

Weed control methods in direct seeded onion Final Report

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Methods:

An experiment was established at the Muck Crops Agricultural Research Station in Willard, Ohio to determine the crop safety and weed control efficacy of Linex 4L (linuron) on direct seeded green onions (*var.* Feast). The soil was a Linwood muck soil with approximately 25% organic matter. The experiment design was a randomized complete block with four replications. Three rates of Linex were evaluated: 0.5, 1 and 2 pt/A. All rates of Linex were compared to the commercial standard of Outlook at 21 fl oz/A. Each plot consisted of a 6 ft wide x 20 ft long bed with 3 rows of onions/bed.

Onions were first seeded at the end of June but heavy rains flooded the station and the trial had to be replanted. The second planting took place on 7/29/21 and herbicides were applied POST on 9/2/21 when onions were at the 2-leaf stage. The application was made using a backpack sprayer with a CO₂ propellant, XR 11003 VS nozzles and calibrated to deliver 20 GPA. Plots were irrigated with 0.5" 5 days after application to activate the herbicides. Green onions were harvested when they reached marketable size on 11/5/21. Variables used to determine crop injury were leaf tip burn and/or plant stunting. Both were estimated visually using a linear scale of 0-100 where 0 indicates no crop injury and 100 indicates complete death, compared to the control. Weed control percentage was estimated at 1, 2 and 4 weeks after treated (WAT).

Harvest data were collected from the center 5 ft of the middle row/plot. All plants from the center 5 ft were counted, harvested by hand and weighed.

Results:

Linex provided very good control of purslane and pigweed, weeds that are a major problem in local muck soils (table 1). Linex was able to burn down common purslane that was up to 10-inch in diameter, and pigweed that was up to 8-inches tall. Outlook did not provide any weed control and crop injury was not observed; however, onions were stunted due to weed pressure which was later reflected in harvest data. None of the rates tested controlled grasses.

Onions treated with Linex at 1 and 2 pt/A showed around 30% tip burn at 1 WAT which resulted in slight stunting for the later evaluations. Onions recovered by the 4 WAT evaluation and plants treated with Linex at 0.5 pt/A had no injury. Crop injury caused by the Linex applications was not visible at harvest (Fig. 1), and there were no significant differences in yield (table 2).

Table 1. Percentage weed control and crop injury on onions treated with Linex.

Trt No.	Treatment	Rate	% weed control						% crop injury			
			Purslane			Pigweed			Tip burn	Tip burn	Stunting	Tip burn+stunt.
			9/8/2021	9/14/2021	9/29/21	9/8/2021	9/14/2021	9/29/21	9/8/2021	9/14/2021	9/29/21	
			1 WAT	2 WAT	4 WAT	1 WAT	2 WAT	4 WAT	1 WAT	2 WAT	4 WAT	
1	Untreated	.	0 c	0 c	0 d	0 b	0 c	0 c	0 c	0 c	0 d	0 b
2	Linex	0.5 pt/a	73 b	90 b	84 c	68 a	75 b	65 b	18 b	10 b	10 c	0 b
3	Linex	1 pt/a	86 a	99 a	90 b	78 a	85 a	80 a	30 a	28 a	20 b	4 b
4	Linex	2 pt/a	86 a	100 a	96 a	75 a	86 a	84 a	35 a	30 a	25 a	8 a
5	Outlook	21 fl oz/a	0 c	0 c	0 d	0 b	0 c	0 c	0 c	0 c	0 d	0 b

Note: Means followed by same letter or symbol do not significantly differ (P=.05, Student-Newman-Keuls).

Based on our discussions with local growers, leaf tip burn injury is acceptable to growers as they trim the ends of the leaves before they are shipped to retailers. Data from this experiment is consistent with results observed in 2019 and 2018 trials, where the higher rates of Linex caused tip burn and minor stunting. Slight crop injury is common with highly effective herbicides used in vegetable production. Overall, Linex is expected to make an important contribution to weed control in green onion as an early post-emergence treatment herbicide to control broadleaf weed seedlings in muck soils.

Table 2. Average stand count (5 ft/middle row) and calculated green onion yield (lb/a).

Trt No.	Treatment	Rate	# onion/ 5 ft row	weight (kg)	yield (lb/a)
1	Untreated	.	213 a	1.2 a	6969.6 a
2	Linex	0.5 pt/a	220 a	2.4 a	13648.8 a
3	Linex	1 pt/a	218 a	2.1 a	12196.8 a
4	Linex	2 pt/a	204 a	2.1 a	11906.4 a
5	Outlook	21 fl oz/a	199 a	1.3 a	7550.4 a

Note: Means followed by same letter or symbol do not significantly differ (P=.05, Student-Newman-Keuls)

This trial was funded by the IR-4 Project and the Ohio Produce Growers & Marketers Association (OPGMA). Data from this trial will be submitted to IR-4 to support registration of Linex on green onion.

Figure 1. Green onions at harvest on 11/5/21.

