Imperial County Agricultural Briefs

Features

From your Farm Advisors

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Early Season Onion Weed Control Through Chemigation

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Weed control can be problematic being a major yield limiting factor in onions (*Allium cepa*) as they are poor competitors for sunlight, water, and nutrients. Weeds can germinate unnoticed until the first true leaf resulting in competitive environments that severely reduced onion yields; so, early season weed control is critical. Crop injury is also more likely when these herbicides are applied to very small onions. Recent registrations of selective herbicides for use on onions prior to the first true leaf have become available. This paper summarizes a series of onion weed control studies in southern and northern California desert environments where 33 different herbicide treatments were evaluated for efficacy over a 3-year period. The use of traditional herbicide programs like, Dacthal 75W (DCPA) applied at planting controls a wide range of weed species. Prefar 4E (Bensulide) is registered for use on onions prior to the second true leaf; however in sandy soils it can cause significant vigor loss and weed control is sporadic. Prowl H2O (Pendimethalin) is registered at two true leaves. In other states the traditional Prowl 3.3 EC was registered for use at the onion loop stage. (Prowl H2O just received a California SNL registration for application at the loop stage)

In sandy desert soils environments with little organic matter (OM) and heavier desert soils, particularly with higher OM levels selecting the correct herbicide product, application method, timing and rate to provide effective weed control without crop injury is challenging at best.

In Lancaster Prowl H2O was applied at planting at rates ranging from 2 oz. to 2 pts per acre. Spotty vigor loss was noted at rates of 8 oz. in 2005 in very sandy with and low OM. However, the effect on yield was not documented and may have been minimal. However, for three years Prowl H2O was applied at rates of 1 pt to 2 pts at the onion loop stage without noticeable vigor loss. In 2006 this treatment was made through chemigation and controlled mustards (*Brassica* spp.) and foxtail (*Setaria* spp.) by 88% in weed counts compared to the untreated check (Table 1).

The Prowl H2O treatment applied at 1.5 pts at the onion loop stage yielded the greatest overall weed control. The GoalTender 4F (Oxyfluorfen) application of 4 oz. following the Prowl application helped to suppress the weeds. It should be pointed out that GoalTender applied by it self is very weak on weeds and needs to applied at the earliest stage as possible, at the first true leaf, to enhance weed control. The Goal 2XL (Oxyfluorfen) applied at 8 oz. at the first true leaf caused significant onion damage initially, but the onions seemed to recover over time. This application seemed to suppress weeds. The 6 oz. rate of GoalTender without the Prowl H2O loop application did not control weeds at all. Weed populations suppressed by the Prowl H2O onion loop treatment included foxtail, mustard, lambsquarters (Chenopodium *album*) and redroot pigweed (*Amaranthus retroflexus*). The Prowl H2O loop treatment will be registered in the 2007 season under a 24c exemption label.

TABLE 1. Evaluation of chemigation of Prowl H2O, GoalTender, and Goal 2XL at different rates and onion growth stages.

Location: Lancaster	Plot Size: 24 ft wide by 120 ft long (2 to 4 replications)
Treatment Dates: 4/21/2006 and 5/9/2006	Irrigation type: Solid set sprinklers with injection pump.
Injection time: 25 minutes per treatment.	
Soil Type: Sand with loam	Number of Sprinklers per treatment: 4

Treatment	Rates/Acre	Onion Growth Stage	lbs. a.i. per acre	Onion Phyto[1] 5/12/06	Onion Phyto 5/18/06	Onion Phyto 5/23/06	Foxtail Populations[2] (per acre) 5/26/06	Weed Count[3] (per acre) 6/7/06	Percent Weed Control[4] 6/7/06
1. Prowl H2O (loop) + Goal 2XL (1st leaf)	1.5 pts. 8 oz.	Onion loop 1st true leaf	1.2 0.12	6.0	5.5	2.8	56	492	87%
2. Prowl H2O (loop) + GoalTender (1st leaf)	1.5 pts. 4 oz.	Onion loop 1st true leaf	1.2 0.12	3.3	1.9	1.7	959	1,268	67%
3. GoalTender (1st leaf)	6 oz.	1st true leaf	0.19	4.8	4.3	3.0	2,061	5,484	0%
4. Prowl H2O (loop)	1.5 pts.	Onion loop	1.20	0.0	0.0	0.0	221	485	88%
5. Untreated check				0.0	0.0	0.0	2,474	3,894	0%
LSD (p = 0.05)				2.7	2.7	8.2	2,112	----	----

Rating:	Description:
1. Onion phytotoxicity rating	Ratings taken on a scale of 0 to 10: 0 = No evidence of onion injury; 5 = deformity and some stunted growth; 6-8 = Not acceptable for production; 10 = dead plants.
2. Foxtail populations	Numbers represent the number of green foxtail (*Setaria*) per acre calculated from weed counts per 30 foot plot.
3. Weed count per acre	Numbers represent the number of weeds per acre calculated from weed counts per 30 foot plot. Weed population made up of foxtail (*Setaria*), mustard, lambsquarters, and redroot pigweed.
4. Percent Weed Control	Numbers represent the percent control compared to weed populations of the untreated check.

Another trial was conducted with a CO2 backpack sprayer within the untreated check of the chemigation trial to determine the effect of GoalTender on common weed species. Field results (Table 2) with GoalTender have shown a lack of control of lambsquarter at 3 to 4 oz. per acre. This trial was applied at the first true leaf to evaluate the effectiveness of early applications of GoalTender on lambsquarters, mallow, shepherds purse, tumble mustard, and redroot pigweed. Mallow (*Malva parviflora*) and redroot pigweed were effectively controlled by these early applications of GoalTender. Although there was initial injury of all the weeds, by the end of the trial there was less than 25% control of shepherds purse (*Capsella bursa-pastoris*), tumble mustard, and lambsquarters. From these results GoalTender should be used with caution and supplemented with Goal 2XL. It may be best to apply Prowl H2O as a standard treatment in every field at the loop stage, as it is a cheap and effective treatment.

TABLE 2. Effect of GoalTender on common weed species						
Location: Lancaster			Plot Size: 36" bed x 30' long (4 replications)			
Treatment Date: 5/22/06			Nozzle: 8004 EVS @ 25 psi			
Soil Type: Sand with loam			GPA: 52.4			
Treatment	Rate/Acre	Timing	lbs. a.i. / acre	Onion Phyto[1] 5/23/06	Weed Species Controlled	% Weed Control[2] 5/18/06
1. GoalTender	4 oz	1st true leaf	0.12	1	Malva (Mallow)	85
2. GoalTender	4 oz	1st true leaf	0.12	1	Shepherds purse	25
3. GoalTender	6 oz	1st true leaf	0.19	2	Redroot pigweed	90
4. GoalTender	6 oz	1st true leaf	0.19	2	Tumble mustard	20
5. GoalTender	6 oz	1st true leaf	0.19	2	Lambsquarters	17
LSD (p = 0.05)	----	----	----	0.9	----	2.1
Rating:		Description:				
1. Onion phytotoxicity rating		Ratings taken on a scale of 0 to 10: 0 = No evidence of onion injury; 5 = slight deformity and some stunted growth; 7-8 = Not acceptable for production; 10 = dead plants.				
2. % Weed Control Rating		Ratings taken on a scale of 0 to 100: 0 = no control; 100 = Complete control				

A trial was conducted to compare Dacthal 75W and Prowl H2O applied at planting and the loop stage. The full rate of Dacthal (10 lbs) controlled weeds (Figure 1)) by 100%, whereas the half rate application (5 lbs) controlled weeds by 90%. Prowl H2O applied at the loop stage controlled weeds by 96%, whereas when it was applied at planting at 8 oz. /ac. it controlled weeds by 91%. All of these treatments were favorable, but Prowl H2O at 1.5 pts at the loop is probably the cheapest and most logical application to consider.

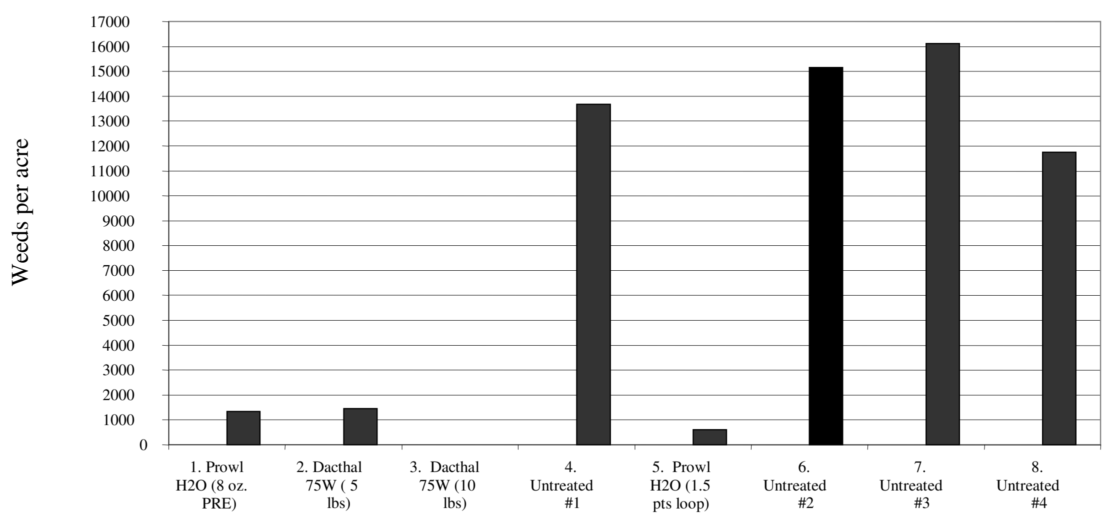

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FIGURE 1. Weeds per acre of Dacthal 75W applied at two rates (5 and 10 lbs) at planting and Prowl H2O applied at planting (8oz.) and the loop stage (1.5 pts).

Some of most difficult weeds to control in onions are yellow nutsedge (*Cyperus esculentus*) and volunteer potatoes (*Solanum tuberosum)*. Outlook (Dimethenamid) has proven to suppress yellow nutsedge in the field. Nortron (Ethofumesate) is another herbicide in a similar chemical family as Outlook and has shown some effectiveness in controlling yellow nutsedge. A trial was conducted in sandy soils to compare Nortron and Outlook for onion tolerance and yellow nutsedge control.

Outlook should not be applied to onions prior to the second true leaf. These treatments were made at the second true leaf into an emerging patch of yellow nutsedge. Although the onion phytotoxicity ratings (Table 3) for the Nortron treatments were low, later in the season these treatments showed significant stunting that was not acceptable for production. It is not recommended that Nortron be registered for onions in sandy soils.

It was discovered as the season progressed that onions showed 'looping' symptoms in the Outlook treatment. Symptoms of 'looping' were that the third leaf actually grew through the 4th and 5th leaves, of which both were on the same side of the plant (onion leaves should be alternating from opposite sides). This was confirmed by others as being phytotoxicity from herbicides and is common among herbicides similar to Outlook. In earlier carrot (*Daucus carota*) trials Outlook has shown nutsedge suppression at 7 oz./ac. This rate should be used in sandy soils in onions. Outlook registration is currently pending, but is scheduled to be registered in California for use in 2007.

TABLE 3. Onion tolerance of Nortron and Outlook for yellow nutsedge control.

Location: Lancaster — Plot Size: 36" bed x 30' long (3 replications)

Soil Type: Sandy — Nozzle: 8004 EVS @ 25 psi — GPA: 52.4

Treatment	Rate/Acre	Timing	lbs. a.i.	Onion Phyto[1] 6/7/06	Onion Looping[2] (per acre) 6/7/06
1. Nortron SC	1 pt	2 true leaves	0.50	3.7	0.0
2. Nortron SC	2 pts.	2 true leaves	1.00	4.0	1,618 (1% population)
3. Outlook	14 oz	2 true leaves	0.66	5.7	4,530 (3% population)
4. Untreated Check	0.6 pts.	2 true leaves	0.12	0.0	----
LSD (p = 0.05)	----	----	----	1.2	1,067

Rating:	Description:
1. Onion phytotoxicity rating	Ratings taken on a scale of 0 to 10: 0 = No evidence of onion injury; 5 = deformity and some stunted growth; 7-8 = Not acceptable for production; 10 = dead plants
2. Onion looping per Acre	The number of onion plants with looping symptoms from herbicide toxicity on a per acre basis. Estimations were made from individual plant counts per plot.
Onion Nutsedge Control	Nutsedge control ratings were not taken in this trial as the plot was hand weeded before ratings could be made. However, in other trials, nutsedge control for one application of Outlook at 14 oz per acre has been around 60% at the end of the season.

A post-emergence herbicide weed control experiment was conducted at the Intermountain Research and Extension Center (IREC) in an attempt to identify treatments that produce satisfactory weed control with little or no crop injury. The primary herbicides evaluated were Goal and Buctril, applied post-emergence, at various rates, alone and in combination.

Sequential applications of low rates were also applied in a strategy that has been successfully tried in onions and other crops. This strategy is designed to slow early weed growth, making weeds susceptible to control with repeat applications later in the season. The strategy is designed to avoid serious crop loss to early weed competition or herbicide injury.

In the post emergence studies broadleaf weeds; mostly redroot pigweed, hairy nightshade (*Solanum sarrachoides*) and lambsquarters began germinating shortly after planting. The experimental treatments evaluated on Table 4 indicate treatments produced acceptable commercial control (>70%). Split applications of Goal XL provided excellent control without appearent yield loss. Perfect weed control was archived with the early combination treatment of Prowl H20, a half rate of Outlook and split Goal applications. Applications with the full rate of Outlook at the 1 to 1.5 leaf stage appeared to reduce onion yields. .

TABLE 4. Application date and onion growth stage for post emergence studies

	6/1/06	6/6/06	6/9/06	6/13/06	6/26/06	
Herbicides	Flag leaf to 1 true leaf	1.5 leaf	2 leaf	3 leaf	Weed Control Rating (10=complete control)	Onion Yield (cwt/A)
Goal XL	Goal XL @ 2oz/A	Goal XL @ 2oz/A		Goal @ 4 oz	9.8	323
Goal XL		Goal XL @ 4oz/A	Goal @ 4oz/A	Goal @ 6 oz	8.7	318
Goal + Buctril		Goal XL @ 4oz/A + Buctril @ 4 oz/A	Goal @ 4oz/A	Goal @ 6 oz	8.5	328
Outlook + Goal	Outlook @ 21 oz/A + Goal XL @ 2oz/A	Goal XL @ 2oz/A		Goal @ 4 oz	9.5	307
Outlook + Goal		Goal XL @ 4oz/A + Outlook @ 21 oz/A	Goal @ 4oz/A	Goal @ 6 oz	9.6	317
Outlook + Goal + Buctril		Goal XL @ 4oz/A + Buctril @ 4 oz/A + Outlook @ 21 oz/A	Goal @ 4oz/A	Goal @ 6 oz	8.6	296
Prowl + Goal	Prowl @ 4 pts/A + Goal XL @ 2oz/A	Goal XL @ 2oz/A		Goal @ 4 oz	8.9	324
Prowl + Goal + Outlook	Prowl @ 4 pts/A + Goal XL @ 2oz/A + Outlook @ 10.5 oz/A	Goal XL @ 2oz/A		Goal @ 4 oz + Outlook @ 10.5 oz/A	10.0	322
UTC (hand weeded weekly)					10.0	313
UTC					1.0	0

Control Weeds to Stop False Chinch Bug

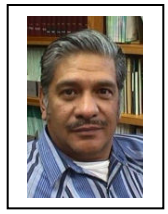
Eric T. Natwick

With the current El Nino conditions we may receive unusually heavy and frequent rainfall this winter and spring. The heavy and frequent rainfall will support the widespread growth of london rocket, a weed in the mustard family. Mustards are a favorite host of the false chinch bug. False chinch bugs are small, light or dark gray insects about 0.12 inch long. The immature bugs are tan with some red markings. When mustard weeds begin to dry down with the onset of warmer weather, the false chinch bugs will begin to migrate in mass. These bugs migrate to vegetable crops and cotton seedlings. These mass migrations can destroy cotton seedlings, peppers or melons in a matter of hours as the bugs swarm over the plants and suck them dry.

False chinch bugs feed mainly on seedlings, but will also move into mature crops such as peppers and cause severe damage to the fruit as they move into a field. Individual bugs do little damage, but large migrations can severely injure or kill young plants or destroy fruit in just a few hours. Migrating false chinch bugs can also contaminate the heads of lettuce and cole crops. The bugs move as a group and usually do not move beyond several border rows if noticed and controlled with a pesticide early.

Controlling cruciferous weed hosts now within fallow fields, along fence rows and road ways will help to eliminate the probability of this pest occurring in vegetables or cotton. Monitoring crops, fences, and weedy areas surrounding the field can serve as an early detection method for migrating bugs. Treat migrating populations before they enter into the crop, if possible. Treat field borders to stop further field migration and damage. If potential problems are detected early, complete crop treatment is usually not necessary. If damage from false chinch bugs reaches unacceptable levels, treatment with a pyrethroid insecticide to field edges are usually sufficient to control this pest.

Mud in Livestock Pens



Juan N. Guerrero

Average annual rainfall in the Imperial Valley is 2.85 inches. The wettest months of the year are November, December, January, and February; mean monthly precipitation of .36, .36, 46 and .32 inches, respectively. While the Sonoran Desert is known principally for its hot summers, winter rains may also cause problems for penned livestock. Locally, during the winter, the worst climate related problem for penned livestock is mud, not cold. For example, cattle in mud 4 to 8 inches deep may have decreased feed intakes of 20%; cattle that don't eat don't gain weight. Cattle in mud 4 to 8 inches deep may have reduced weight gains, 15 to 20%, and have reduced feed efficiency by 10 to 15%. Livestock in mud will gain less weight and the weight that they do gain will be more expensive. Mud is a serious problem for pen-fed livestock.

For persons feeding only a few cattle in one small pen, runoff diversion is a good practice to keep pens dry during rainfall events. Building a berm around the high side of the pen to prevent rainfall runoff from the adjacent field will help keep the pen dry. Small cattle pens should also have drainage. Pen runoff may be diverted to an adjacent field. Great care must be taken, however, that pen drainage not flow into canals or irrigation drains. Federal law prohibits the contamination of the nation's waterways from the runoff of livestock pens.

Locally, a small rainfall event, as small as ¼ inch, may cause mud problems in livestock pens. When cattle walk in muddy pens, they expend greater amounts of energy merely for locomotion; that same amount of energy might have been used for weight gain. Moreover, in muddy pens, when cattle lie down, their skin is in contact with cold, wet mud; which causes greater energy expenditures to maintain normal body temperatures; again, energy that might have gone to weight gain.

Because of the problems that we have with heat in the irrigated Sonoran Desert, we generally place more cattle within a given area, than in the rest of the country. Locally, we recommend from 110 to 150 ft² per head of pen space. On dirt pens, in the rest of the country, from 250 to 500 ft² per head of pen space is generally recommended.

Perhaps the best way to maintain feed intake in muddy pens is to construct a concrete apron (Figure 1) along the interior of the feed bunks. Note that there is a small 4" step. From the fence line to the edge of the apron; the apron should be 8 to 10 ft. wide. The apron should also be 4 to 6 inches thick. The use of this cement apron will help prevent the problems associated with muddy cattle pens.

An emergency effort that may be made during wet weather is to place bedding in cattle pens to reduce the effects of muddy pens. Old, weathered hay is also a good, although costly solution for muddy pens.

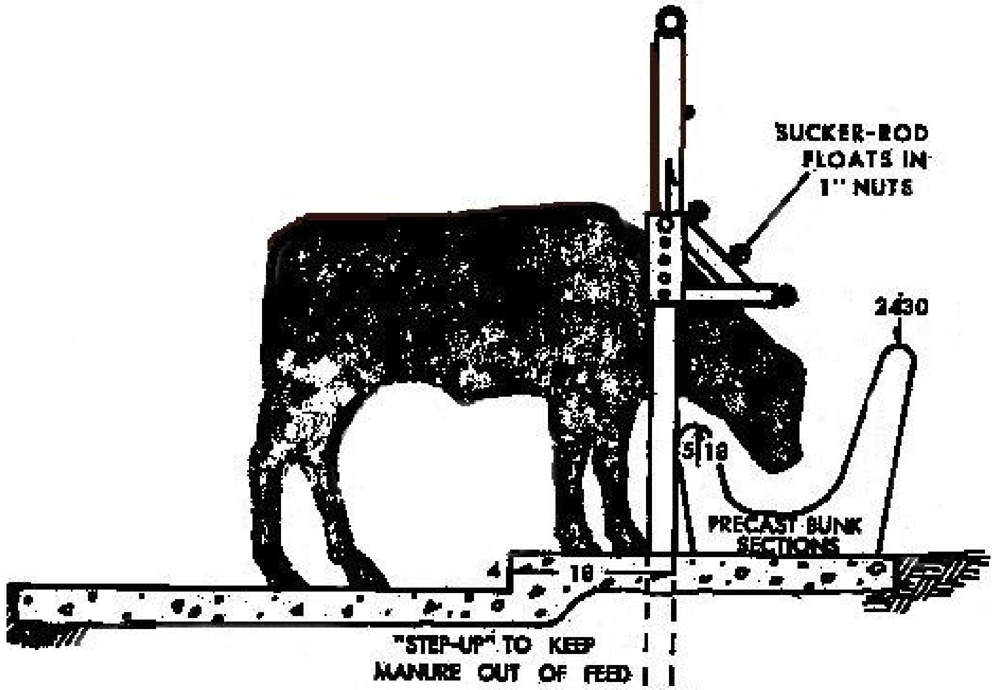
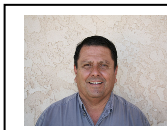


Figure 1. Cement apron next to feed bunk to prevent pen muddiness.

Wild Oats Control in Bermuda Grass Production in the Imperial Valley





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Francisco Maciel and Jose Quiroz

Wild oat (*Avena fetua*) infestations in Bermuda grass (*Cynodon dactylon*) can increase harvest cost and down time and reduce yield potential. Typically wild oat control has been achieved by good fertility programs with non granular type herbicides, i.e. Diuron, 2, 4-D, Atrazine and others. This paper summarizes the findings of a study undertaken to determine the effectiveness of Triallate granules (Far-GO) in controlling wild oat in Bermuda grass. This paper also presents our findings regarding the best time of herbicide application and both seed yield and seed quality of Bermuda grass following herbicide treatments. Finally, this paper outlines our results regarding the rate of Triallate best suited to the desert environment.

Four research sites were selected through the Imperial Valley each having demonstrated a history of wild oat infestations that typically compromised Bermuda grass harvest efficiency and yield potential. A series of randomized plots 41.8 sq. m large in four commercial fields replicated 3 times provided the research sites for determining the effectiveness of Triallate, rate variations, timing and the form of Triallate.

The first site was used to determine if there was a difference in weed control performance with

Triallate applied at 16.8 and 33.6 kg/ha 7 and 3 days prior to incorporation from precipitation. The second through forth sites were used to determine the efficacy of Triallate applied at 16.8 and 33.6 kg/ha, Trifluralin + Triallate (Buckle) applied at 16.8 kg/ha, Trifluralin 10G applied at 22.4 kg/ha and Aatrex 4FL applied at 2.33 L/ha compared to untreated checks.

Comparisons of Triallate applied at 16.8 and 33.6 kg/ha 7 and 3 days prior to incorporation from precipitation (Figure 1) show no significant difference in weed control performance between applied product rates and timing of application prior to incorporation as compare to the untreated check. All treatments provided acceptable levels of performance of 85% or better.

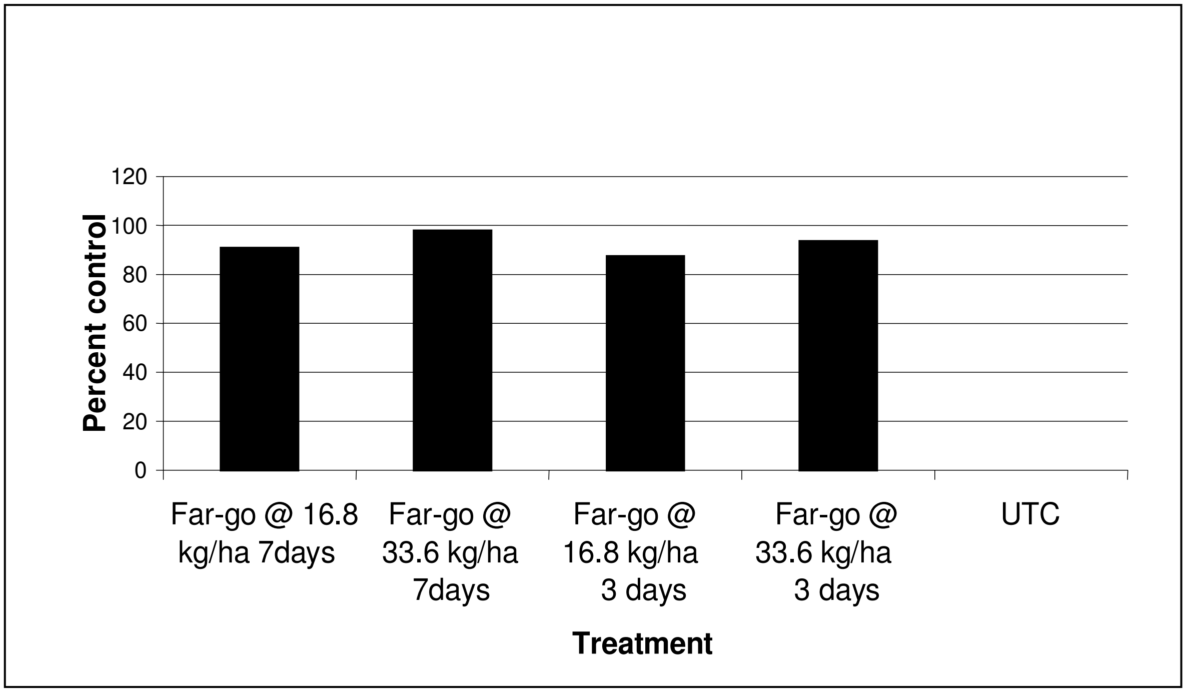


Figure 1. Weed control of 2 rates of Triallate (FarGO) applied at different timings on Bermudagrass for wild oats infestation.

As illustrated in Figure 2, when compared to the "Untreated" area, all treatments control at least 50% of the Wild Oat population. As shown in the figure, Triallate at 33.6 kg/ha worked significantly better than any of the other treatment. The effectiveness of Trifluralin + Triallate (Buckle) applied at 16.8 kg/ha was found to be 15 percent lower than that of Triallate at 33.6 kg/ha. Triallate at 16.8 kg/ha performed 14% lower than Trifluralin + Triallate applied at 16.8 kg/ha. Trifluralin 10G applied at 22.4 kg/ha and Aatrex 4FL applied at 2.33 L/ha performance is comparable.

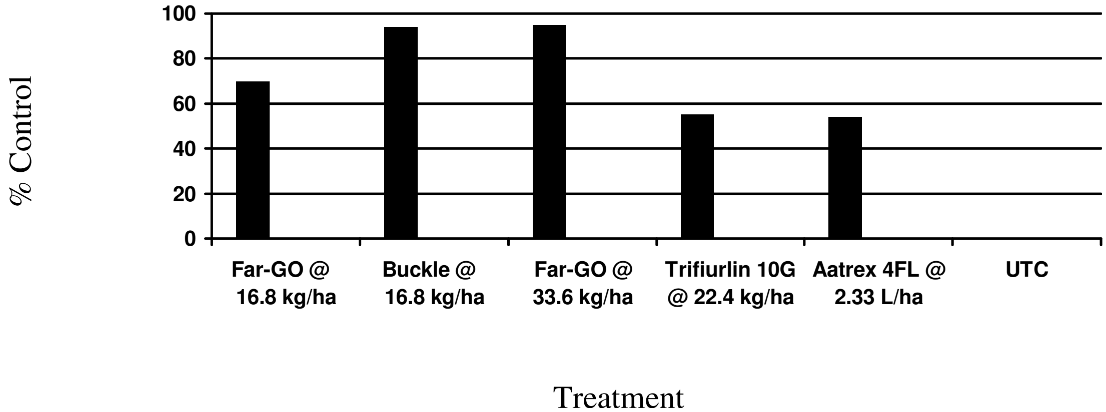


Figure 2. Wild oat control comparing 5 treatments applied 2 days before incorporation.

One of the major reasons to grow Bermuda grass in Imperial Valley is the production of seed. Findings using the treatments described above are reported in Figure 3. As shown in the figure, when compared to untreated areas, no significant yield reduction was found. This demonstrates that the application of any of these treatment, while significantly controlling wild oat do not impact seed yield.

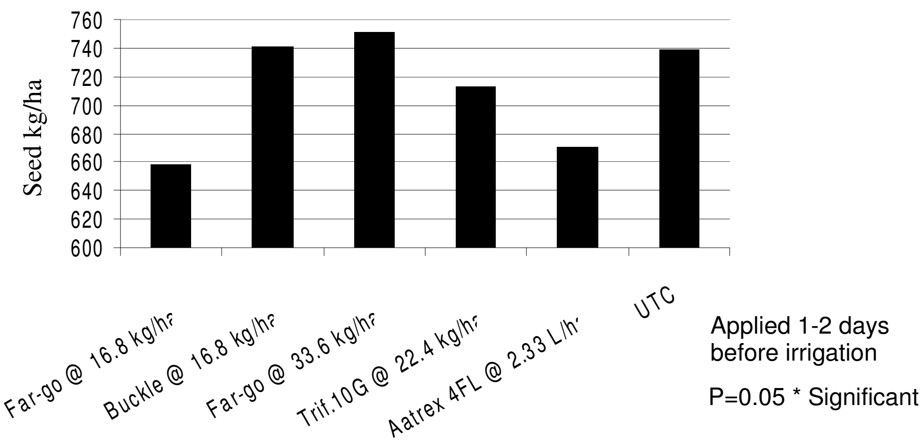


Figure 3. Bermuda grass seed yield treatments applied 2 days prior to irrigation.

Germination tests were performed on seed harvested in each of the three treated sites to determine if the application of herbicide has an impact on seed quality. Results are encouraging, demonstrating that herbicides are management tools that do not negatively impact the quality of seed production.

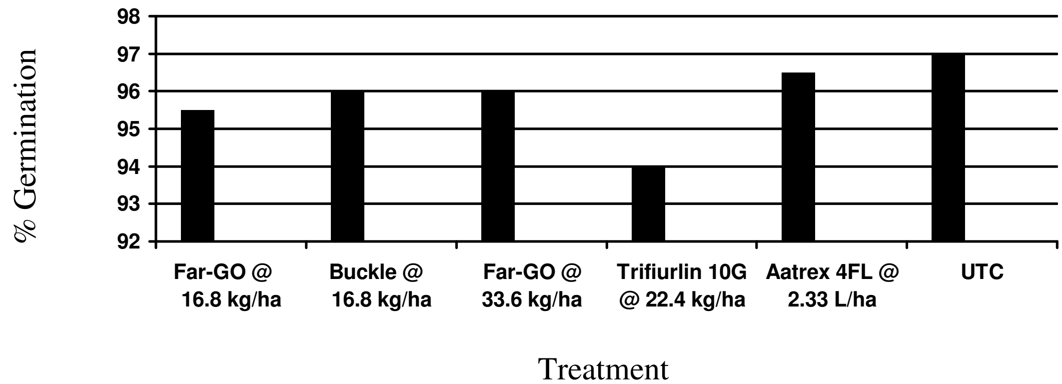


Figure 4. Bermuda grass seed germination following 5 treatments applied 2 days prior to irrigation.

Results from this study show that Triallate (Far-Go) is effective against Wild Oats in Bermuda grass. Results also show that Triallate does not reduce the seed yield nor does it diminish seed quality. Future studies will investigate the timing of the herbicide application and the compare the use of Triallate formulations.

Performance of Iceberg Lettuce Varieties and Breeding Lines in *Rhizomonas suberifaciens* infested soil

Thomas Turini, Ryan Hayes and Beiquan Mou

Corky root of lettuce is caused by the soil-borne bacterium *Sphingomonas suberifaciens,* formerly *Rhizomonas suberifaciens*. It is a widespread disease in costal lettuce production areas of California and is present in Imperial County.

Symptoms of this disease begin as yellow lesions on the tap-root and larger laterals. Later, these bands expand and develop a greenish-brown rough appearance and longitudinal corky ridges become apparent. The center portion of the root may become brown and hollow. When the disease is severe, roots become brittle and may be pinched off.

This disease will reduce plant size. Reductions by 30 to 70% have been reported. The disease tends to be more severe when soil temperatures are high. Between 50^{o} and 87^{o}F, growth of *R. suberifaciens* increases with increases in temperature.

There has been extensive use of the *cor* gene to develop corky root resistance in iceberg and romaine cultivars. However, none of the commercially available corky root resistant iceberg varieties were developed specifically for the low desert environment.

To address this issue, seed of 22 iceberg lettuce breeding lines or varieties were sown in a commercial field in the Bard area on 14 and 15 Sep and received the first irrigation on 15 Sep 2006. The entries are listed in the table below. The experimental design was a randomized complete block with 4 replications. Each plot consisted of one 10 ft long 30 in bed with 2 seed lines per bed.

On 27and 28 Nov, five heads per plot in replications 1-3 were evaluated for quality. Heads were evaluated for firmness or maturity based on the following scale: 1 = no head or open, 2 = cap leaves have closed but the head is puffy, 3 = fully formed and filled head that yields under pressure, 4 = solid head that does not yield under pressure, 5 = heads that are splitting. The heads were cut, trimmed and weighed; weights are presented in lbs per head. Trimmed heads were sliced vertically and core length, head diameter and head height were measured; measurements are presented in inches.

Five root systems per plot were dug for corky root disease evaluation. Replication 1 was dug on 28 Nov, Replications 2 and 3 were dug on 4 Dec and Replication 4 was dug on 5 Dec. Roots were rated on a 0 to 9 corky root disease severity scale in which 0 had completely white roots and 9 had dead plants with a dark brown taproot and minimal secondary root growth as described by Brown et al., 1988.

Corky root severity differed among treatments. Under the conditions of this study, root symptoms were least severe on 4010 W/S, which was not different than 4014 W/S, 4015 W/S, 04-0353-2, 4017 W/S, 4016 W/S, 04-0379-2, 4008 B/S and 04-0375-1 LSD (P=0.05). Under the conditions of this study all of these entries, with the exception of 4016 W/S, were unacceptable due to the core lengths. 4016 W/S had a maturity rating of 2.3 and a head weight of 1.41 lbs, which indicates that it was not mature at harvest. While some of the entries had significantly lower corky root symptom severity, none of these were commercially acceptable under the conditions of this study. It is possible that they would be acceptable if planted later in the season under low desert conditions, but further research is needed.

Root disease ratings and quality of iceberg lettuce breeding lines and varieties in *Rhizomonas suberifaciens* Bard, California receiving first irrigation on 15 Sep 2006.

Entry	Provider	Corky root severity[z]	Maturity[y]	Head quality[x]			
				Core length (in)	Head diameter (in)	Height (in)	Weight per head (lbs)
4010 W/S	Progeny	2.0	3.3	4.06	9.92	5.67	1.68
4014 W/S	Progeny	2.1	3.3	3.46	5.83	5.98	2.01
4015 W/S	Progeny	2.2	4.0	4.29	6.06	5.63	1.61
04-0353-2	USDA	2.2	3.4	4.09	5.87	5.47	1.94
4017 W/S	Progeny	2.6	3.4	4.53	6.46	6.02	1.87
4016 W/S	Progeny	2.7	2.3	1.77	6.50	5.91	1.41
04-0379-2	USDA	3.1	3.2	3.07	5.67	5.47	1.70
4008 B/S	Progeny	3.4	3.2	3.82	5.91	5.20	1.74
04-0375-1	USDA	3.4	3.3	4.33	6.18	5.59	1.81
04-0350-1	USDA	3.8	3.1	4.41	6.02	6.06	1.85
04-0363-1	USDA	3.9	3.5	4.45	5.75	5.75	1.76
4012 W/S	Progeny	4.6	3.4	3.58	6.02	5.75	1.72
Lighthouse	Keithly Williams	5.0	3.6	1.69	5.91	5.28	2.03
Infineon	Progeny	5.0	3.6	2.24	5.75	5.67	1.96
Raider	Keithly Williams	5.1	4.0	1.81	5.35	5.35	1.76
Sizzler	Gene Fresh	5.6	3.9	1.85	5.83	5.12	1.79
Prestige	Progeny	5.7	3.4	1.65	5.59	5.35	1.81
4013 W/S	Progeny	6.1	3.8	2.83	6.22	5.79	2.05
4011 B/S	Progeny	6.2	2.7	2.44	5.59	5.35	1.26
Crusader	Progeny	6.4	3.8	1.85	5.71	5.47	1.87
Javelina	Keithly Williams	6.6	3.8	2.44	6.14	5.24	2.01
MoHawk	Keithly Williams	6.7	4.0	2.36	6.06	5.35	2.12
LSD (P=0.05)		1.6	0.5	1.14	0.72	0.39	0.26

z Five roots per plot were dug on 28 Nov to 5 Dec and rated on a 0 to 9 corky root disease severity scale in which 0 had completely white roots and 9 had dead plants with a dark brown taproot and minimal secondary root growth

y On 27 and 28 Nov, 5 heads per plot in replications 1 to 3 were evaluated for firmness or maturity based on the following scale: 1 = no head or open, 2 = cap leaves have closed but the head is puffy, 3 = fully formed and filled head that yields under pressure, 4 = solid head that does not yield under pressure, 5 = heads that are splitting.

x On 27 and 28 Nov, 5 heads per plot were cut, trimmed and weighed. Trimmed heads were sliced vertically and core length, head diameter and head height were measured.

Don't miss your opportunity to attend **THE DESERT VEGETABLE CROPS FIELD DAY, January 24th** at the **UC-Desert Research & Extension Center** located at the corner of Holton Rd & Meloland Rd. The program starts with registration and refreshments at **7:30 am** with **Tours** and **Presentations** leaving at **8:00 am** – Sharp. This informative industry event for Growers, PCA's, CCA's, Industry Representatives will conclude with a **Steak BBQ** & the trimmings provided by UC-DREC and neighboring agriculture industry companies.

For **CCA's** and **PCA's** there will be **up to 5 CEU's** credit with **3 tours** and **23** total research presentations to choose from. This Field day is sponsored by the good people from your local **Agriculture Industry, University of California and the University of Arizona.**

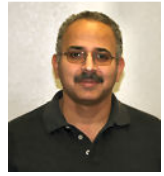
Field day presentation topics will include:

1) Understanding Why Horticultural Crops in the Desert Rarely Respond to K Fertilization by Dr. Charles Sanchez
2) Management tools for powdery mildew on lettuce by Dr. Michael Matheron
3) Food Safety Issues in the Field by Dr. Jorge M. Fonseca
4) Robotic cultivation – machine vision to guide a cultivator by Dr. Steve Fennimore
5) Weed Control in Vegetables by Mr. Kurt Hembree
6) Solarization for Desert Vegetable Production by Dr. Jim Stapleton
7) Purpose of the National Carrot Germplasm Winter Nursery at DREC by Mr. Joe Nuñez
8) Insect Management in Spring Produce Crops by Dr. John Palumbo
9) Getting the most out of lettuce herbicides by Mr. Barry Tickes
10) Insecticide Resistance in Beet Armyworm by Dr. David L. Kerns
11) Rodents and Crop Contamination by Dr. Terrell P. Salmon
12) Insect Pest Management on Lettuce: In the Southern California Deserts is Integrated Pest Management Fact or Fiction? by Dr. Nick Toscano
13) New Herbicide for Desert Vegetables by Dr. Milt McGiffen
14) Herbicide resistance by Dr. Wayne T. Lanini
15) Insect Control on Cole Crops by Mr. Eric Natwick
16) New Growth Regulators for Desert Raised Cucurbits by Mr. Michael Rethwisch
17) Protected Agriculture In Sinaloa Vegetable Production by Mr. Jose Aguiar
18) Managing Wide Row Vegetables by Dr. Kurt Nolte
19) Herbicide Control of Nutsedge and Nightshade in Tomatoes by Dr. Scott Stoddard
20) Drip Fumigation for Vegetable Crops by Dr.Husein Ajwa
21) Comparison of Sprayer Application in Desert Crops by Dr. Rick Bottoms
22) Control of lettuce drop with fungicides and biological control agents by Mr. Tom Turini
23) Lettuce Breeding for the Low Desert by Dr. Ryan Hayes

You would have to travel and spend considerable time and costs to get this valuable **cutting edge information…** So mark your calendar for **Wednesday January 24th at 7:30 a.m.**!

CIMIS REPORT

Khaled Bali and Steve Burch*



California Irrigation Management Information System (CIMIS) is a statewide network operated by California Department of Water Resources. Estimates of the daily reference evapotranspiration (ET_o) for the period of January 1 to March 31 for three locations in the Imperial County are presented in Table 1. ET of a particular crop can be estimated by multiplying ET_o by crop coefficients. For more information about ET and crop coefficients, contact the UC Imperial County Cooperative Extension Office (352-9474) or the IID, Irrigation Management Unit (339-9082).

Please feel free to call us if you need additional weather information, or check the latest weather data on the worldwide web (visit http://tmdl.ucdavis.edu and click on the CIMIS link).

Table 1. Estimates of daily Evapotranspiration (ET_o) in inches per day

Station	January		February		March	
	1-15	16-31	1-15	15-28	1-15	16-31
Calipatria	0.08	0.09	0.12	0.15	0.18	0.22
El Centro (Seeley)	0.08	0.09	0.12	0.14	0.16	0.20
Holtville (Meloland)	0.08	0.09	0.12	0.14	0.17	0.21

* Irrigation Management Unit, Imperial Irrigation District.