

2010 Celery Weed Control Evaluations

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Summary: Trials 1 evaluated the Tillet[®] robotic cultivator which uses a camera coupled with a data processor to detect crop plants which guides notched rotating discs that cultivate the seedline and indicates when they need to swing out of the way of crop plants (Figure 1). The Tillet removed 57% of the weeds in the seedline, but did not reduce subsequent hand weeding time over the standard hand weeding treatment. In trial 2, Chateau at 0.094 lb a.i./A and Dual Magnum at 0.95 lb a.i./A provided excellent weed control and did not reduce celery yield.

Methods: Trial No. 1: The trial was conducted in King City on transplanted organic celery (variety ‘Conquistador’) which was transplanted on May 28. Tillet cultivation was conducted on June 16; pre and post celery stand, pre and post weed counts and weeding time were also conducted on June 16. Weed pressure was light at this site and the dominant weed was volunteer tomatoes. Crop biomass was evaluated on August 11 and no harvest was conducted because the field was disced due to poor market conditions. **Trial No. 2:** The trial was established in San Juan Bautista on August 5, 2010. The treatments were applied to shaped beds and the field was transplanted with the variety ‘Sonora’ on August 6. Treatments were applied in the equivalent of 66 GPA of water with two passes of a one-nozzle wand with an 8008E tip which was pressurized at 30 psi with CO₂. Each plot was one 40-inch bed wide by 10 feet long and randomized 3 times in a randomized complete block design. Soil was Sorrento silt loam. The field was grown according to standard irrigation, fertilization and pest management practices. Weeds in the trial were rated on September 7 prior to the post-emergence application of Caparol on September 9. No further weed ratings were made following this date. Yield evaluations were made on November 15 by harvesting all heads in a strip 4.3 feet long on each bed and counting and weighing them.

Results: Trial No. 1: The Tillet cultivator was reasonably safe on the transplanted celery plants except for one of the four rotating units. As a result, the Tillet decreased the stand of celery by 2% (Table 1). Weed pressure at this site was light and the Tillet removed 57% of the weeds, but did not reduce subsequent hand weeding time. There was no difference in biomass or mean head weight on August 11. **Trial No. 2:** There was significant phytotoxicity of Chateau at 0.188 lb a.i./A and both rates of Zeus on September 7 (Table 2). All treatments except Zeus at 0.20 lb a.i./A provided complete weed control on September 7. There were no differences in the number of plants among the treatments, but Chateau at 0.188 lb a.i./A and both Zeus treatments reduced mean head weight and tonnage of celery at harvest on November 15.



Figure 1 Tillet cultivator with notched rotating discs

Table 1. Trial No. 1. Pre and post cultivation weed counts, weeding time and biomass of celery

Cultivation Treatment	June 16								August 11	
	Initial stand count (plants/A)	Post tillet stand count (plants/A)	% stand decrease	Initial weed count (weeds/A)	Post tillet weed counts (weeds/A)	Post hand weeding weed count (weeds/A)	% weed reduction (pre tillet hand weeding)	Hand weeding time (hr/A/worker)	Crop Biomass T/A	Mean head weight lbs
Standard	46,863	NA	NA	2,616	NA	523	80	3.9	23.2	0.99
Tillet	46,569	45,620	2.0	2,714	1,177	NA	57	3.5	22.0	0.97
Pr>F treat	0.672	NA	NA	0.833	NA	NA	0.059	0.080	0.051	0.239
Pr>F block	0.810	NA	NA	0.422	NA	NA	0.680	0.157	0.048	0.056
LSD 0.05	NS	NA	NA	NS	NA	NA	NS	NS	1.2	NS

Table 2. Trial No. 2. Phytotoxicity rating, weed ratings and yield evaluations of celery.

Treatment	Lbs a.i./A	Material/A	September 7			November 15		
			Phyto-toxicity ¹	Shepherd's purse	Hairy Night shade	Mean Head wt (lbs)	Stand Plants/A	Yield tons/A
Untreated	---	---	0.0	4.7	4.7	2.3	58,599	68.7
Chateau	0.094	3.0 oz	0.0	0.0	0.0	2.5	55,459	68.0
Chateau	0.188	6.0 oz	2.3	0.0	0.0	2.0	55,459	55.8
Dual Magnum	0.95	1.0 pt	1.3	0.0	0.0	2.3	56,506	65.3
Zeus	0.10	3.2 oz	4.7	0.0	0.0	2.0	53,367	54.5
Zeus	0.20	6.4 oz	5.7	0.7	0.0	2.0	51,274	51.0
Pr>Treat			<0.001	0.001	<0.001	0.003	0.576	0.019
Pr>Block			1.000	0.506	0.402	0.001	0.461	0.201
LSD _{0.05}			1.9	1.8	1.7	0.2	NS	11.3

1 – phytotoxicity rating: 0 = crop healthy to 10 = crop dead.