

Evaluation of Stinger (Clopyralid) for Weed Control in Broccoli

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Abstract

Three rates of Stinger (Clopyralid) were evaluated for weed control, crop safety and soil persistence in broccoli. Efficacy tests indicated that 0.25 pt./A was ineffective in controlling volunteer alfalfa; while 0.5 pt produced marginal control and 1.0 pt. produced excellent control. No injury was noted at any rate. 140 days after treatment, injury was moderate to severe to alfalfa, moderate to tomatoes, cotton, carrots and lettuce and slight to onions.

Introduction

Ten to twenty thousand acres of broccoli are grown each year in Arizona. This crop is grown from August to March and subjected to winter annual, summer annual and perennial weeds. The most commonly used herbicides are Dacthal, Prefar, Trifluralin and Goal. Some weeds such as the legumes (white and yellow sweet clover, black medic and volunteer alfalfa) and curley dock (buckwheat family) and not controlled with these herbicides. Seed from weeds in the legume family are particularly troublesome in broccoli grown for seed due to difficulty in cleaning.

Clopyralid (Stinger, Curtail, Confront, Reclaim, Transline) was first registered in the U.S. in 1987 and is used to control broadleaf weeds in sugar beets, field corn, wheat, barley, Christmas tree plantations, grasses grown for seed, rangeland, permanent pastures and non-crop areas. It is effective in controlling many weeds including those (legumes and dock) not controlled with other herbicides available on broccoli. It does not control many widespread weeds such as those in the mustard goosefoot or pigweed families.

Clopyralid is an auxin-type herbicide that causes stem bending, swelling and elongation and leaf cupping similar to that produced by other growth regulators. Clopyralid is in the picolinic acid chemical family and has a moderate persistence in the soil that can be of concern in diverse and double-cropped regions.

Tests were conducted to evaluate the efficacy, crop safety and soil persistence of Clopyralid used on broccoli grown in the low desert of Arizona.

Procedure

Efficacy test: This test was conducted at the University of Arizona Yuma Valley Agriculture Center on silty clay loam soil. Three rates of Stinger; 0.25 pt., 0.5 pt. and 1.0 were applied on 3/12 when the broccoli had 4-5 true leaves and was 6-10 inches in diameter. These treatments were replicated 4 times and included an untreated check. Broadcast applications were made with a CO₂ backpack sprayer calibrated to apply 20 gallons per acre. Plot size was 2 rows (84 inches) by 25 ft. Alfalfa was planted over the top of the entire test as an indicator to assess weed control. Evaluations were made on 4/09, 56 days after treatment by visually estimating percent weed control and crop phytotoxicity.

Plant back test: This test was also conducted at the University of Arizona Yuma Valley Agriculture Center. Broccoli was planted on 10/19. Two rows per 42-inch bed were direct seeded and irrigated up with furrow irrigation. Treatments consisting of 0.5, 1.0 and 1.5 pt./A of Stinger and an untreated check were applied on 11/16 when the broccoli was at the 4-6 inch rosette and 6-10 leaf stage of growth. Plot size was 10 rows by 100 ft. replicated 4 times. A broadcast application was made of each treatment using a commercial sprayer set to apply a 20-gallon per acre spray volume. The broccoli crop was shredded and beds reworked with a cultivator. The field was not disked and the beds were kept intact with a minimum of soil movement. The rotational crops were planted into these beds approximately 3 and 12 months after Stinger applications. Visual evaluations of injury were made after the rotational crops were well established.

Results

Efficacy Test:

Table 1. Weed Control and Crop Safety* of 3 rates of Stinger in Broccoli

Rate (pt/A)	Weed Control (%) - Volunteer Alfalfa				
	Rep 1	Rep 2	Rep 3	Rep 4	Avg
0.25	40	50	35	40	41a
0.50	70	65	75	70	70b
1.0	95	95	100	95	96c
Untreated	0	0	0	0	0d
*No visual injury at any rate					

Means followed by the same letter are not significantly different. ANOVA protected LSD (p = 0.05).

It is apparent from the results in Table 1 that 0.25 pt. of Stinger was ineffective in controlling volunteer alfalfa while 1.0 pt. produced excellent control and 0.5 pt. produced marginal levels (65-75%) of control. No crop injury was noted at any rate.

Plant Back test:

Table 2. Comparisons among rates within crops, and comparisons among crops within rates.

Injury 140 DAT ^a				
Rate (pt/acre)				
Crop	0	0.5	1.0	1.5
Sweet corn	0 a A	0 a D	0 a C	0 a D
Alfalfa	0 c A	3.8 b A	5.0 a A	5.5 a A
Broccoli	0 a A	0 a D	0 a C	0 a D
Cotton	0 b A	1.5 a B	2.5 a B	2.5 a BC
Lettuce	0 b A	0.5 b CB	0.5 b C	2.5 a BC
Tomato	0 b A	1.3 b B	3.8 a B	4.0 a B
Cantaloupe	*	*	*	*
Carrots	0 b A	1.3 a BC	3.0 a B	1.5 a CD
Onion	0 A	0 a D	0.5 a C	0.3 a D

Among Rates Analysis: Means within a row (crop) followed by the same lowercase letter are not significantly different, ANOVA, protected LSD_(p<0.05)

Among Crops Analysis: Means within a column (rate) followed by the same lowercase letter are not significantly different, ANOVA, protected LSD_(p<0.05)

^aScale: 0 = no injury, 10 = dead, * = poor stand

Injury 140 days after treatment appears in Table 2. Injury was moderate to severe to alfalfa and slight to moderate to tomatoes, cotton, carrots and lettuce. Injury to onions was slight while sweet corn and broccoli were not injured. All crops planted 12 months after treatment grew normally. There were no signs of Stinger residues at this time.

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