

Project Title: Weed Management Studies for Processing Vegetables

Researcher: Dr. John O'Sullivan, Dept. of Plant Agriculture, University of Guelph, Simcoe

Objective:

The objective of this research project was to develop improved weed management programs for processing cucumbers, peppers, cole crops, squash, pumpkins and sweet corn by evaluating a range of herbicides for crop tolerance and weed control efficacy on these crops. Information on yield, crop sensitivity and control of problem weeds was developed. Improved weed management programs reduce the need for labor for hand hoeing and weeding, reduce the cost of production to the grower and enhance competitiveness of the processing vegetable industry.

Methodology:

Research trials were carried out at the Dept. of Plant Agriculture, University of Guelph, Simcoe during the summer of 2001. Treatments were replicated four times in each experiment. Plots were 30 feet long by 7.5 feet wide. Plants were thinned to a known stand appropriate for each crop. Crops were grown according to accepted commercial practices used in Ontario. Crop injury, weed counts, weed biomass, weed ratings and yield were recorded. All trials were harvested by hand at crop maturity. Data was statistically analyzed, tabulated and reported.

Results:

Cucumbers:

Four trials were conducted on cucumbers. In the first trial planted on June 4, a conventional tillage system was compared with reduced tillage systems (disk, zone-till and no-till). Roundup Fast Forward Preseed at 1.7 L/acre and Command ME at 0.5 L/acre (anticipated recommended rate for Command ME, depending on soil type), were applied preemergence. For both trials, 'Vlaspik M' cucumbers were seeded, in 30" rows to give a plant population of approximately 72,000 plants per acre. A John Deere vacuum seeder was utilized for precision seeding. In addition to the benefits of less passes over a field, disk tillage yield was improved, compared to conventional tillage.

In a second trial planted June 25, stale-seedbed and conventional tillage systems were evaluated for potential use in cucumber production. Weeds were allowed to germinate and grow for 10, 20, 30, and 40 days before seeding. Weeds in the stale-seedbed were killed with either an application of Roundup Fast Forward Preseed at 1.7 L/acre alone or in combination with Command ME at 0.5 L/acre, following seeding. The predominant weeds present were curled doc, shepherds purse, common lamb's-quarters, crabgrass and foxtail. The data supports the use of stale-seedbeds as an integrated crop management tool that optimizes land preparation time in the spring, weed control and yield.

In a third trial, micro rates of Basagran Forte was evaluated on both conventional and stale-seedbed tillage systems. Conventional tillage plots were tilled right before seeding. Cucumbers were seeded directly into the germinated weeds in the stale-seedbeds. All plots were seeded on June 18 with a John Deere vacuum seeder calibrated for a plant density of 72,000 plants per acre. An application of Roundup Transorb was made to stale-seedbed plots at 1 L/acre on

June 20. Treatments included two EPOST applications of 89, 177, 266 and 354 ml/acre of Basagran Forte on July 6 and July 16. Basagran at much reduced rates caused very slight injury but no yield reductions.

In the fourth trial, Sandea (halosulfuron-methyl) was assessed on cucumbers. The trial was planted on June 12 with a John Deere vacuum seeded calibrated to give a plant density of 72,000 plants per acre. Sandea was applied preemergence, and post emergence. Post emergence applications of Sandea caused significant crop injury. However, there was no significant yield reduction.

Peppers

Command, Devrinol and Dual Magnum were evaluated for weed control in Bell Peppers. Weed free plots were also maintained. None of these products caused any crop damage. This was true even when the 2x rate of both Command and Dual Magnum were used. Command alone provided excellent control of broad-leaf weeds. The addition of Devrinol to Command improved weed control. Dual Magnum provided less satisfactory broad-leaf weed control. A minor-use application for Dual Magnum use on peppers is currently in progress. Field work is complete and samples for residue analysis are currently at the lab in Guelph.

Cole Crops

Dual Magnum, Devrinol, Lentagran and Lontrel were evaluated for weed control in transplanted cabbage. Lentagran gave some crop injury at the half and full rate of application, however, this did not result in a yield reduction. The addition of Lontrel to Lentagran reduced crop injury. The addition of Lontrel and Lentagran post-emergence to either Dual Magnum or Devrinol improved weed control and gave yields comparable to the weed free check.

Dual Magnum, Devrinol, Lentagran and Lontrel were also evaluated for weed control in transplanted cauliflower. Lentagran caused some crop injury when applied alone at the half and full rate. The addition of Lontrel to Lentagran reduced crop injury and improved weed control. The combination of Dual Magnum and Devrinol gave excellent weed control with no yield reduction. The addition of Lontrel and Lentagran as a post-emergence treatment to either Dual Magnum or Devrinol also improved weed control, reduced crop injury and gave satisfactory yield.

Pumpkins

Command and Devrinol were evaluated for weed control in both conventional and weed free plots in pumpkins. Command at the 2x rate (1.26 l/ac) cause a slight degree of crop injury, however, this did not result in a yield reduction. The addition of Devrinol to Command improved broad-leaf weed control. Weed free plots treated with these herbicides provided yields comparable to the weed free check.

Sandea (halosulfuron), applied early post-emergence and post-emergence was evaluated for weed control in pumpkin. Post emergence applications of Sandea caused significant crop injury. However, there was no significant yield reduction.

Squash

Command and Devrinol were evaluated for weed control in both conventional and weed free plots in squash. Command at the 2x rate (1.26 l/ac) did not cause any injury to squash. The addition of Devrinol to Command improved broad-leaf weed control. None of these products resulted in a yield reduction.

Sandea (halosulfuron), applied early post-emergence and post-emergence was evaluated for weed control in squash. Post emergence applications of Sandea caused significant crop injury to squash. There was also a significant yield reduction.

Sweet Corn

All eight varieties evaluated for tolerance to Callisto herbicide were completely tolerant. Yields were not reduced even at twice the recommended application rate. Of the eight varieties tested for sensitivity to Tribute most were found to be sensitive however, only one variety DelMonte 2038 had reduced yields. The remaining varieties had a low level of injury and no significant yield reduction. Of the 12 varieties evaluated for sensitivity to Accent herbicide, four showed severe injury and only one had a significant yield reduction. The remaining eight varieties were determined to be tolerant.