2018 Automated Thinner Lettuce and Weed Control Evaluation

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Methods: Trials were conducted at the USDA Spence Research Station. The Romaine lettuce variety Sun Valley was seeded onto shaped beds on August 16 and the first irrigation water was applied on August 17. Weeds at this site included: sow thistle, hairy nightshade, common purslane, burning nettle, shepherd's purse and nettleleaf goosefoot. Other weeds included malva and groundsel. The weeds were allowed to come up with the lettuce were treated on September 11, 25 days after first water. Spray materials were selected based on materials potentially used by spray thinners and/or automated weeders. Conventional herbicides included: Raptor (imazamox), Sharpen (saflufenacil), ET (pyraflufen), Rely (glufosinate) and Shark (carfentrazone). Organic herbicides included: Suppress (caprylic acid and capric acid) and Axxe (ammonium nonanoate). All materials were applied with appropriate adjuvants. See tables for materials and rates. Weed evaluations were made 3 and 9 days after treatment application, September 14 and September 20, respectively. Weed counts were made by counting weeds in three 1 ft^2 quadrats per plot. All materials were applied with one pass of an 8006 nozzle @ 30 psi, applying the equivalent of 25 gallons of water per acre. Each plot 25 feet x 3.33 feet and replicated 4 times in a replicated block design.

Results: The treatments were applied to weed and lettuce seedlings that were 25 days old. Treatments that had the most complete control of weeds on 3 days after treatment included: Sharpen, Axxe @ 15%, Suppress @ 6%, Shark and Suppress @ 9% (Table 1). Sharpen, ET and Suppress @ 9% provided the most complete control of lettuce plants on this evaluation date. At 9 days after treatment Sharpen and Rely had complete weed control and Raptor had the next lowest number of weeds (Table 2). Sharpen, ET, Rely and Shark all provided excellent control of lettuce on this evaluation date. The number of weeds in the organic herbicide plots increased from 3 to 9 days post treatment. The reason for this was due to regrowth of weeds that were not completely killed (Photos 1 & 2). The organic herbicides have no systemic activity and only kill tissue that they contact.

Regrowth of weeds following application of Suppress @6%

Photo 1. Regrowth of shepherd's purse

Photo 2. Regrowth of stinging nettle

Table 1. Weed counts (No./3 ft2) and lettuce phytotoxicity on September 14 (3 days post treatment)

Treatment	Rate/A	Purslane	Shepherd's purse	Sow Thistle	Groundsel	Nettle	Burr Clover	Pigweed	Chenopod	Total weeds	Lettuce phyto
Raptor	4.0 fl oz MSO 1% v/v AMS 15% wt/v[1]	4.0	10.0	5.5	0.3	0.3	0.5	0.5	0.0	21.3	2.8
Sharpen	1.0 fl oz MSO 1% v/v	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.3	10.0
ET	1.0 fl oz MSO 1% v/v	0.0	8.3	0.0	0.0	0.0	0.3	0.0	0.0	8.5	9.3
Rely	29 oz/A	2.5	8.8	0.3	0.5	1.3	0.0	0.0	0.0	13.3	8.3
Shark	0.066 ml/l NIS 0.25% v/v	1.0	4.0	0.0	0.5	0.0	0.0	0.0	0.0	5.5	8.5
Suppress[2]	3% v/v Oroboost 0.5% v/v Natural oil 1% v/v	1.0	10.5	0.0	0.5	1.0	0.5	0.0	0.3	13.8	4.5
Suppress[2]	6% v/v Oroboost 0.5% v/v Natural oil 1% v/v	0.8	3.5	0.0	0.3	0.8	0.0	0.0	0.0	5.3	8.3
Suppress[2]	9% v/v Oroboost 0.5% v/v Natural oil 1% v/v	0.0	5.3	0.0	0.0	0.8	0.0	0.0	0.0	6.0	9.1
Axxe	6% v/v Oroboost 0.5% v/v Natural oil 1% v/v	2.5	14.8	0.0	0.8	0.5	0.0	0.0	0.0	18.5	4.8
Axxe	10% v/v Oroboost 0.5% v/v Natural oil 1% v/v	0.3	13.3	0.3	0.8	1.0	0.3	0.0	0.0	15.8	6.0
Axxe	15% v/v Oroboost 0.5% v/v Natural oil 1% v/v	0.3	3.8	0.0	0.0	0.3	0.0	0.0	0.0	4.5	7.8
Untreated	---	3.5	14.8	7.0	2.3	0.3	0.3	0.0	0.0	28.3	0.0
Pr>F treat		0.0792	0.0092	0.0034	0.0051	0.6844	0.273	0.4671	0.4671	<0.0001	<0.0001
$LSD_{0.05}$		ns	8.1	3.8	1.0	ns	ns	ns	ns	7.9	1.7

1 – lbs/100 gallons; 2 – water acidified to pH 6.0

Table 2. Weed counts (No./3 ft2) and lettuce phytotoxicity on September 20 (9 days post treatment)

Treatment	Rate/A	Purslane	Shepherd's purse	Sow Thistle	Groundsel	Nettle	Burr Clover	Pigweed	Chenopod	Total weeds	Lettuce phyto
Raptor	4.0 fl oz MSO 1% v/v AMS 15% wt/v[1]	2.0	3.8	1.0	0.3	0.0	0.5	0.0	0.0	7.5	4.8
Sharpen	2.0 fl oz MSO 1% v/v	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.0
ET	2.0 fl oz MSO 1% v/v	0.0	11.3	0.0	0.3	0.3	0.5	0.0	0.0	12.3	9.8
Rely	29 oz/A	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.0
Shark	0.066 ml/l NIS 0.25% v/v	5.5	4.0	0.0	1.8	0.0	0.0	0.0	0.0	11.3	9.8
Suppress[2]	3% v/v Oroboost 0.5% v/v Natural oil 1% v/v	1.3	14.8	0.8	1.0	0.5	0.3	0.8	0.0	19.3	4.0
Suppress[2]	6% v/v Oroboost 0.5% v/v Natural oil 1% v/v	2.0	8.8	0.0	0.5	0.0	0.0	0.0	0.0	11.3	8.0
Suppress[2]	9% v/v Oroboost 0.5% v/v Natural oil 1% v/v	1.0	8.3	0.8	0.8	1.3	0.0	0.0	0.0	12.0	9.3
Axxe	6% v/v Oroboost 0.5% v/v Natural oil 1% v/v	4.0	19.3	0.3	0.8	0.5	0.3	0.3	0.3	25.5	4.0
Axxe	10% v/v Oroboost 0.5% v/v Natural oil 1% v/v	3.0	15.3	0.8	1.0	0.3	0.0	0.0	0.0	20.3	6.3
Axxe	15% v/v Oroboost 0.5% v/v Natural oil 1% v/v	1.8	11.3	0.0	0.3	0.0	0.3	0.3	0.0	13.8	8.3
Untreated	---	6.0	15.5	7.3	1.3	0.3	0.3	0.0	0.3	30.8	0.0
Pr>F treat		0.0013	0.0013	<0.0001	0.3336	0.4744	0.6844	0.5423	0.5658	<0.0001	<0.0001
$LSD_{0.05}$		3.0	3.0	1.9	ns	ns	ns	ns	ns	9.2	2.1

1 – lbs/100 gallons; 2 – water acidified to pH 6.0