

Evaluation of Herbicides for Broadleaf Weed Control in Pumpkins, 2000

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Interpretative Summary

As more tobacco and traditional row crop producers have been looking for alternative crops, pumpkin production in Tennessee has increased. Along with the increasing acreage has come increased weed control problems especially with large seeded broadleaf weeds. Therefore, an experiment was conducted in a grower's pumpkin field in Jefferson Co., TN to evaluate the efficacy and phytotoxicity of Permit 75DF herbicide as a partner with Command 4EC. The Permit 75DF treatments of 0.5, 0.75, and 1 oz/A were compared to recommended practices of pairing Curbit 3EC at 2 quarts/A or Prefar 4E at 6 quarts/A with Command 4EC, along with Command 4EC alone. Command 4EC was applied to the entire field at 1.5 pints/A. Rainfall was received within 7 days after application, so activation of the herbicides was not an issue. However, there were already a few large seeded broadleaf weeds (cocklebur, prickly sida, and morningglory spp.) beginning to emerge at application. Overall, environmental conditions between treatment and rating were normal. Hand cultivation soon after weed ratings prevented collection of further weed control data, while an erratic stand made yield data unusable.

The only treatment that caused any reduction in crop vigor was the 1 oz rate of Permit 75DF. Permit 75DF suppressed morningglories as compared to the standard treatments. However, hand weeding was still required to provide satisfactory control of morningglory spp. All rates of Permit 75DF provided significantly better overall broadleaf weed control than the check or standard treatments, while the standard combinations of Curbit 3EC or Prefar 4E were significantly better than Command 4EC alone. However, \$20 or \$66/A is a significant expense to accomplish only a 12% increase in weed control activity. Especially when that increase only reaches the 50% range.

Some researchers have seen significant crop injury from Permit 75DF rates as low as 0.25 oz/A. Therefore, there is concern regarding the crop safety of Permit 75DF on pumpkins. At present, Gowan, the marketer of Permit 75DF in vegetable crops, is reluctant to pursue a label.

Introduction

As growers are looking for alternative enterprises to supplement farm income, pumpkin production for ornamental use is on the increase. Although a significant amount of production is located in the vegetable producing areas of Walden's Ridge and the Cumberland Plateau, pumpkin production is expanding throughout the state of

Tennessee. Fields that have traditionally been in tobacco or other agronomic crop production often present weed control challenges for vegetable crop growers. Large seed broadleaves, which can be hard to control using the best of herbicides options are often impossible to control utilizing labeled products for vegetable crops. Such is the case with much of the pumpkin production in less traditional vegetable growing areas.

Command 4EC has been registered for use in pumpkins for several years, and has been used with varying results. Command 4EC is very effective on grasses and selected small seeded broadleaf weeds. However, it tends to provide little control of the major large seeded broadleaf weeds of agronomic production. To increase efficacy, tank mixes with Curbit 3EC and Prefar 4E have been used by many growers. However, these products have similar spectrums, and generally only aid in control of weeds like redroot pigweed. Also, Prefar 4E is rather expensive (\$44 to \$66/A) for the amount of benefit received from adding it to the weed control program.

Permit 75DF has been used as a postemergence herbicide in corn for several years. Permit 75DF has excellent postemergence activity on major broadleaf weeds like cocklebur, pigweed, ragweed, and velvetleaf, while exhibiting little activity on grasses. Permit 75DF also has good soil activity. Therefore, Permit 75DF has been evaluated in a number of vegetable crops as a preemergence weed control option. Applying a tank mix of Command 4EC and Permit 75DF preemergence, potentially offers growers broader spectrum weed control. However, much of the research with Permit 75DF has been at very low rates (0.25 oz of product/A). These rates provide very little residual soil activity. Therefore, in 2000 an experiment was imposed in a growers pumpkin in field in Jefferson Co., TN to evaluate the efficacy and crop safety of Permit 75DF.

Materials and Methods

Danny Shelton, a grower in Jefferson Co. near New Market, TN had just planted 'Magic Lantern' pumpkins into a "reduced" tillage scenario. The soil had been disked, but significant residue remained on the soil surface. Danny had applied Command 4EC preemergence at 1.5 pints/A immediately after planting. Permit 75DF treatments of 0.5, 0.75, and 1 oz of product/A were applied preemergence on June 19, 2000. Check treatments of Curbit 3EC at 2 quarts/A and Prefar 4E at 6 quarts/A, along with Command 4EC alone were also applied the same date. Environmental conditions at application are shown in Table 1. Crop injury and weed control ratings were taken on July 17, 2000, approximately 4 weeks after application. The crop injury rating consisted of percentage vigor reduction. Weed control ratings were based on the percentage reduction in biomass. Subsequent weed control ratings were prohibited due to hand weeding in late July. Also, erratic stand made collection of yield data of no value. Data were analyzed using ANOVA procedures and means of dependent variables found to be significant at the 0.05 level of probability were separated using Fishers Protected LSD.

Results and Discussion

Rainfall was received within 7 days after application, so activation of the herbicides was not an issue. However, there were already a few large seeded broadleaf weeds (cocklebur, prickly sida, and morningglory spp.) beginning to emerge at application. Overall, environmental conditions between treatment and rating were normal.

Little crop injury was observed from the herbicide treatments applied (Table 1). The only treatment that caused any reduction in crop vigor was the 1 oz rate of Permit 75DF. All of the Permit 75DF treatments provided better control of the large seeded broadleaf weeds than the check or standard treatments. Permit 75DF suppressed morningglories as compared to the standard treatments. However, hand weeding was still required to provide satisfactory control of morningglory spp. All rates of Permit 75DF were extremely efficacious on common cocklebur and prickly sida. All rates of Permit 75DF provided significantly better overall broadleaf weed control ratings than the check or standard treatments, while the standard combinations of Curbit 3EC or Prefar 4E were significantly better than Command 4EC alone. However, \$20 or \$66/A is a significant expense to accomplish only a 12% increase in weed control, especially when that increase only reaches the 50% range.

At present, a petition has been submitted to the EPA from IR-4 for registration of Permit 75DF for use in cucumbers. However, there is concern regarding the crop safety of Permit 75DF on pumpkins, as some researchers have seen significant crop injury at rates as low as 0.25 oz/A.

Table 1. Environmental conditions at time of application of preemergence herbicides at Danny Shelton's in Jefferson Co., TN, June 19, 2000.

Parameter	Measurement
Wind	Less than 2 mph from WSW
Cloud Cover	75%
Soil Conditions	Dry, slightly crusted
Air Temperature	Low 80's
Soil Temperature	Upper 70's @ 4 inches
First Rain	Within 7 days after application

Table 2. Crop injury rating of 'Magic Lantern' pumpkins and weed control ratings of pumpkin plots receiving Command 4EC and subsequent selected preemergence herbicide treatments in Jefferson Co., TN, 2000.

Herbicide Treatments	Application Rate (rate/A)	Injury Rating (%) ^x	Morningglory spp. Control (%) ^y	Common Cocklebur Control (%)	Prickly Sida Control (%)	Broodrape Control (%)
Command 4EC + Permit 85DF	1.5 pints/A 0.5 oz/A	0 b ^z	45 b	93 ab	95 ab	100 a
Command 4EC + Permit 85DF	1.5 pints/A 0.75 oz/A	0 b	48 ab	98 a	100 a	100 a
Command 4EC + Permit 85DF	1.5 pints/A 1 oz/A	11 a	50 a	100 a	100 a	100 a
Command 4EC + Curbit 3EC	1.5 pints/A 4 pints/A	0 b	0 c	86 ab	75 cd	100 a
Command 4EC + Prefar 4E	1.5 pints/A 12 pints/A	0 b	0 c	81 b	79 bc	100 a
Command 4EC	1.5 pints/A	0 b	0 c	63 c	60 d	100 a

^x Injury rating was taken on July 17, 2000 and consisted of percentage vigor reduction.

^y Weed control ratings were taken on July 17, 2000.

^z Means within a column followed by the same letter are not significantly different at the 0.05

level of probability, Fisher Protected LSD.

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This research represents one season's data and does not constitute recommendations. After sufficient data is collected over the appropriate number of seasons, final recommendations will be made through research and extension publications.