, visual crop injury, and/or decreased yield. Dacthal applied post-plant provided the best control of kochia when combined with Prowl H_20 at loop stage. Dacthal at rates ≥ 4 pt/A reduced kochia density by more 85% when combined with Prowl H_20, while Dacthal applied alone at all rates up to 8 pints/A failed to reduce kochia density more than 60%. Prowl H_20 worked best applied post-plant before the 1st irrigation compared to application at the loop stage. Prowl H_20 applied post-plant provided over 96% kochia control, while Prowl H_20 applied at the loop stage provided 60% kochia control. Prowl H_20 applied post-plant did not reduce onion stand and this application timing had the highest yield in the trial.

Sulfentrazone has potential as both a postemergence and preemergence herbicide in onions, but choosing the proper herbicide rate is critical to assure crop safety. Zeus (sulfentrazone) applied at 3 fl. oz/A post-plant and at the 3-4 leaf stage gave great kochia control and acceptable crop safety. Zeus at 1 and 2 fl. oz/A applied post-plant was safe on onions, but the low rates provided mediocre weed control. Conversely, Zeus at 4 fl. oz/A applied post-plant gave great weed control, but it caused unacceptable crop injury and onion stand loss. Zeus applied at the loop stage caused unacceptable crop injury.

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