2007 Dry Bulb Onion Weed Control Studies

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Objectives:

1. To evaluate new pre and postemergence treatments for onions
2. To evaluate the timing of Outlook on Yellow Nutsedge control

Summary: The 2007 trials provided an excellent opportunity to evaluate many aspects of weed control in onions. Chateau and Goal Tender at ultra low rates looked promising as preemergence treatments. Prowl applied at the loop stage followed by Goal Tender at the first true leaf stage gave the best broadleaf and grass weed control. This year provided an excellent opportunity to evaluate nutsedge control options for onions. Outlook was registered for use in onions in California in 2007. The label allows an application at the second true leaf stage; however, by this growth stage in this area nutsedge is already emerged. Outlook does not have post emergence activity against nutsedge and three strategies were examined this year to overcome this problem: 1) Evaluations of the safety of 1st true leaf evaluations; 2) evaluations of burning back the nutsedge with an acid based fertilizer and then applying Outlook to control the regrowth; and 3) evaluations of postemergence applications of Basagran to control nutsedge. In short, 1st true leaf applications did not significantly reduce yields in these studies. Burning back nutsedge with 7-7-0-7 provided a viable strategy to control emerged nutsedge; when followed by applications of Outlook it provided two months of nutsedge control which allowed the onions to achieve reasonable size before nutsedge regrowth commenced. Outlook also reduced the number of nutsedge nutlets in the soil over the untreated control at the end of the season which indicates that the Outlook may have the ability to reduce nutsedge pressure in the subsequent year following treatment. Basagran provides short term control of nutsedge; however, we observed substantial phytotoxicity on onions at higher rates in these studies.

Methods: ***Trial No. 1:*** All trials were conducted in collaboration with Bob Martin, grower with Rio Farms and Wyatt Duncan of Integrated Crop Protection. ***Trial No. 1*** The soil type at the site was the Pico fine sandy loam. Each plot was one 40-inch bed wide by 20 feet long and replicated four times in a randomized complete block design. The trial was seeded to the variety 'Cometa' on April 2 and the post plant preemergence applications were made on the same day; the first irrigation was applied on April 3. Applications at the loop stage of the onions (flag leaf emergence) were made on 4/18 (16 days after planting), first true leaf applications were made on 5/4 (32 days after planting) and second true leaf applications were made on 5/14 (42 days after planting). ***Trial No. 2:*** This trial was designed to evaluate the safety of first true leaf applications of Outlook. The field had been treated with standard grower practices prior to the Outlook applications: Dacthal as a post plant preemergence treatment and Goal Tender at the first true leaf stage. First true leaf applications of Outlook were made on April 3; 2nd true leaf on April 11; and second 7 oz treatments were made on April 11 and April 18. Soil at the site was the Metz complex (loamy sand). ***Trial No. 3:*** This trial was conducted to evaluate the potential of burning back established nutsedge plants with an acid based fertilizer (7-7-0-7) to improve the efficacy of Outlook which only has preemergence activity. The field had been treated with standard grower practices prior to the Outlook applications: Dacthal post plant preemergence and Goal Tender at the first true leaf stage. First true leaf applications were made on April 4 (the 7-7-0-7 was applied at 11:30 a.m. and the Outlook at 1:00 p.m.) and second true leaf on April 11; and second 7 oz

treatments were made on April 11 (treatment 1) and April 18 (treatment 3). One half inch of irrigation water was applied on April 5 to water in the Outlook in treatments 1 and 2. Evaluations of the number of nutlets in the soil of each treatment were conducted by collecting roughly 8,000 – 10,000 cm^3 of soil on September 27 - the same day as the harvest evaluations. The soil was sieved to remove all nutlets in the soil which were then counted and weighed. The number of nutlets in each sample was converted to nutlets per 1,000 cm^3. Soil at the site was the Metz complex (loamy sand). ***Trial No. 4:*** This trial was conducted to contribute to a national effort to evaluate Buctril for postemergence suppression of yellow nutsedge. The field had been treated as described for trial no. 3. Application were made at the second and third true leaf stages, April 11 and April 23, respectively. ***General Trial Information:*** All applications (unless otherwise noted) made with two passes of a one tip wand with an 8008E nozzle applying the equivalent of 72 GPA. Yield evaluations were conducted by harvesting all onions in an 8 foot long strip from the middle of each plot. See tables for treatment and rate information.

Results: ***Trial No. 1:*** The first evaluation date on May 4 measured the effect of the preemergence and loop stage applications (Table 1). There was good weed pressure at the site with shepherd's purse, nightshade and lovegrass as the dominant weeds. Of the preemergence treatments, Chateau at 7.1 and 14.2 grams and Goal Tender at 1.0 oz/A provided the best weed control. Of the loop stage applications V-10142 had the best weed control at this evaluation date. The second weed evaluation on May 14 measured the effect of the post emergence treatments that were applied at the first true leaf stage. Application of Goal Tender at the first true leaf to Dacthal reduced weeds by 87% over the untreated (Table 2). However, Goal Tender alone applied at the 1st true leaf stage provided 50% weed control; this treatment has performed better in years past and this indicates that the weeds were too large at the time of application and were more difficult to control. The application of Goal Tender at the first true leaf stage following Prowl H2O at the loop stage provided the best weed control in this trial and this repeats the same observation made in 2006. Scythe along at 1.5% did not control weeds, but at the 3.0% rate it controlled 67% of the weeds. The hours per acre to weed the various treatments varied from 1.6 to 46.4 and followed the same pattern as the number of weeds/plot. Nutsedge populations were light at the May evaluations dates, but by August the populations were large enough to evaluate (Table 3); however, the population was spotty which made statistical analysis difficult. It can be seen that there is a trend indicating that the Outlook treatments had less nutsedge per plot. Other than lower yields in the V-10142 treatment there are no other great differences in the yield of the various treatments. Chateau and Goal Tender preemergence treatments had acceptable yields.

Trial No. 2: This trial was established to examine the safety of applying Outlook at the 1st true leaf stage. The trial was established after the grower had applied the standard preemergence (Dacthal) followed by post emergence application (Goal Tender). There was not a high population of nutsedge at the site and no weed evaluations were conducted. Yield evaluations did not detect any significant yield reduction from the first true leaf applications (Table 4). There was a trend indicating fewer bulbs per acre at the 14 oz/A rate of Outlook applied at the first true leaf stage; however, there was no indication of a reduction in yield at the 7 oz/A rate.

Trial No. 3: This trial was established in a part of a field heavily infested with yellow nutsedge. The nutsedge was emerged by the time the onions were at the first and second true leaf stage. Given that Outlook is a post emergence material, it was thought that if the nutsedge was burned back with an acid based fertilizer (i.e. 7-7-0-7) then Outlook could

inhibit the emergence of new leaves of nutsedge. Acid based fertilizer 7-7-0-7 was applied to all treatments at the first true leaf stage and then the various rates and timings of Outlook were applied similar to trial No. 2. Weed pressure was so extreme in the trial that weed control ratings were used to evaluate treatments rather than weed counts. First true leaf applications of Outlook gave better weed control on the April 23 and May 4 evaluation dates, but by June 1 all Outlook treatments had similar weed control ratings which were greatly improved over the untreated control (Table 5). However, on the August 9 evaluation date the nutsedge began to regrow and weed control began to breakdown. There was no significant phytotoxicity in any of the treatments. There were significantly fewer nutsedge and lower weight of nutsedge nutlets in the soil in the Outlook treated plots (Table 6). There is a trend that indicates that the 14 oz/A application had fewer nutsedge in the soil than the two sequential applications of 7.0 oz/A. By reducing nutsedge in the soil, Outlook may the potential to reduce nutsedge pressure in the subsequent crop. Yields of all Outlook treatments were improved over the untreated (Table 6). However, yields were less than observed in Trial No. 2, which may indicate that there was a yield reduction due to nutsedge or the initial applications of 7-7-0-7 were phytotoxic or both factors may have contributed.

Trial No. 4: This trial examined the use of Basagran to burn back nutsedge. Two sequential applications of the listed treatments were applied at the second and third true leaf stage. Specific rates of Basagran with and without a COC were made. Basagran at 16.0 oz/A provided moderate control of nutsedge and the addition of a COC improved weed control. Basagran at 32 oz/A provided good control of yellow nutsedge through May 4, but by June 1 the nutsedge was vigorously regrowing. Basagran at the 16 and 32 oz/A rate had moderate phytotoxicity ratings. The addition of 14 oz/A of Outlook to 16 oz/A of Basagran provided excellent control of nutsedge on the June 1 evaluation date, but with high phytotoxicity ratings. No yield evaluations of this trial were conducted.

Table 1. Trial No. 1. Weed evaluations (number per 4 ft^2) on May 4, 2007

No.	Treatment	Material/A	a.i./A lbs	Application[1]	Shepherds Purse	Night Shade	Purslane	Pigweed	Love Grass	Total Weeds
1	Untreated	----	----	----	5.0	6.7	25.3	1.3	5.6	47.3
2	Dacthal 6F	1.33 gals	8.0	Pre	5.3	8.3	1.7	1.0	0.0	17.7
3	Dacthal 6F Fb Goal 2XL	1.33 gals 1.0 pt	8.0 0.125	Pre Post 2 t. leaf	----	----	----	----	----	----
4	Dacthal 6F Fb Goal Tender 4F	1.33 gals 6.0 oz	8.0 0.188	Pre Post 1 t. leaf	----	----	----	----	----	----
5	Goal Tender 4F	6.0 oz	0.188	Post 1 t. leaf	----	----	----	----	----	----
6	Goal Tender 4F	0.5 oz	0.0156	Pre	2.3	5.7	5.0	0.0	1.3	18.3
7	Goal Tender 4F	1.0 oz	0.0312	Pre	1.7	4.3	0.0	1.0	0.0	7.7
8	Chateau 51WD	7.12 gm	0.008	Pre	0.3	0.0	0.0	0.0	1.7	2.0
9	Chateau 51WD	14.24 gm	0.016	Pre	0.0	0.0	0.0	0.0	0.0	0.0
10	Prowl H2O 3.8 Fb Goal Tender	24 oz 6.0 oz	0.71 0.188	Post loop Post 1 t. leaf	3.7	13.7	10.3	0.3	0.0	29.7
11	V-10142 75 WG	121.1 gm	0.20	Post loop	0.0	7.0	4.3	0.0	0.7	14.0
12	Scythe	1.08 gal	1.5% v/v	Post 1 t. leaf	----	----	----	----	----	----
13	Scythe	2.16 gal	3.0% v/v	Post 1 t. leaf	----	----	----	----	----	----
14	Dacthal 6F Fb Goal Tender 4F Fb Outlook 6.0	1.33 gals 6.0 oz 14.0 oz	8.0 0.188 0.66	Pre Post 1 t. leaf Post 2 t. leaf	----	----	----	----	----	----
15	Dacthal 6F Fb Goal Tender 4F Fb Outlook 6.0 Fb Outlook 6.0	1.33 gals 6.0 oz 7.0 oz 7.0 oz	8.0 0.188 0.33 0.33	Pre Post 1 t. leaf Post 2 t. leaf 14 days later	----	----	----	----	----	----
16	Dacthal 6F Fb Goal Tender 4F Fb Outlook 6.0 Fb Outlook 6.0	1.33 gals 6.0 oz 7.0 oz 7.0 oz	8.0 0.188 0.33 0.33	Pre Post 1 t. leaf Post 1 t. leaf 14 days later	----	----	----	----	----	----
	LSD (0.05)	----	----	----	3.2	6.1	12.5	1.6	1.9	9.4

Table 2. Trial No. 1. Weed evaluations (number per 4 ft^2), phytotoxicity ratings and time to weed on May 14, 2007

No.	Treatment	a.i./A lbs	Application[1]	Shepherds Purse	Night Shade	Purslane	Pigweed	Love Grass	Total Weeds	Phyto	Hrs/A to weed
1	Untreated	----	----	7.7	7.7	10.7	1.3	12..3	42.3	0.0	46.4
2	Dacthal 6F	8.0	Pre	5.0	0.3	0.3	0.0	0.0	8.0	0.3	8.2
3	Dacthal 6F Fb Goal 2XL	8.0 0.125	Pre Post 2 t. leaf	9.3	0.3	0.0	0.0	0.0	10.0	0.0	7.0
4	Dacthal 6F Fb Goal Tender 4F	8.0 0.188	Pre Post 1 t. leaf	5.3	0.0	0.0	0.0	0.0	5.3	0.0	6.2
5	Goal Tender 4F	0.188	Post 1 t. leaf	6.3	4.3	0.0	0.0	8.7	21.7	0.0	22.2
6	Goal Tender 4F	0.0156	Pre	3.7	4.3	3.7	0.7	4.0	18.7	0.0	21.5
7	Goal Tender 4F	0.0312	Pre	1.0	4.7	0.0	0.3	0.0	6.7	0.0	8.0
8	Chateau 51WD	0.008	Pre	0.3	0.0	0.0	0.0	7.0	7.3	0.0	7.6
9	Chateau 51WD	0.016	Pre	0.0	0.0	0.0	0.0	2.0	2.0	0.3	3.2
10	Prowl H2O 3.8 Fb Goal Tender	0.71 0.188	Post loop Post 1 t. leaf	0.3	0.0	0.0	0.0	0.0	0.7	0.0	1.6
11	V-10142 75 WG	0.20	Post loop	0.3	9.3	0.0	0.0	1.7	14.3	6.3	11.7
12	Scythe	1.5% v/v	Post 1 t. leaf	6.7	5.0	11.0	0.7	17.0	40.7	0.3	39.8
13	Scythe	3.0% v/v	Post 1 t. leaf	6.3	0.0	0.0	0.0	7.0	13.7	3.7	14.7
14	Dacthal 6F Fb Goal Tender 4F Fb Outlook 6.0	8.0 0.188 0.66	Pre Post 1 t. leaf Post 2 t. leaf	2.0	0.0	0.0	0.0	0.0	2.7	0.0	4.7
15	Dacthal 6F Fb Goal Tender 4F Fb Outlook 6.0 Fb Outlook 6.0	8.0 0.188 0.33 0.33	Pre Post 1 t. leaf Post 2 t. leaf 14 days later	4.3	0.0	0.0	0.0	0.0	4.7	0.0	5.6
16	Dacthal 6F Fb Goal Tender 4F Fb Outlook 6.0 Fb Outlook 6.0	8.0 0.188 0.33 0.33	Pre Post 1 t. leaf Post 1 t. leaf 14 days later	2.7	0.3	0.0	0.0	0.0	4.7	0.0	2.8
	LSD (0.05)	----	----	4.3	4.0	5.1	0.8	5.7	6.8	0.5	6.1

Table 3. Trial No. 1. Nutsedge counts on August 15, 2007 and yield evaluations on October 11 & 16.

No.	Treatment	Material/A	a.i./A lbs	Application[1]	Nutsedge No./30 ft^2	Yield Tons/A	Yield Bulbs/A	Yield mean lbs/head
1	Untreated	----	----	----	17.3	60.9	120,063	1.01
2	Dacthal 6F	1.33 gals	8.0	Pre	29.8	64.6	114,754	1.12
3	Dacthal 6F Fb Goal 2XL	1.33 gals 1.0 pt	8.0 0.125	Pre Post 2 t. leaf	11.5	57.3	127,005	0.90
4	Dacthal 6F Fb Goal Tender 4F	1.33 gals 6.0 oz	8.0 0.188	Pre Post 1 t. leaf	12.0	64.7	135,173	0.95
5	Goal Tender 4F	6.0 oz	0.188	Post 1 t. leaf	8.0	69.5	122,513	1.12
6	Goal Tender 4F	0.5 oz	0.0156	Pre	6.0	61.8	124,963	0.99
7	Goal Tender 4F	1.0 oz	0.0312	Pre	30.8	61.0	121,288	1.00
8	Chateau 51WD	7.12 gm	0.008	Pre	17.3	69.0	129,455	1.06
9	Chateau 51WD	14.24 gm	0.016	Pre	31.0	60.8	115,979	1.05
10	Prowl H2O 3.8 Fb Goal Tender	24 oz 6.0 oz	0.71 0.188	Post loop Post 1 t. leaf	23.5	57.5	120,879	0.95
11	V-10142 75 WG	121.1 gm	0.20	Post loop	20.5	13.5	46,963	0.57
12	Scythe	1.08 gal	1.5% v/v	Post 1 t. leaf	8.0	58.1	116,796	0.98
13	Scythe	2.16 gal	3.0% v/v	Post 1 t. leaf	12.8	57.9	120,063	0.96
14	Dacthal 6F Fb Goal Tender 4F Fb Outlook 6.0	1.33 gals 6.0 oz 14.0 oz	8.0 0.188 0.66	Pre Post 1 t. leaf Post 2 t. leaf	4.0	63.2	126,188	1.00
15	Dacthal 6F Fb Goal Tender 4F Fb Outlook 6.0 Fb Outlook 6.0	1.33 gals 6.0 oz 7.0 oz 7.0 oz	8.0 0.188 0.33 0.33	Pre Post 1 t. leaf Post 2 t. leaf 14 days later	5.0	64.4	124,146	1.04
16	Dacthal 6F Fb Goal Tender 4F Fb Outlook 6.0 Fb Outlook 6.0	1.33 gals 6.0 oz 7.0 oz 7.0 oz	8.0 0.188 0.33 0.33	Pre Post 1 t. leaf Post 1 t. leaf 14 days later	3.2	61.6	124,146	0.99
	LSD (0.05)	----	----	----	21.5	9.5	14,551	0.15

Table 4. Trial No. 2 Yield evaluations on September 27, 2007

No.	Treatment	Material/A	a.i./A lbs	Application[1]	Yield Tons/A	Yield Bulbs/A	Yield Mean wt/head
1	Fb Outlook 6.0 Fb Outlook 6.0	7.0 oz 7.0 oz	0.33 0.33	Post 1 t. leaf 14 days later	61.05	88,629	1.13
2	Fb Outlook 6.0	14.0 oz	0.66	Post 1 t. leaf	55.12	73,517	1.24
3	Fb Outlook 6.0 Fb Outlook 6.0	7.0 oz 7.0 oz	0.33 0.33	Post 2 t. leaf 14 days later	61.50	91,488	1.11
4	Fb Outlook 6.0	14.0 oz	0.66	Post 2 t. leaf	63.02	93,938	1.11
5	Untreated	----	----	----	61.22	85,770	1.21
					n.s.	n.s.	n.s.

Table 5. Trial No. 3. Weed ratings[1] and phytotoxicity ratings on April 23, May 4, June 1 and August 9, 2007

No.	Treatment	Material/A	a.i./A lbs	Application	Nutsedge				S. Purse		Phytotoxicity			
					4/23	5/4	6/1	8/9	4/23	5/4	4/23	5/4	6/1	8/9
1	7-7-0-7 Fb Outlook 6.0 Fb Outlook 6.0	35 gallons 7.0 oz 7.0 oz	 0.33 0.33	Post 1 t. leaf Post 1 t. leaf 14 days later	5.8	7.8	8.3	3.5	5.8	4.3	0.2	0.0	0.0	0.0
2	7-7-0-7 Fb Outlook 6.0	35 gallons 14.0 oz	 0.66	Post 1 t. leaf Post 1 t. leaf	6.7	8.0	8.6	3.5	6.3	5.2	0.3	0.0	0.0	0.0
3	7-7-0-7 Fb Outlook 6.0 Fb Outlook 6.0	35 gallons 7.0 oz 7.0 oz	 0.33 0.33	Post 1 t. leaf Post 2 t. leaf 14 days later	2.3	4.2	8.1	3.1	5.0	3.7	0.0	0.0	0.0	0.0
4	7-7-0-7 Fb Outlook 6.0	35 gallons 14.0 oz	 0.66	Post 1 t. leaf Post 2 t. leaf	2.8	5.3	8.0	3.3	5.3	4.8	0.0	0.0	0.0	0.0
5	Untreated	----	----	----	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	LSD (0.05)	----	----	----	0.9	1.1	0.6	0.6	1.1	1.1	n.s.	n.s.	n.s.	n.s.

1 – Scale: 0 = no weed control to 10 complete weed control.

Table 6. Trial No. 3. Yellow nutsedge nutlet counts in soil and onion yield evaluations on September 27, 2007

No.	Treatment	Material/A	a.i./A lbs	Application	Nutlets/ 1000 cm^3 soil	Nutlets Wt (gr)/ 1000 cm^3 soil	Nutlets Mean wt (gr)	Onion Yield Tons/A	Onion Yield Bulbs/A	Onion Mean wt/head
1	7-7-0-7 Fb Outlook 6.0 Fb Outlook 6.0	35 gallons 7.0 oz 7.0 oz	 0.33 0.33	Post 1 t. leaf Post 1 t. leaf 14 days later	103.6 a	7.52 a	0.072	46.5	97,206	0.78
2	7-7-0-7 Fb Outlook 6.0	35 gallons 14.0 oz	 0.66	Post 1 t. leaf Post 1 t. leaf	61.8 a	5.28 a	0.079	47.2	89,854	0.86
3	7-7-0-7 Fb Outlook 6.0 Fb Outlook 6.0	35 gallons 7.0 oz 7.0 oz	 0.33 0.33	Post 1 t. leaf Post 2 t. leaf 14 days later	116.8 a	7.51 a	0.076	45.7	88,220	0.84
4	7-7-0-7 Fb Outlook 6.0	35 gallons 14.0 oz	 0.66	Post 1 t. leaf Post 2 t. leaf	98.2 a	6.21 a	0.070	46.3	90,181	0.84
5	Untreated	----	----	----	290.6 b	25.45 b	0.093	34.7	97,533	0.58
	LSD (0.05)	----	----	----	123.8	8.90	n.s.	9.9	n.s.	0.14

1 – Scale: 0 = no weed control to 10 complete weed control.

Table 7. Trial No. 4. Weed control ratings on April 23, May 4 and June 1, 2007

No.	Treatment	Material/A	a.i./A lbs	Nutsedge			Shepherds Purse			Phytotoxicity		
				4/23	5/4	6/1	4/23	5/4	6/1	4/23	5/4	6/1
1	Basagran	8.0 oz	0.25	0.0	0.8	0.3	2.3	8.2	---	0.0	0.3	0.3
2	Basagran COC	8.0 oz 1.0%	0.25 0.72 gal	0.5	1.3	1.0	3.8	7.7	---	0.0	1.3	0.5
3	Basagran	16.0 oz	0.50	2.0	4.3	2.3	7.3	9.2	---	0.5	1.0	1.3
4	Basagran COC	16.0 oz 1.0%	0.50 0.72 gal	3.5	5.8	4.0	8.0	9.7	---	0.8	2.8	2.5
5	Basagran	32.0 oz	1.0	5.3	7.5	4.8	8.5	9.2	---	0.5	3.0	3.0
6	Basagran COC	32.0 oz 1.0%	1.0 0.72 gal	6.8	8.3	6.5	9.5	10.0	---	1.5	5.3	4.5
7	Basagran Outlook COC	16.0 oz 14.0 oz 1.0%	0.50 0.66 0.72 gal	4.0	9.0	9.3	7.0	10.0	---	0.8	4.5	4.0
8	Untreated	---	---	0.0	0.0	0.0	0.0	0.0	---	0.0	0.0	0.0
	LSD (0.05)	---	---	0.9	1.2	0.8	1.8	1.9	---	0.9	0.9	1.0