

**Weed Management in Potatoes and Onions in Tulelake.** Rob G. Wilson\*, Darrin Culp, Skyler Peterson, & Kevin Nicholson. University of California Intermountain Research & Extension Center, 2816 Havlina Rd. Tulelake, CA. 96134 \*[rgwilson@ucdavis.edu](mailto:rgwilson@ucdavis.edu)

Weeds are a perennial pest in potatoes and onions grown in Tulelake, CA. Historically, growers have tried to avoid planting vegetables in fields with a history of high weed populations, but limited water availability and wide-spread disease and nematode problems have restricted suitable vegetable acreage to a point where growers are obligated to plant in certain fields regardless of weed pressure. Weed control in onions is particularly difficult due to the early emergence of weeds and the slow emergence and growth of onions. Herbicide screening studies were conducted in Tulelake, CA from 2011 to 2014 with funding support from the California Garlic and Onion Research Advisory Board, California Potato Research Board, and private industry. Studies were designed to evaluate preemergence and postemergence herbicides applied at several rates and application times on two distinct soil types, silty clay loam and sandy loam. Weed density, crop stand, crop injury, and crop yield were measured to determine treatments' influence weeds and crop yield.

In potatoes, treatments with the highest control of hairy nightshade (*Solanum physalifolium*), common lambsquarters (*Chenopodium album*), redroot pigweed (*Amaranthus retroflexus*), and redstem filaree (*Erodium cicutarium*) included EPTC (Eptam), dimethenamid (Outlook), dimethenamid + pendimethalin (Prowl H<sub>2</sub>O), rimsulfuron (Matrix) + metribuzin (Sencor), and fomesafen (Reflex) applied preemergence at hilling followed by rimsulfuron early postemergence. One postemergence application of rimsulfuron + methylated seed oil (MSO) applied early or late did not provide greater than 90% control of all weed species. Rimsulfuron split-applied early and late postemergence provided good control of hairy nightshade and lambsquarters on silty clay loam soil, but this treatment did not provide a high level of hairy nightshade control on sandy loam soil.

Top-performing herbicide treatments shared the common theme of combining a preemergence herbicide(s) with rimsulfuron + MSO applied early postemergence. Treatments that relied solely on postemergence applications failed to provide greater than 90% control of all weed species. All preemergence treatments failed to provide greater than 90% weed control at potato emergence suggesting rimsulfuron applied postemergence was critical to achieving 90% weed control regardless of the preemergence program. Metribuzin remains a popular herbicide used in potatoes because it controls several weeds that rimsulfuron does not. In these trials, metribuzin improved control of common mallow (*Malva neglecta*), redstem filaree, and common lambsquarters compared to applying rimsulfuron early postemergence alone.

Herbicide treatments did not cause visual injury or a reduction in potato stand compared to the untreated control on multiple soil types. At sites with silty clay loam soil, all herbicide treatments had similar total yield and US # 1 yield compared to the control. At sites with sandy loam soil, all herbicide treatments except fomesafen had similar total yield and US # 1 yield compared to the control.

In onions, DCPA (Dacthal) applied post-plant and pendimethalin (Prowl H<sub>2</sub>O) applied at or before the loop stage reduced kochia (*Kochia scoparia*), lambsquarters, and hairy nightshade density compared to the untreated control. There was an additive effect when these two herbicide treatments were used in combination especially for kochia control. DCPA and pendimethalin at labeled rates did not reduce onion stand or onion yield compared to hand-weeded plots in multiple trials on multiple soil types. Tulelake growers have long thought that DCPA was not effective on Tulelake soils believing that the herbicide was tied up due to the fine soil texture and high organic matter content. This research refutes this previously held belief and demonstrates that DCPA applied after planting can be effective and economical when used at low rates and combined with pendimethalin. Herbicide programs incorporating both preemergence and postemergence herbicide treatments were capable of reducing weed density by more than 90% compared to the untreated control. Unfortunately no single herbicide or herbicide combination treatment provided 100% weed control at multiple sites, suggesting hand-weeding may be necessary for follow-up weed control in fields with high weed seedbanks.