

Crop tolerance to preemergence herbicides applied under the plastic mulch within a strawberry-vegetable relay cropping system

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Summary

Crop tolerance to preemergence herbicides applied under the plastic mulch was tested within a strawberry-vegetable relay cropping system. We found that Chateau, Goal 2XL, Goal 2XL+Devrinol 2-XT, or Spartan FL 4F could be applied on the bed top at bed formation with no impact on the strawberry yield or the yield of the vegetable crop transplanted into the same bed.

Methods

Three experiments were conducted at the Gulf Coast Research and Education Center in Balm, FL, during the 2018 and 2019 growing season to determine the efficacy and safety of multiple preemergence herbicides on strawberry and relay cropped vegetables including cantaloupe (Hybrid Melon, Athena), squash (Hybrid Spineless Beauty), and peppers (Hybrid Giant Superette). Each trial was set up as a randomized complete block design with four replicates. The soil type at the site was a Myakka fine sand (sandy, siliceous, hyperthermic, Aeric, Alaquods) with 1.5% organic matter, pH of 6.5, and sand, silt, clay content of 96, 3, and 1%, respectively.

Bed formation, fumigation and herbicide application occurred on August 20, 2018. Beds were 12 inches high, and 26 inches wide at the peak with 4 foot centers between beds. Beds were fumigated with Telone® C-35 (300 lbs acre-1) using a standard fumigation rig equipped with two backward swept shanks set to deliver the fumigant at the base of the bed. A single drip tape was laid on the peak of the bed with a width of 5/8 inch, emitters every 12 inches

and a flow rate of 0.22 gallons per hour. Herbicide treatments were applied to the bed top immediately after fumigation and immediately prior to laying the plastic mulch. All herbicides were applied in 20 gallons per acre of water with a backpack sprayer (Bellspray Inc., Opelousa, LA) equipped with a single 8002EVS nozzle (Teejet Technologies, Wheaton, IL) at a pressure of 35 PSI. Two rows of strawberry (cv Radiance) were transplanted per bed with 15 inch spacing between plants on October 4, 2018. Beds were covered with virtually impermeable film (Berry Plastics, Evansville IN) immediately following herbicide application. All plots were irrigated and fertilized throughout the growing season as per industry standards.

Cantaloupe and squash were transplanted with 30 inch spacing between the two rows of strawberries on January 4, 2019, and pepper was transplanted on February 4, 2019, with 15 inch spacing. Strawberry plants were removed on March 4, 2019 by hand.

Data collection included strawberry damage ratings, vegetable damage ratings, strawberry yields and vegetable yields. Strawberry damage ratings were taken at 2 and 4 weeks after transplant. Vegetable damage ratings were done on February 10, 20, March 8, 13, and 21. Strawberry yield was collected bi-weekly until plants were removed.

Results

Impact of herbicides on strawberry growth and yield

None of the herbicides had an impact on strawberry growth or yield. However, a word of caution is that Dual Magnum is not registered for use in

strawberries and in other trials Dr. Boyd has found that this product can cause minor crop damage. Over multiple trials, we have also found that the presence of a relay crop growing between the strawberry rows has no significant impact on strawberry yield.

Impact of herbicides on vegetable growth and yield

None of the herbicides damaged the banana peppers or the cantaloupes or had any impact on yield when they were transplanted into the strawberry beds. None of the herbicides had a significant impact on squash growth or yield. However, squash plant size tended to be smaller where Goal 2XL and Spartan 4F were applied. Squash yields were 24 and 27% lower where Goal 2XL and Spartan 4F were applied, respectively. The differences were not statistically different but the consistent trend suggests that additional research is needed to verify squash safety following these herbicide products.

Table 1. Herbicide treatments applied preemergence under the plastic mulch at GCREC in 2018.

Trade name	Active Ingredient	Rate
Nontreated	-	-
Chateau	flumioxazin	3 oz/acre
Goal 2XL	oxyfluorfen	1 pint/acre
Goal 2XL + Devrinol 2-XT	oxyfluorfen + napropamide	1 pint/acre + 1 gallon/acre
Spartan FL 4F	sulfentrazone	4 oz/acre
Dual Magnum	S-metolachlor	1 pint/acre

Conclusions

Our results indicate that when Chateau, Goal 2XL, Goal 2XL+Devrinol 2-XT, Spartan FL 4F or Dual Magnum were applied under the plastic mulch prior to strawberry transplant, they had no impact on strawberry yield or vegetable growth and yield when the vegetables were transplanted into the strawberry bed. A note of caution is that in previous research Dr. Boyd has found that Dual Magnum can damage strawberry crops under some situations.

Disclaimer

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