

Evaluation of Command Tank Mixes 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. Even within the traditional vegetable producing areas morningglories are becoming a major weed problem. Therefore, in 2000 an experiment was conducted at The University of Tennessee Plateau Experiment Station near Crossville, TN to evaluate the phytotoxicity and efficacy of selected experimental herbicides tank mixed with Command 4EC. Treatments included: Permit 75DF at 0.5 and 1 oz/A; Spartan at 3 and 4 oz/A; FOE 5043 60DF at 8 and 16 oz/A; Staple 85DF at 0.6 and 0.8 oz/A; Prefar 4E at 12 pints/A; and Curbit at 4 pints/A tank mixed with Command 4EC at 1 pint/A; along with PCC 170, a premix of Command and Curbit, at 8 pints/A and Command 4EC at 1 pint/A alone.

Both tank mixes containing Spartan 75DF provided significantly more control of all morningglory species observed. The tank mixes containing Staple 85DF, Curbit 3EC, or Permit 75DF at 0.5 oz/A appeared to provide some short lived suppression. Morningglory pressure was so great that about 6 weeks after application the entire plot area was a mass of vines. However, the plots receiving the tank mixes containing Spartan 75DF were still discernible. IR-4 is presently conducting efficacy and phytotoxicity trials, and considering residue trials to assess the possible registration of Spartan 75DF. However, crop safety is likely to be a concern with the use of Spartan 75DF. A 5 oz/A rate of Spartan 75DF would provide even better control of morningglories. However, the 4 oz/A rate is probably near the threshold of crop safety.

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 products labeled for vegetable crops. Such is the case with much of the pumpkin production in the less traditional vegetable growing areas. However, various species of morningglory are becoming a severe problem, even in the traditional vegetable production regions. 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 morningglories. Several herbicides registered for use in other crops exhibit activity on various species of morningglories, while other newer chemistries offer potential in general broadleaf weed control. Therefore, in 2000 an experiment was conducted at The University of Tennessee Plateau Experiment Station near Crossville, TN to evaluate the phytotoxicity and efficacy of selected experimental herbicides tank mixed with Command 4EC.

Materials and Methods

The plot area was offset disked, disked, and rototilled on July 7, 2000. Single row plots 20 ft long and 12 ft wide were planted in 'Howden' pumpkins on July 7, 2000. Two seeds were planted in 5 hills, spaced 4 ft apart in-row. On July 9, 2000, preemergence tank mixes were applied in 25 gallons of solution/A at 20 psi utilizing a compressed air sprayer equipped with 8004 flat fan nozzles. Treatments included: Permit 75DF at 0.5 and 1 oz/A; Spartan at 3 and 4 oz/A; FOE 5043 60DF at 8 and 16 oz/A; Staple 85DF at 0.6 and 0.8 oz/A; Prefar 4E at 12 pints/A; and Curbit at 4 pints/A tank mixed with Command 4EC at 1 pint/A; along with PCC 170, a premix of Command and Curbit, at 8 pints/A and Command 4EC at 1 pint/A alone. Environmental conditions observed at the time of application are recorded in Table 1. Plant stand were taken on July 24, 2000 and weed control was rated on July 25, 2000. Since 10 seeds were planted in each plot, plant stand is reported in percentage (stand count X 10). Weed control is presented in terms of percentage biomass reduction. These pumpkins were planted too late to generate accurate yield data. Also, hot dry weather prevented proper plant and fruit development, therefore no yield data was recorded. All data were analyzed using ANOVA methods, and means of dependent variable found to be significant at the 0.05 level of probability were separated using Fisher's Protected LSD.

Results and Discussion

Rainfall was received within 2 days after application, therefore activation of the herbicides was not an issue. The location used in this trial had an unbelievable population of morningglories. In the past, at least four different species have been identified at this location: entireleaf, ivyleaf, pitted, and sharp-podded. The morningglories were so thick, no other weed species could compete.

Plant stand was less than desirable, although there were no significant differences among herbicide treatments (Table 2). Both tank mixes containing Spartan 75DF provided significantly better control of all morningglory species observed. The poorest control was observed with the tank mix containing Prefar 4E, where the observed control was 10 % less than the control provided by Command 4EC alone. The tank mixes containing Staple 85DF, Curbit 3EC, or Permit 75DF at 0.5 oz/A appeared to provide some short lived suppression. The tank mixes containing FOE 5043 and the premix PCC 170 appeared to have no morningglory activity above the suppression obtained with

Command 4EC alone. Morningglory pressure was so great that about 6 weeks after application the entire plot area was a mass of vines. However, the plots receiving the tank mixes containing Spartan 75DF were still discernible.

The future of Spartan registration for use in pumpkins is questionable. IR-4 is presently conducting efficacy and phytotoxicity trials, and are considering residue trials to assess possible registration. However, crop safety is likely to be a concern with the use of Spartan 75DF. A 5 oz/A rate of Spartan 75DF would provide even better control of morningglories. However, the 4 oz/A is probably on the threshold of crop safety.

Table 1. Environmental conditions at time of application of preemergence herbicides at The University of Tennessee Plateau Experiment Station, Crossville, TN, 2000.

Parameter	Measurement
Date of Application	7/9/00
Time of Application	7:00 p.m.
Wind	Calm
Relative Humidity	54%
Cloud Cover	10%
Soil Conditions	Surface dry, freshly tilled
Air Temperature	87EF
Soil Temperature	84EF @ 4 inches
First Rain	1.45 inches within 36 hours 1.81 inches total for rain event

Table 2. Plant stand of 'Howden' pumpkin (taken on July 24, 2000) and early season weed control ratings (taken on July 25, 2000) of plots receiving tank mixes of Command 4EC and experimental preemergence herbicides at The University of Tennessee Plateau Experiment Station, Crossville, 2000.

Herbicide Treatment	Application Rate (rate/A)	Plant Stand (%)	Entireleaf and Ivyleaf Morningglory Control (%)	Pitted and Sharp-podded Morningglory Control (%)	Overall Morningglory Control (%)
Command 4EC + Permit 75DF	1 pint/A 0.5 oz/A	48 ^y	58 b	58 b	58 b
Command 4EC + Permit 75DF	1 pint/A 1 oz/A	43	45 bc	45 bc	45 bc
Command 4EC + Spartan 75DF	1 pint/A 3 oz/A	55	84 a	84 a	84 a
Command 4EC + Spartan 75DF	1 pint/A 4 oz/A	48	90 a	88 a	89 a
Command 4EC + FOE 5043 60DF	1 pint/A 8 oz/A	55	50 bc	50 bc	50 bc
Command 4EC + FOE 5043 60DF	1 pint/A 16 oz/A	55	48 bc	48 bc	48 bc
Command 4EC + Staple 85DF	1 pint/A 0.6 oz/A	40	58 b	58 b	58 b
Command 4EC + Staple 85DF	1 pint/A 0.8 oz/A	50	53 bc	53 bc	53 bc
Command 4EC + Prefar 4EC	1 pint/A 12 pints/A	58	38 c	38 c	38 c

Command 4EC + Curbit 3EC	1 pint/A 4 pints/A				
		45	60 b	61 b	61 b
PCC 170 ^z	8 pints/A	55	48 bc	48 bc	48 bc
Command 4EC	1 pint/A	70	48 bc	49 bc	48 bc

^y Means within a column followed by the same letter are not significantly different at the 0.05 level of probability using a Fisher's Protected LSD. Absence of letters indicates not significant difference at the 0.05 level of probability.

^z PCC 170 is a premix of Command and Curbit, and the 8 pint/A rate is similar to the tank mix treatment of Command 4EC plus Curbit 3EC.

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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.