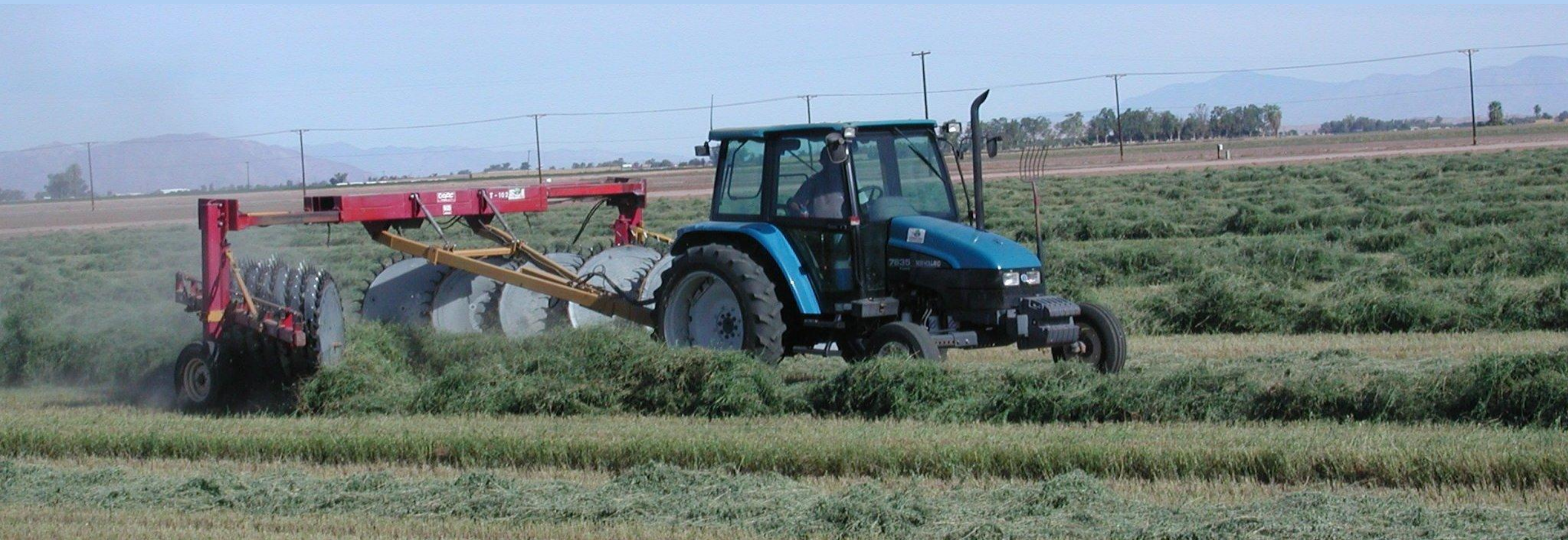
Imperial County Agricultural Briefs



Features **From your Farm Advisors**

May, 2010

Efficacy of Fungicides Against the Downy Mildew Pathogen *Bremia Lactucae* on Lettuce

Donna Henderson

Downy mildew is caused by the fungal pathogen *Bremia lactucae* on lettuce. Downy mildew on lettuce can be a problem for growers, especially during wetter winters such as we experienced in 2009/2010. This research was done to testvarious fungicides of existing chemistries and several new chemistries against *B. lactucae*. Field research plots were established at University of California Desert Research and Extension Center during the 2009-2010 lettuce-growing season, during conditions favorable for downy mildew development. Fungicides that were tested included four different schedules of fungicides that included Aliette (O-ethyl Phosphonate, Bayer Cropscience), Reason (Fenamidone, Bayer Cropscience), Maneb 80WP (Manganese ethylenebisdithiocarbamate, Bayer Cropscience), and lastly Revus (Mandipropamid, Syngenta) followed by Aliette and an untreated control. In addition, new experimental fungicides were included in the trial: GWN-4700 (Zoxamide, Gowan Co.), GWN-9823 (no. compound, Gowan Co.), GWN-4700 + GWN-9939 (Zoxamide + no. compound, Gowan Co.), GWN-4700 + GWN-9940 (Zoxamide + no. compound, Gowan Co.), GWN-4700 + GWN-9938 (Zoxamide + no. compound, Gowan Co.).

The research plots are located at the Desert Research and Extension Center, in Holtville, CA. Romaine lettuce variety fresh heart was planted on November 4, 2009. Cool and wet weather common in December and early January favor Downy mildew development, therefore, the November planting date. The trial was a randomized complete block design, consisting of 10 total treatments, with five replications. Each plot was one 40-inch bed 25 feet long. Plots were sprinkler irrigated for germination. November until January plots were furrow irrigated, but switched to sprinkler irrigation after canopy closure and the first sign of disease 27 January to facilitate disease development. Applications were done on an as needed schedule, upon increases in disease incidence and severity. The first sign of downy mildew was observed sporadically on 27 January 2010 in some of the research plots, and first application of fungicides was applied on 2 February 2010. However, the dry weather did not allow the pathogen to develop, therefore more frequent sprinkler irrigation was used to facilitate pathogen growth. Thereafter, increases in disease development were observed prior to each application date, and treatments were applied again on 5 March 2010.

Fungicides were applied with a hand pump backpack sprayer with pressure-regulated nozzle at 30 psi. All treatments were applied in combination with a non-ionic surfactant as warranted by the label (Induce, Helena Chemical Co.) at 0.005% v/v. Disease incidence in each plot was evaluated by evaluating ten randomly chosen plants for the presence or absence of disease. Disease severity of downy mildew on the leaf surface of ten randomly chosen plants was done prior to each fungicide application using the following rating system: 0 = no downy mildew present; 1 = 1 to 5 downy mildew colonies on leaf surface; 2 = 6 to 10 downy mildew colonies on leaf surface; 3 = more than 10 colonies to 25% of leaf surface covered with downy mildew; 4 = 26 to 50% of leaf surface covered with downy mildew; 5 = 51 to 100% of leaf surface covered with downy mildew. Data were subjected to analysis of variance. Fisher's least significant difference was used to analyze the data means. Non-transformed means are presented as percentage of the leaf surface covered with downy mildew symptoms. The project was terminated March 31 2010 due to plant senescence. Data were evaluated using statistical analysis software SAS 9.2 (SAS Institute, Cary, NC).

Treatment list:
*fb = followed by

Treatment	Oz /acre	Liters Water/Acre	Application date
1. Untreated	--	--	--
2. Aliette, fb Reason	48, 8.2	75.6, 56.7	2 February, 5 March
3. Reason, fb Maneb	8.2, 32	56.7, 56.7	2 February, 5 March
4. Aliette, fb Maneb	48, 32	75.6, 56.7	2 February, 5 March
5. Revus, fb Reason	6.08, 8.2	40, 56.7	2 February, 5 March
6. GWN-4700	4.0	56.7	2 February, 5 March
7. GWN-9823	6.4	56.7	2 February, 5 March
8. GWN-4700 + GWN-9939	3.0, 5.0	56.7, 56.7	2 February, 5 March
9. GWN-4700 + GWN-9940	3.0, 21	56.7, 56.7	2 February, 5 March
10. GWN-4700 + GWN-9938	3, 32	56.7, 56.7	2 February, 5 March

Results

There was no significant difference ($P< 0.0975$) in the initial disease incidence (presence or absence) or disease severity throughout the treatment plots 4 March, prior to the second fungicide application. However, there was a significant difference in the disease incidence between the blocks, indicating that the disease was more prevalent towards the center of the field. On 11 March there was a significant difference ($P< 0.0119$) between treatments for disease severity (percent infected leaves), but not disease incidence. This indicates that the disease was present throughout the field, but treatments applied on 5 March were able to impede development of the pathogen and make an impact on disease severity for the 11 March evaluation.

MINIMIZING SOIL EROSION

Khaled M. Bali

Soil erosion is the detachment and movement of soil particles from the land surface by wind, water, ice, or other natural agents. Erosion is a two-phase process; detachment of individual particles from soil aggregates and the transport of these particles by water or other natural force. Soil particles vary in size and shape, sand is the largest particle group and clay is the smallest particle group.

Soil varies in their susceptibility to erosion. If the soil has a cohesive structure, then it takes a lot more energy to detach particles from such a structure as compared to soil that has a weak structure. The detaching agent (a rain drop for example) must have enough kinetic energy to remove soil particles from soil aggregates. This energy depends on the mass and velocity of the eroding agent. The amount of eroding soil or sediments depends on many factors such as velocity of running water, field slope, soil type, and cover crop. It takes little energy to move silt and clay particles with irrigation water as it moves a a long the field. The velocity of water in furrows is typically higher than the velocity of water in borders. The potential for erosion is higher in furrow irrigated fields because of the higher velocity and the smaller wetted area per unit of applied water.

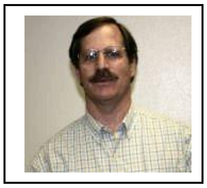
What can be done to minimize erosion?

- Use of any material that can improve soil structure such as binding agents (organic mater or chemical agents) will reduce soil erosion.
- Reduce slope.
- Reduce flow rate or water velocity.
- Management practices such as cover crops or tillage practices that minimize soil exposure to wind or water erosion.
- Reuse surface runoff water on the same field
-

Why do we need to reduce sediment load in waterways?

- Erosion is a loss of productive soil particles and fertilizers attached to these particles.
- To reduce potential negative environmental impact of sediment in waterways.
- To comply with water quality regulations (Total Maximum Daily Load limits on silt/sediment in drains, rivers, and waterways-Section 303(d) of the Clean Water Act).

Evaluation of Insecticides for Lygus Bug, Stink Bug and Three-cornered Alfalfa Hopper Control in Seed Alfalfa




Eric T. Natwick and Martin Lopez

Several insecticide rotation schemes were evaluated for lygus bug (LB) control at the University of California Desert Research and Extension Center from in 2009. Efficacy of the insecticide rotations against stink bugs, and threecornered alfalfa hoppers were also evaluated. The insecticide efficacy trial was conducted on a stand of CUF-101 alfalfa on beds of 40 inch centers. The experimental design was RCB using 4 replicates with 8 insecticide rotation treatments and an untreated check. Plots were eight beds (26.7 ft) wide by 75 ft long. Formulations and rates for each compound are provided and test materials were applied on the dates at the specified rate equivalencies listed in Table 1. The applications were made with a Lee Spider Spray Trac operated at 20 psi delivering 31.4 gpa. A broadcast application was delivered through 17 nozzles (TJ-60 11003VS). A non-ionic surfactant (NIS) was applied at 0.25% v/v in a tank mixture with all insecticide treatments. The Carzol 92 SP spray mixture was buffered to pH 5.0 using Helena Buffer PS. The pretreatment insect population evaluations conducted on 20 May. Post treatment evaluations were conducted on 8, 15, 18, 22, 30 June, 7 and 14 July 2009. During each evaluation, ten sweeps per plot were collected with a standard 15-inch diameter sweep net. Sweep samples were bagged, labeled, and frozen for later counting of small lygus bug nymphs, large lygus bug nymphs and lygus bug adults; all lygus bugs nymphs were also tallied (Tables 2 - 5). Stink bug (SB) evaluations for nymphs and adults combined, and threecornered alfalfa hoppers are included in Tables 6-7. Treatment means were analyzed using 2-way ANOVA and means separated by a protected LSD (P=0.05). Log (X+1) transformations were used, as needed, with transformed means presented in tables.

Pre-treatment numbers of lygus bug adults, small nymphs and all lygus bug stages were similar (P=0.05) among treatments and the untreated control (UTC) (Table 2-5). There were no differences for mean numbers of small lygus bugs among the insecticides treatments and the untreated check any of the sampling dates, except for the 22 June when the Dibrom 8 followed by (f/b) Warrior f/b Lorsban 4E treatment regime had significantly more small nymphs than the check and on 7 July when all treatment regimes except the Dibrom 8 @ 20 oz/acre f/b NAI-2302 15EC at 14 oz/acre regime and the Dibrom 8 @ 20 oz/acre f/b NAI-2302 15EC at 14 oz/acre regime had significantly fewer small lygus bugs compared to the check (Table 2).

There were no significant differences (P = 0.05) among the insecticide treatments and the untreated control for large lygus bug nymphs on 15, 18, and 22 June nor on 14 July; however, all insecticide treatment regimes had post treatment averages that were significantly lower than the control (Table 3). On 8 June, all insecticide treatments with Rimon (applied on 2 June) had significantly larger lygus bug nymphs than the untreated control, but all other insecticide treatments were not difference from the control. The control had significantly more large lygus bug nymphs on 30 June than Dibrom 8 f/b Beleaf 50 SG f/b Carzol 92 SP, Dibrom 8 f/b NAI-2302 15EC, Rimon f/b Beleaf 50 SG f/b Carzol 92 SP and Rimon f/b Beleaf 50 SG f/b Lorsban 4E; all other insecticide treatments were not different from the control. On 7 July, only Dibrom 8 f/b Beleaf 50 SG f/b Carzol 92 SP, Dibrom 8 f/b NAI-2302 15EC, and Rimon f/b Beleaf 50 SG f/b Carzol 92 SP had significantly fewer large lygus bug nymphs compared to the control.

There were no significant differences (*P* = 0.05) among the insecticide treatments and the untreated control for lygus bug adults on 8, 15, and 18 June; however, all insecticide treatment regimes had post treatment averages that were significantly lower than the control (Table 4). Only the insecticide treatment regimes of Dibrom 8 f/b NAI-2302 12EC and Rimon f/b Beleaf 50 SG f/b Carzol 92 SP had significantly fewer lygus bug adults than the untreated control on 22 June. All insecticide treatment regimes had significantly fewer lygus bug adults than the control on 30 June except Dibrom 8 f/b NAI-2302 15EC and Rimon f/b Beleaf 50 SG f/b Lorsban 4E. All insecticide treatment regimes had significantly fewer lygus bug adults than the control on 7 July. Only the insecticide treatment regimes of Dibrom 8 f/b Warrior f/b Lorsban 4E and Rimon f/b Beleaf 50 SG f/b Lorsban 4E had significantly fewer lygus bug adults than the untreated control on 14 July.

There were no significant differences (*P* = 0.05) among the insecticide treatments and the untreated control for all stages of lygus bugs (adults and nymphs pooled) on 18 June and 14 July; however, all insecticide treatment regimes had post treatment averages for all stages of lygus bugs that were significantly lower than the control (Table 5). On 8 June, the only insecticide regimes of Dibrom 8 f/b NAI-2302 15EC, Rimon f/b Beleaf 50 SG f/b Carzol 92 SP, Rimon f/b Beleaf 50 SG f/b Lorsban 4E, and Rimon f/b BAS 320 05I had means for all stages of lygus bug that were significantly lower than the control. All insecticide treatment regimes had means for all stages of lygus bugs that were significantly lower than the control on 15 June except Dibrom 8 f/b Warrior f/b Lorsban 4E, Dibrom 8 f/b Beleaf 50 SG f/b Carzol 92 SP, and Rimon f/b Beleaf 50 SG f/b Lorsban 4E. Only Dibrom 8 f/b NAI-2302 12EC and Rimon f/b Beleaf 50 SG f/b Carzol 92 SP had means for all lygus bugs compared to the control on 22 June. On June 30 and 7 July, all insecticide treatments regimes had means for all stages of lygus bug that were significantly lower than the mean for the control; some treatment means unacceptably high.

There were no differences among the insecticide treatment regimes and the untreated control for numbers of stink bugs except on 30 June when all treatments except Rimon f/b BAS 320 05I had significantly (*P* = 0.05) fewer stink bugs than the untreated control (Table 6). On 30 June, only the treatments with Dibrom 8 f/b Beleaf 50 SG f/b Carzol 92 SP, Dibrom 8 f/b NAI-2302 15EC (all three rates), and Rimon f/b Beleaf 50 SG f/b Carzol 92 SP all had significantly fewer threecornered alfalfa hoppers than the control, but the season averages for all insecticide regimes were significantly lower than the control for the except Rimon f/b BAS 320 05I (Table 7).

Table 1. List of Insecticide Treatments and Application Dates, Holtville, California, 2009.

Treatment	oz/acre	Application Dates	Plot #'s
1. Untreated	--------	-----------	1, 16, 22, 35
2. Dibrom 8 f/b Warrior f/b Lorsban 4E	20.0 f/b 3.84 f/b 32.0	2 June 9, 29 June 19 June	2, 17, 27, 32
3. Dibrom 8 f/b Beleaf 50 SG f/b Carzol 92 SP*	20.0 f/b 2.8 f/b 8.0	2 June 9, 19 June 29 June	6, 12, 19, 36
4. Dibrom 8 f/b NAI-2302 15EC	20.0 f/b 14.0	2 June 9, 19, 29 June	9, 14, 25, 29
5. Dibrom 8 f/b NAI-2302 15EC	20.0 f/b 21.0	2 June 9, 19, 29 June	7, 15, 26, 31
6. Dibrom 8 f/b NAI-2302 12EC	20.0 f/b 27.0	2 June 9, 19, 29 June	3, 11, 24, 34
7. Rimon f/b Beleaf 50 SG f/b Carzol 92 SP*	12.0 f/b 2.8 f/b 8.0	2 June 9, 19 June 29 June	8, 13, 21, 28
8. Rimon f/b Beleaf 50 SG f/b Lorsban 4E	12.0 f/b 2.8 f/b 32.0	2 June 9, 19 June 29 June	4, 18, 23, 30
9. Rimon f/b BAS 320 05I	12.0 f/b 19.0	2 June 9, 19, 29 June	5, 10, 20, 33

NIS @ 0.25% v/v was added to foliar spray mixtures. *Buffered to pH 5.0.

Table 2. Small Lygus Bug Nymphs per Sweeps in Seed Alfalfa. Holtville, CA. 2009.

Treatment	oz/acre	20 May	8 Jun	15 Jun	18 Jun	22 Jun	30 Jun	7 Jul	14 Jul	PTA
Untreated	--------	0.70	3.45	0.85	0.43	0.35 b	8.70	12.40 a	2.75	4.13
Dibrom 8 f/b Warrior f/b Lorsban 4E	20.0 f/b 3.84 f/b 32.0	0.88	3.00	0.68	0.35	1.33 a	5.80	6.43 bc	5.03	3.23
Dibrom 8 f/b Beleaf 50 SG f/b Carzol 92 SP	20.0 f/b 2.8 f/b 8.0	0.70	0.98	0.13	0.15	0.25 b	0.35	3.33 c	6.68	1.69
Dibrom 8 f/b NAI-2302 15EC	20.0 f/b 14.0	0.68	1.60	0.45	0.23	0.73 ab	7.85	8.58 ab	2.03	3.06
Dibrom 8 f/b NAI-2302 15EC	20.0 f/b 21.0	0.90	2.73	0.48	0.35	0.25 b	3.78	7.90 abc	1.93	2.49
Dibrom 8 f/b NAI-2302 12EC	20.0 f/b 27.0	1.00	1.48	0.10	0.20	0.40 b	2.23	4.78 bc	6.23	2.20
Rimon f/b Beleaf 50 SG f/b Carzol 92 SP	12.0 f/b 2.8 f/b 8.0	0.60	0.88	0.40	0.53	0.30 b	1.30	6.88 bc	5.83	2.30
Rimon f/b Beleaf 50 SG f/b Lorsban 4E	12.0 f/b 2.8 f/b 32.0	0.78	0.98	0.73	0.40	0.48 b	3.90	6.63 bc	13.18	3.75
Rimon f/b BAS 320 05I	12.0 f/b 19.0	0.65	0.90	0.05	0.15	0.13 b	4.45	2.95 c	3.08	1.67

Means within columns followed by the same letter are not significantly different; LSD, *P* = 0.05.

Table 3. Large Lygus Bug Nymphs per Sweeps in Seed Alfalfa. Holtville, CA. 2009.

Treatment	oz/acre	20 May	8 Jun	15 Jun	18 Jun	22 Jun	30 Jun[z]	7 Jul	14 Jul	PTA
Untreated	--------	0.33	13.53 a	1.10	0.43	0.18	7.25 a	18.63 a	8.00	7.01 a
Dibrom 8 f/b Warrior f/b Lorsban 4E	20.0 f/b 3.84 f/b 32.0	0.20	9.93 abc	0.88	0.73	0.38	1.43 abc	14.80 ab	3.50	4.52 b
Dibrom 8 f/b Beleaf 50 SG f/b Carzol 92 SP	20.0 f/b 2.8 f/b 8.0	0.30	8.55 abcd	0.43	0.30	0.08	0.38 bc	8.43 bcd	8.48	3.80 bc
Dibrom 8 f/b NAI-2302 15EC	20.0 f/b 14.0	0.43	10.10 ab	0.28	0.13	0.13	2.48 ab	11.78 abc	3.93	4.11 bc
Dibrom 8 f/b NAI-2302 15EC	20.0 f/b 21.0	0.30	13.08 a	0.18	0.20	0.40	1.30 bc	7.85 bcd	4.80	3.97 bc
Dibrom 8 f/b NAI-2302 12EC	20.0 f/b 27.0	0.30	12.13 a	0.20	0.13	0.10	0.80 bc	15.23 ab	10.80	5.63 ab
Rimon f/b Beleaf 50 SG f/b Carzol 92 SP	12.0 f/b 2.8 f/b 8.0	0.33	5.38 bcd	0.25	0.53	0.28	0.18 c	1.83 d	17.80	3.74 bc
Rimon f/b Beleaf 50 SG f/b Lorsban 4E	12.0 f/b 2.8 f/b 32.0	0.43	3.03 d	0.33	0.35	0.23	1.35 c	14.78 ab	14.35	4.91 bc
Rimon f/b BAS 320 05I	12.0 f/b 19.0	0.33	3.58 cd	0.28	0.13	0.25	0.95 abc	4.28 cd	5.20	2.09 c

Means within columns followed by the same letter are not significantly different; LSD, *P* = 0.05.

[z] Log 10^x transformed data used for analysis and actual means shown.

Table 4. Adult Lygus Bug per Sweeps in Seed Alfalfa. Holtville, CA. 2009.

Treatment	oz/acre	20 May	8 Jun	15 Jun	18 Jun	22 Jun	30 Jun[z]	7 Jul	14 Jul	PTA
Untreated	--------	5.25	15.03	10.73	3.50	5.03 a	9.88 a	21.38 a	9.13 ab	10.66 a
Dibrom 8 f/b Warrior f/b Lorsban 4E	20.0 f/b 3.84 f/b 32.0	5.38	1.16	6.68	3.28	5.08 a	4.45 b	7.30 b	1.30 c	5.66 b
Dibrom 8 f/b Beleaf 50 SG f/b Carzol 92 SP	20.0 f/b 2.8 f/b 8.0	4.35	13.75	7.63	1.53	3.38 abc	2.03 c	22.13 b	4.88 bc	6.33 b
Dibrom 8 f/b NAI-2302 15EC	20.0 f/b 14.0	5.48	9.15	4.13	2.63	4.60 ab	5.63 ab	11.95 b	4.68 bc	6.11 b
Dibrom 8 f/b NAI-2302 15EC	20.0 f/b 21.0	4.70	12.53	6.38	2.35	4.98 a	4.50 b	9.93 b	7.15 abc	6.79 b
Dibrom 8 f/b NAI-2302 12EC	20.0 f/b 27.0	7.45	13.80	3.75	2.20	3.00 bc	4.20 b	9.43 b	7.68 abc	6.29 b
Rimon f/b Beleaf 50 SG f/b Carzol 92 SP	12.0 f/b 2.8 f/b 8.0	5.65	8.45	6.98	2.03	2.73 c	3.28 bc	6.23 b	13.08 a	6.11 b
Rimon f/b Beleaf 50 SG f/b Lorsban 4E	12.0 f/b 2.8 f/b 32.0	5.23	6.93	7.33	2.28	3.43 abc	5.55 ab	11.08 b	2.18 c	5.54 b
Rimon f/b BAS 320 05I	12.0 f/b 19.0	4.58	10.20	4.55	2.03	4.15 abc	4.20 b	9.03 b	4.73 bc	5.55 b

Means within columns followed by the same letter are not significantly different; LSD, *P* = 0.05.
[z] Log 10^x transformed data used for analysis and actual means shown.

Table 5. All Stages of Lygus Bug per Sweeps in Seed Alfalfa. Holtville, CA. 2009.

Treatment	oz/acre	20 May	8 Jun	15 Jun	18 Jun	22 Jun	30 Jun	7 Jul	14 Jul	PTA
Untreated	--------	5.78	32.03 a	12.68 a	4.35	5.53 ab	26.15 a	52.40 a	19.88	21.86 a
Dibrom 8 f/b Warrior f/b Lorsban 4E	20.0 f/b 3.84 f/b 32.0	6.45	24.48 ab	8.23 ab	4.35	6.78 a	11.68 bc	28.40 bc	9.83	13.39 bc
Dibrom 8 f/b Beleaf 50 SG f/b Carzol 92 SP	20.0 f/b 2.8 f/b 8.0	5.35	23.28 abc	7.93 ab	1.98	3.70 bcd	2.75 c	22.88 bc	20.03	11.79 bc
Dibrom 8 f/b NAI-2302 15EC	20.0 f/b 14.0	6.58	21.35 bcd	4.85 b	2.98	5.45 abc	15.95 b	32.30 b	10.63	13.36 bc
Dibrom 8 f/b NAI-2302 15EC	20.0 f/b 21.0	5.90	28.33 ab	7.03 b	2.90	5.63 ab	9.33 bc	25.68 bc	13.88	13.25 bc
Dibrom 8 f/b NAI-2302 12EC	20.0 f/b 27.0	8.75	27.40 ab	4.05 b	2.53	3.50 cd	7.23 bc	29.43 bc	24.70	14.12 bc
Rimon f/b Beleaf 50 SG f/b Carzol 92 SP	12.0 f/b 2.8 f/b 8.0	6.58	14.45 cd	7.60 b	3.08	3.30 d	4.75 c	14.93 c	36.70	12.11 bc
Rimon f/b Beleaf 50 SG f/b Lorsban 4E	12.0 f/b 2.8 f/b 32.0	6.43	13.43 d	8.38 ab	3.03	4.13 bcd	10.80 bc	32.58 b	29.70	14.58 b
Rimon f/b BAS 320 05I	12.0 f/b 19.0	5.55	12.18 d	4.88 b	2.30	4.53 bcd	9.60 bc	16.25 bc	13.00	8.96 c

Means within columns followed by the same letter are not significantly different; LSD, *P* = 0.05.

Table 6. Stink Bug Adults and nymphs per Ten Sweeps in Seed Alfalfa. Holtville, CA. 2009.

Treatment	oz/acre	20 May	8 Jun	15 Jun	18 Jun	22 Jun	30 Jun[z]	7 Jul	14 Jul	PTA
Untreated	--------	0.00	3.75	2.25	2.50	5.25	7.25 a	2.50	6.25	4.25
Dibrom 8 f/b Warrior f/b Lorsban 4E	20.0 f/b 3.84 f/b 32.0	0.25	3.00	0.50	3.25	3.25	0.25 de	2.25	3.50	2.29
Dibrom 8 f/b Beleaf 50 SG f/b Carzol 92 SP	20.0 f/b 2.8 f/b 8.0	0.50	2.25	1.50	0.50	6.00	0.00 e	0.00	4.25	2.07
Dibrom 8 f/b NAI-2302 15EC	20.0 f/b 14.0	0.75	1.25	1.25	0.75	5.50	3.00 bc	3.00	5.25	2.86
Dibrom 8 f/b NAI-2302 15EC	20.0 f/b 21.0	0.00	1.50	1.50	1.75	1.50	2.25 bcd	1.75	5.50	2.25
Dibrom 8 f/b NAI-2302 12EC	20.0 f/b 27.0	0.00	0.25	1.50	0.25	7.50	1.75 bcd	1.75	4.25	2.46
Rimon f/b Beleaf 50 SG f/b Carzol 92 SP	12.0 f/b 2.8 f/b 8.0	0.00	2.50	1.75	0.25	11.00	1.25 cde	1.00	6.00	3.39
Rimon f/b Beleaf 50 SG f/b Lorsban 4E	12.0 f/b 2.8 f/b 32.0	0.25	4.25	2.00	1.50	9.00	0.75 cde	2.00	0.75	2.89
Rimon f/b BAS 320 05I	12.0 f/b 19.0	0.00	1.75	3.25	0.75	8.00	6.00 ab	1.00	5.75	3.79

Means within columns followed by the same letter are not significantly different; LSD, *P* = 0.05.

[z] Log 10^x transformed data used for analysis and actual means shown.

Table 7. Threecornered Alfalfa Hoppers per Sweeps in Seed Alfalfa. Holtville, CA. 2009.

Treatment	oz/acre	15 Jun	18 Jun	22 Jun	30 Jun	7 Jul	14 Jul	PTA
Untreated	--------	1.10	0.93	0.83	0.90 a	1.85	0.45	1.01 a
Dibrom 8 f/b Warrior f/b Lorsban 4E	20.0 f/b 3.84 f/b 32.0	0.58	0.70	0.78	0.43 abc	0.95	0.70	0.69 bc
Dibrom 8 f/b Beleaf 50 SG f/b Carzol 92 SP	20.0 f/b 2.8 f/b 8.0	0.88	0.65	0.38	0.23 c	0.88	0.40	0.57 c
Dibrom 8 f/b NAI-2302 15EC	20.0 f/b 14.0	0.60	1.13	0.73	0.35 bc	0.80	0.55	0.69 bc
Dibrom 8 f/b NAI-2302 15EC	20.0 f/b 21.0	0.58	0.98	0.68	0.08 c	1.10	0.23	0.60 bc
Dibrom 8 f/b NAI-2302 12EC	20.0 f/b 27.0	0.78	0.40	0.38	0.20 c	0.65	0.40	0.47 c
Rimon f/b Beleaf 50 SG f/b Carzol 92 SP	12.0 f/b 2.8 f/b 8.0	0.68	0.63	0.70	0.13 c	0.60	0.50	0.54 c
Rimon f/b Beleaf 50 SG f/b Lorsban 4E	12.0 f/b 2.8 f/b 32.0	0.53	0.65	0.75	0.75 ab	0.70	0.35	0.62 bc
Rimon f/b BAS 320 05I	12.0 f/b 19.0	1.03	1.23	0.33	0.90 a	0.88	0.75	0.85 ab

Means within columns followed by the same letter are not significantly different; LSD, *P* = 0.05.

Introducing!

Dr. Chris McDonald -New Desert Natural Resources Advisor

Dr. Chris McDonald joined the University of California Cooperative Extension in January as the Desert Natural Resources advisor for San Bernardino, Riverside and Imperial counties. Dr. McDonald is based at the UCCE office in San Bernardino and serves clientele in the above three counties including the clientele in Imperial County.

Dr. McDonald earned a Ph.D. in Natural Resources at the University of Arizona in 2009, where he studied plant ecology in wildlands. He investigated the effects of prescribed fire and livestock grazing on reducing the abundance of two nonnative invasive grasses. These two grasses threaten to alter the biodiversity, fire regime and economic activities in southern Arizona. He found that management and removal of the invasive buffelgrass (*Pennisetum ciliare*) is crucial as buffelgrass can increase the occurrence of fire in the desert. Buffelgrass-fueled fires can spread rapidly and these fires burn at temperatures which kill many long-lived native plants, including the saguaro cactus.

He also found that the invasive Lehmann lovegrass (*Eragrostis lehmanniana*) responds poorly to fire and livestock grazing while native grasses have a much higher survival. Thus, ranchers and land managers in semi-arid grasslands can use prescribed fire to manage for a diversity of grasses on their ranges, potentially increasing production and wildlife.

Dr. McDonald has also co-taught 6th grade science for a year as part of a teaching improvement program and has conducted outreach activities to middle and high school students on desert plant ecology and fires.

Throughout his research career, he has collaborated with ranchers, fire departments, government agencies, non-governmental organizations and the public to improve management activities and hopes to continue similar collaborations in his position as a natural resource advisor.

Dr. McDonald earned an M.S. degree from the University of Arizona studying the fire ecology and pollination of an endangered cactus; using the results of his research to improve land management and development in southern Arizona. He also received a B.S. degree from UC Riverside.

His education and experience fit well with managing invasive plants in Southern California. There are many invasive plants that alter the fire regime of the desert, others threaten management programs while others impede on economic activities. He strives to provide a research-based program to improve plant management in Southern California. Dr. McDonald can be reached at (909) 387-2242 and at cjmcdonald@ucdavis.edu .

CIMIS REPORT AND UC DROUGHT MANAGEMENT PUBLICATIONS

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 May 1 to July 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	May		June		July	
	1-15	16-31	1-15	16-30	1-15	16-31
Calipatria	0.32	0.36	0.39	0.40	0.39	0.38
El Centro (Seeley)	0.31	0.34	0.36	0.38	0.38	0.37
Holtville (Meloland)	0.32	0.35	0.38	0.39	0.39	0.38

* Irrigation Management Unit, Imperial Irrigation District.

Link to UC Drought Management Publications

http://ucmanagedrought.ucdavis.edu/