

CALIFORNIA LEAFY GREENS RESEARCH PROGRAM

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EVALUATING NEW WEED MANAGEMENT SYSTEMS FOR FRESH MARKET SPINACH

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ABSTRACT

Few herbicides are available for use in spinach and more effective weed control tools are needed. These evaluations tested the efficacy and safety of Spin-Aid for use on spinach. The goal of these evaluations was to examine if lower rates of Spin-Aid applied at night can improve the safety of this material on spinach. If this proves to be the case, we hope to work with the registrant, Engage Agro, to modify the label to allow the use of this material on clipped spinach. We observed that 1.0 pint of Spin-Aid applied at night reduced weed pressure by 53 to 95% over the standard preemergent treatment, but reduced the yield of spinach by 3 to 13%.

OBJECTIVES

The purpose of this research was to evaluate postemergence applications of Spin-Aid in fresh market spinach. Previous work has found that Spin-Aid applied late in the day resulted in less injury to spinach than early morning applications (Lati et al. 2016).

PROCEDURES

Three trials were conducted in commercial spinach fields during 2016: Trials 1 and 3 near San Juan Bautista, Trial 2 near Salinas.

Methods: *Trial No. 1.* Conducted in San Juan Bautista at a commercial bunch spinach field that had been planted July 20. Spin-Aid was applied at 0.5, 1 and 2 pints/A July 29 with a CO₂ backpack sprayer making two passes of a one tip wand with an 8008EVS nozzles at 30 psi applying in a volume of 83 gallons/A. Applications were made in the morning at 9:30 a.m., and in the evening at 6:30 p.m.. Weed counts were made and spinach yield was measured August 19. *Trial No. 2.* Conducted west of Salinas in a bunch spinach field planted on August 8. Spin-Aid at 1 pint/A was applied in a nighttime application August 18 by a commercial applicator to a two-bed wide strip by the 1,100 ft. length of the field. Weed biomass and harvest biomass were measured on September 1 and 7, respectively. *Trial No. 3.* Was conducted at San Juan Bautista in a bunch spinach field planted on September 12. The application was made at night with a commercial tractor applicator applying 1 pint/A of Spin-Aid on September 20. The application was made to the entire field except for a 5-bed strip. **Practices for all three trials:** All fields were direct seeded fields planted for bunch spinach production. The applications of Spin-Aid were made early enough in the crop cycle to comply with the 21 day PHI as per the product label, and as a result, the first true leaves were generally <1/8 inch long at the time of application. Spinach yield was measured by harvesting replicated 0.5 m² sample quadrats.

RESULTS AND DISCUSSION

Results: *Trial No. 1.* The morning application of Spin-Aid at 2.0 pints/A caused more injury to spinach than the evening application (Table 1). There were no differences between the 0.5 and 1.0 pint/A treatments or between morning and evening applications. There were no differences in Malva control among Spin-Aid rates or time of application. All Spin-Aid treatments reduced the nettleleaf goosefoot compared to the nontreated control. There were no significant differences in yield between treatments. *Trial No. 2.* There were about 50% fewer weeds in the Spin-Aid treatment than the standard treatment on September 1 (Table 2). The yield in the Spin-Aid treatment was 6% less than the standard treatment. *Trial No. 3.* There were significantly fewer Malva plants in the Spin-Aid treatment than in the standard treatment (Table 3). The yield in the Spin-Aid treatment was 13% less than the standard treatment.

Reference

Lati, R.N., B. Mou, J.S. Rachuy, and S.A. Fennimore. 2016. Light Intensity Is a Main Factor Affecting Fresh Market Spinach Tolerance for Phenmedipham. *Weed Science* 64:146-153.

Table 1. Trial No. 1. Crop injury estimates, weed counts (No./m²) and spinach yield.

Spin-Aid/A	Timing	Aug. 2	August 12				Aug 19
		Phyto	Phyto	Malva	Nettleleaf Goosefoot	Total weeds	Yield T/A
Standard	---	0.0	0.0	0.42	0.70	1.11	7.4
0.5 pint	Morning	0.0	0.7	0.19	0.09	0.28	6.9
1.0 pint	Morning	0.2	1.3	0.23	0.00	0.23	7.1
2.0 pint	Morning	2.0	3.3	0.05	0.05	0.09	6.4
0.5 pint	Evening	0.0	0.0	0.14	0.05	0.19	7.2
1.0 pint	Evening	0.3	1.2	0.05	0.00	0.05	7.2
2.0 pint	Evening	0.7	1.5	0.05	0.00	0.05	7.1
Pr>F treat		<0.0001	0.0001	0.4356	<0.0001	0.0025	0.0902
LSD _{0.05}		0.3	0.9	NS	0.08	0.43	NS

Table 2. Trial No. 2. Weed counts (No./m²) on Sept 1 and spinach yield evaluation on Sept 7

Spin-Aid/A	Purslane	Nightshade	Shepherd's purse	Sow Thistle	Burning Nettle	Total weeds	Yield T/A
Standard	4.53	0.64	0.39	0.08	0.06	5.70	10.9
1.0 pint	2.50	0.14	0.00	0.00	0.03	2.67	10.3
Pr>F treat	0.0229	0.0612	0.0413	0.0257	0.3125	0.0121	0.0326
LSD _{0.05}	1.61	NS	0.36	0.08	NS	1.99	0.536

Table 3. Trial No. 3. Weed counts (No./m²) on Oct. 7 and spinach yield on October 24

Spin-Aid/A	Malva	Nettleleaf Goosefoot	Yield T/A
Standard	1.25	0.00	14.7
1.0 pint	0.39	0.05	12.7
Pr>F treat	0.0193	0.3632	0.0048
LSD _{0.05}	0.06	NS	0.984