RESEARCH SUMMARY

WEED CONTROL IN PROCESSING VEGETABLES (2017)

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Tolerance of Lima Bean to Herbicides.
Two trials were kept weed-free to test for the effect of pethoxamid, a new preemergence herbicide under development for field crops. We also examined the tolerance of lima bean to Zidua, Prowl H20, and Shieldex (tolpyralate). Though plant height, dry weight and yield was not less than the untreated check in any of the treatments, some injury symptoms (leaf puckering and plant stunting) was observed early in the growing season. By crop maturity, lima bean had outgrown the injury.

Tolerance of Snap Bean to Herbicides.
Two trials were kept weed-free to test for the effect of pethoxamid, a new preemergence herbicide under development for field crops. We also examined the tolerance of snap bean to Zidua, Prowl H20, and Shieldex (tolpyralate). Though plant height, dry weight and yield was not less than the untreated check in any of the treatments, some injury symptoms (leaf puckering and plant stunting) was observed early in the growing season. By crop maturity, snap bean had outgrown the injury.

Herbicide Tolerance in Carrots
Two trials were established to develop management strategies for control of linuron-resistant pigweed in carrot.

Pyroxasulfone (Zidua®) is an excellent candidate for control of linuron-resistant pigweed; therefore studies were established in mineral and muck soils to determine tolerance of carrot to postemergence applications of pyroxasulfone. As Zidua® rate increased from 105 to 588 g/ha at the early application timing, injury increased from 1-18%, 4-36% and 3-46% at 7, 14 and 28 days after herbicide treatment (DAT). Visible injury increased from 9-23%, 9-21% and 6-19% at 7, 14 and 28 days after application at the 5-6 leaf stage of carrot. Despite the levels of injury that were apparent at either application timing, marketable yield was similar to the untreated check at most herbicide rates. Marketable yield was reduced by 70%, relative to the untreated check when Zidua® was applied to 1-2 leaf carrot at 588 g/ha, respectively. In contrast, the yield reduction was 37% when Zidua® was applied to 5-6 leaf carrot at 588 g/ha, respectively. This experiment has now been conducted at a total of 12 site-years – carrot shows acceptable tolerance to 117 g/ha of Zidua applied at the 5-6 leaf stage of carrot.

The second trial was established to determine the tolerance of carrot to preemergence and early postemergence (2-3 leaf stage of carrot) herbicides for control of linuron-resistant pigweed in carrot,

Tank mixes of Dual II Magnum with Nortron or Prowl H20 (applied PRE) followed by micro-rates of Goal gave the best control of redroot pigweed, common lambsquarters and crabgrass. Visual injury was observed in those treatments where Goal micro-rates followed the PRE tank mixes at 7 days after application of Goal; though the carrots outgrew this injury by 28 days after treatment, carrot yields were less than the untreated check in all treatments where Goal micro-rates were applied.. Carrot yield was greatest where the three-way tank mix of Dual II Magnum+Nortron+Prowl H20 (PRE) was applied, and where PRE tank mixes were followed by Blazer micro-rates.

Tolerance of Processing Peas to PRE applications of Zidua
This trial was established to test for tolerance of eight pea cultivars ('Ricco', 'PAO 826', 'Lil Mo', 'Concept', 'Tyne', Spring', 'Reliance', and 'Sweet Savour') to preemergence applications of Zidua® at rates of 47 and 94 g/ac. Pea tenderness at harvest was rated using a tenderometer and final yield adjusted based on tenderometer readings. In addition, the level of weed control was rated in each treatment.

Visible injury was less than 10% in most pea cultivars at both rates of pyroxasulfone (Zidua®), except PAO826 and Concept, which showed 16% visual injury at 28 days after emergence (DAE). Injury symptoms included leaf puckering and shortened midribs (drawstringing). Despite the injury in these two cultivars, pea tenderness ratings were all similar to the untreated check, an indication that pea maturity was not negatively affected. Finally, pea yield in all cultivars was similar to the untreated check. There was a tendency for pea yield to be slightly greater in the plots that had received herbicide treatment, associated with the presence of weeds competing for resources with the crop.

Weed control was rated on a percent scale (from 0 to 100%) at both rates of Zidua®. The weed control ratings at the label rate of 47 g/ha varied depending on weed species present. Zidua® at 47 g/ha provided fair (66-83%) control of large crabgrass, fair (45-63%) control of common lambsquarters, and excellent (96-100%) control of redroot pigweed.

Though trials were not conducted with Integrity® in 2017, previous research conducted from 2013 to 2016 on Integrity were used to support an initial URMULE submission with BASF. Integrity (0.44 L/ac) would offer pea growers a solution for control of Group 2 resistant eastern black nightshade.

Effect of Application Timing, Rate and Soil Type on Pea Tolerance To Flumioxazin

Three trials were established to determine pea tolerance to PPI and PRE applications of flumioxazin (Valtera) on sand, loam and clay loam soils. Valtera is a PPI or PRE herbicide with efficacy on Group 2 resistant black nightshade and common ragweed, and would be an excellent tank mix partner with Dual II Magnum. Though it is a residual herbicide, it does not have the same potential to carryover to vegetable crops as Pursuit. Valtera did not cause significant visual injury to pea, nor did it negatively impact pea maturity or yield.

Data were provided to PMRA to support the UMRULE submission for Valtera in peas that was initially submitted in 2015.

Tolerance of Pumpkins and Squash to Herbicides

The purpose of these two trials was to determine the tolerance of pumpkin and squash to preemergence applications of Zidua, Prowl H2O, Shieldex (tolpyralate) and pethoxamid. Zidua caused 9 to 15% visible injury to squash, but did not injure pumpkin. Despite the visible injury, there was no reduction in the number of marketable squash or pumpkins produced, and no reduction in yield. However, pethoxamid caused substantial injury to both crops (as much as 56% and 93% in pumpkin and squash, respectively), and reduced pumpkin and squash yield by 40% and 90%, respectively.

Pethoxamid caused substantial injury, and reductions in # fruit per plot and final yield of pumpkin and squash.