Direct Seeded Broccoli Postemergence Weed Control Trial

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Weed control in direct seeded broccoli got a boost in late 2006 with the 24(c) registration of Goal Tender. The registration was for both broccoli and cauliflower, but the bigger use of this material will probably be for direct seeded broccoli. It was registered for use as a broadcast postemergence application at the rates of 4-6 ounce/A, but can be used as a directed spray up to 8 ounces/A. The label stipulates that the material can be applied when direct seeded broccoli has a minimum of four true leaves and that the material should not be mixed with adjuvants, fertilizers or other pesticides.

This registration was a new and welcome technology in the constant battle with weeds in direct seeded broccoli and many growers and PCAs began using it and have been learning the nuances of the material in a wide variety of environmental conditions and weed spectra. Goal tender is particularly effective as a burn down material when the weeds are small (i.e. <2 true leaves); however, once the weeds get past this stage, its effectiveness drops off. This is an important concept when considering the use of this material. One concern that was raised this spring was the lack of efficacy on shepherd's purse. As a result, we conducted a trial in the Greenfield area to examine some of the dynamics that may influence the efficacy of this material.

The trial was conducted in a broccoli field that was not treated with a preemergence herbicide and had a wide spectrum of weeds present. The soil type was Elder Loam and all materials were applied post planting when the broccoli plants had 1.5 to 2.0 leaves on April 3. Each plot was one 40-inch bed by 20 feet long. There were six replications arranged in a randomized complete block design. All materials were applied with a CO_2 backpack sprayer at 30 psi. The gallonage was varied by using one pass of an 8004 nozzle (23 GPA) or four passes of an 8008 nozzle (148 GPA).

This trial taught us a couple of key points about the use of Goal Tender for postemergence weed control on broccoli. Higher gallonage greatly improved the level of weed control over lower gallonage at the 4 or 6 ounce/A rate (Table 1). This was seen dramatically for weeds that are highly susceptible to Goal Tender such as Malva and Hairy Nightshade. It was also true for more difficult to control weeds such as Groundsel and Lambsquarter. In addition, it was true for weeds that Goal Tender only provides partial control such as Sow Thistle and Shepherds Purse. For instance, 6 ounces of Goal Tender only provided a weed control rating of 3.8 at 23 gallons/A spray volume, but received a rating of 7.0 at a spray volume of 148 gallons/A. The actual spray volume used in this trial may not be as important as the concept -- ***higher spray volume improved weed control.*** In addition, notice that the weed control treatments were applied when the broccoli plants had 1.5 to 2.0 true leaves. This was about 30 days after planting and was early enough that the weeds were still small. For instance, Shepherds Purse plants were about the size of a nickel and only a few were the size of a quarter. The smaller nickel-sized Shepherds Purse plants were better controlled than the quarter sized plants which

reinforces the other conclusion of this study – ***the smaller the weeds the better control by Goal Tender.***

The level of safety provided to the crop in all treatments was acceptable and certainly no greater than AN20. Dow AgroSciences is interested in looking modifying the label to allow Goal Tender applications at the 2 true leaf stage of the broccoli and, if approved, this will greatly facilitate weed control because it will allow the Goal Tender to be applied when the weeds are smaller and more susceptible. There is a great deal of learning and experimentation occurring this year with postemergence applications of Goal Tender on broccoli. I am curious how it is going and please let me know if you have any particular issues with this new technology that we might be able to address with focused research.

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Table 1. Weed[1] and phytotoxicity[2] ratings 3 and 10 days after treatment (April 6 and April 13 respectively)

Material	Material /A	Application Volume Gallons/A	Malva		Lambs-quarter		Shepherds Purse		Hairy Nightshade		Sow Thistle		Groundsel		Phytotoxicity	
			3	10	3	10	3	10	3	10	3	10	3	10	3	10
Goal Tender	4 oz	23	6.8	8.3	5.6	1.9	3.8	2.3	5.2	5.5	4.1	2.5	4.5	2.1	1.0	1.0
Goal Tender	6 oz	23	7.6	8.8	6.7	3.6	5.1	3.8	7.2	8.2	6.0	3.8	5.7	4.0	1.2	1.3
Goal Tender	4 oz	148	9.1	9.8	8.1	5.5	6.5	5.5	8.9	7.5	6.5	5.8	8.7	7.0	1.3	1.8
Goal Tender	6 oz	148	9.6	9.9	9.1	7.8	7.2	7.0	9.2	7.8	7.3	7.1	8.3	7.0	2.0	2.5
AN 20	35 gallons	35	6.2	9.1	1.8	1.1	5.1	2.8	6.2	2.5	3.7	1.3	2.7	0.9	1.8	2.9
Untreated	----	----	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LSD (0.05)			2.9	0.9	3.8	n.s.	2.7	1.1	2.3	n.s.	1.6	1.6	1.5	2.7	0.7	0.9

1 – Scale: 0 = no weed control to 10 = weeds dead

2 – Scale: 0 = no crop injury to 10 = crop dead.

Table 1. Weed[1] and phytotoxicity[2] ratings April 6 (3 DAT)

Material	Material /A	Water Volume Gallons/A	Malva	Lambs Quarter	Shepherds Purse	Nightshade	Sow Thistle	Groundsel	Phytotoxicity
Goal Tender	4 oz	23	6.8	5.6	3.8	5.2	4.1	4.5	1.0
Goal Tender	6 oz	23	7.6	6.7	5.1	7.2	6.0	5.7	1.2
Goal Tender	4 oz	148	9.1	8.1	6.5	8.9	6.5	8.7	1.3
Goal Tender	6 oz	148	9.6	9.1	7.2	9.2	7.3	8.3	2.0
AN 20	35 gallons	35	6.2	1.8	5.1	6.2	3.7	2.7	1.8
Untreated	----	----	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LSD (0.05)			2.9	3.8	2.7	2.3	1.6	1.5	0.7

1 – Scale: 0 = no weed control to 10 = weeds dead; 2 – Scale: 0 = no crop injury to 10 = crop dead.

Table 2. . Weed[1] and phytotoxicity[2] ratings April 13 (10 DAT)

Material	Material /A	Application Volume Gallons/A	Malva	Lambs Quarter	Shepherds Purse	Nightshade	Sow Thistle	Groundsel	Phytotoxicity
Goal Tender	4 oz	23	8.3	1.9	2.3	5.5	2.5	2.1	1.0
Goal Tender	6 oz	23	8.8	3.6	3.8	8.2	3.8	4.0	1.3
Goal Tender	4 oz	148	9.8	5.5	5.5	7.5	5.8	7.0	1.8
Goal Tender	6 oz	148	9.9	7.8	7.0	7.8	7.1	7.0	2.5
AN 20	35 gallons	35	9.1	1.1	2.8	2.5	1.3	0.9	2.9
Untreated	----	----	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LSD (0.05)			0.9	n.s.	1.1	n.s.	1.6	2.7	0.9

1 – Scale: 0 = no weed control to 10 = weeds dead; 2 – Scale: 0 = no crop injury to 10 = crop dead.