

Strawberry tolerance to preemergence herbicides injected under the plastic mulch through the drip tape after transplant

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Summary

Crop tolerance to Chateau, Goal 2XL, Spartan FL 4F, Dual Magnum and a tank mix of Goal 2XL + Devrinol 2-XT applied under the plastic mulch through the drip tape 2 weeks after strawberry transplant was tested at GCREC. Dual magnum was the only herbicide that damaged the crop. None of the other herbicides impacted strawberry growth or yield. This technique is **not currently registered** and cannot be utilized by growers at this time. However, herbicide injections after the overhead irrigation is turned off is of interest because previous research has shown that herbicides applied to the bed top can be lost when the overhead irrigation is being applied.

Methods

An experiment was conducted at the Gulf Coast Research and Education Center in Balm, FL, during the 2018-2019 growing season to determine the efficacy and safety of multiple preemergence herbicides injected through the drip tape after strawberry transplant. The 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 and fumigation 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. Two rows of strawberry (cv Radiance) were transplanted per bed with 15 inch spacing between plants on October 10, 2018. Beds were covered with virtually impermeable film (Berry Plastics, Evansville IN) immediately following fumigation. All plots were irrigated and fertilized throughout the growing season as per industry standards.

Herbicides were injected through drip tape after the overhead irrigation was turned off which was 2 weeks after transplant. Six different herbicides (Table 1) were mixed with 1 gallon of water and injected into the drip tape using a CO₂ pressurized cylinder. After injection, the tape was flushed with water for 30 minutes to move the herbicide into the bed.

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

Data collection included strawberry damage ratings, strawberry shoot dry biomass and berry yield. Strawberry damage ratings were taken on

November 5 and December 18 using a 0-100% scale where 0 is no damage and 100 is complete shoot death. Shoot biomass was collected on March 19, 2019 by clipping 4 plants per plot at the soil surface, drying them in an oven and then weighing the dry biomass. Strawberry yield was collected bi-weekly until plants were removed.

Data were analyzed in SAS using the Mixed procedure. Block was considered a random variable. Means were compared using the least square means statement in SAS, specifying for Tukey's honest significant difference. Model assumptions of normality and constant variance were checked.

Results

Dual magnum was the only herbicide that damaged the strawberries with damage ratings ranging from 0-20%. Herbicide injections had no impact on total berry yield ($p=0.1974$). In fact, although not statistically significant, berry yields tended to be higher in treatments where herbicides were injected with the exception of Dual Magnum. None of the herbicides had an effect on strawberry shoot biomass. It is important to note that this is a non-registered application timing but results indicate that this technique is safe and would permit herbicide injections after the overhead irrigation is turned off. This is important because previous research has shown that much of the herbicides applied on the bed are lost during the overhead irrigation.

Disclaimer

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Figure 1. Photos of plots where herbicides were injected through the drip tape after crop transplant at GCREC. Treatments were as follows: top left to right is the nontreated control, Chateau, and Goal 2XL. Bottom left to right is a tank mix of Goal 2XL and Devrinol 2-XT, Spartan FL 4F, and Dual magnum.

