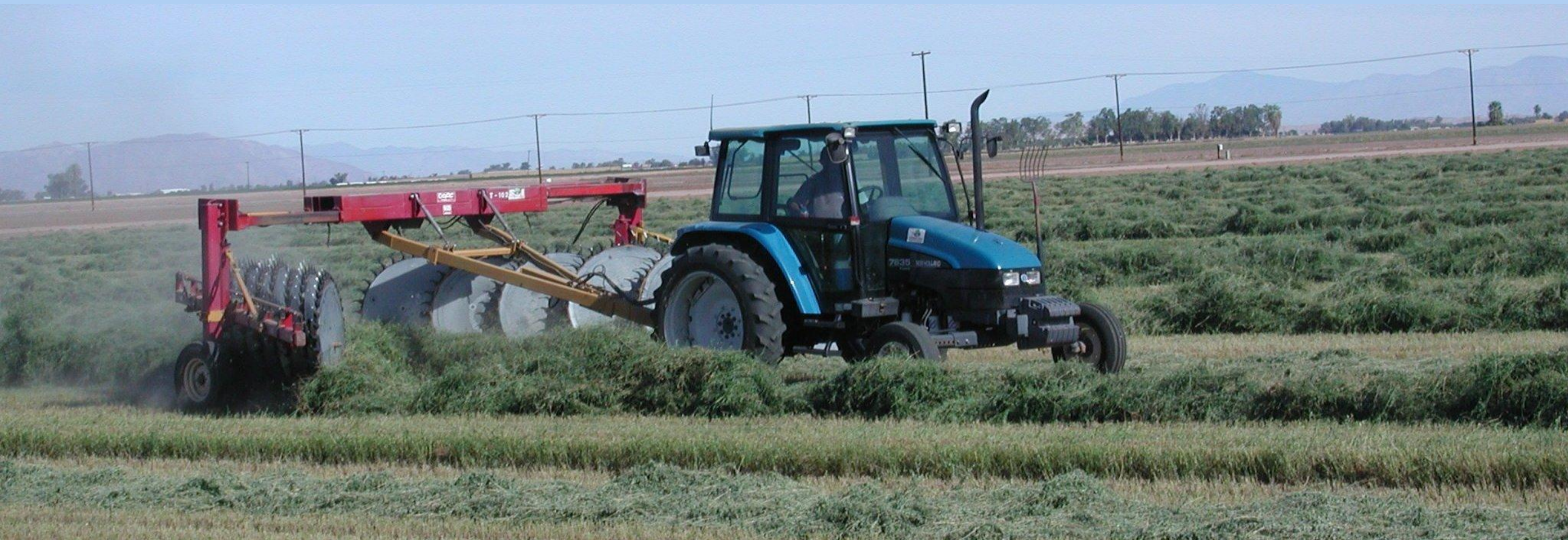
Imperial County Agricultural Briefs



Features From your Farm Advisors

April, 2013

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SUMMER COVER CROPPING SUPPRESSES WEEDS IN A SUBSEQUENT CROP

Oli Bachie

A three-year field study was conducted at the University of California's' South Coast Research and Extension Station to assess the effectiveness of summer cover cropping in suppressing weeds in a subsequent winter crop . Three cropping treatments were employed: 1) French marigold (*T. patula* cv. Single Gold seeded at 2 kg/ha), 2) cowpea (*Vigna unguiculata* cv. UCR CC 36), seeded at 56 kg/ha, and 3) a summer dry fallow as the untreated control. The cover crops were direct-seeded in the last week of June, watered through drip tubing and grown for three months. The fallow control plots did not receive water during the summer. Each cover crop treatment plot was planted with the same cover crop in each of the three years of study. At the beginning of the subsequent winter cropping season (the second week of September), broccoli seedlings (*Brassica oleracea*, cv Marathon) were transplanted in double rows into the tilled strips of the summer cover crop and fallow plots at an inter (between seedlings) and intra-row spacing of 13 and 35 cm, respectively (http://ucanr.org /freepubs/docs /711.pdf). Broccoli transplants were drip irrigated and fertilized with emulsified fish meal (6-2-0 fertilizer) at 5 gallons/acre rate. All plot treatments were maintained in the same location for all three years of study in order to assess a cumulative effect of cover crops over time. Weed population density within the subsequent crop was sampled as early, mid and harvest time samplings. The mid and harvest time samplings were preceded by initial and second hand weeding, respectively

Results showed that the most dominant weed species during all years was *Portulaca oleracea* (common purslane), accounting for 70-85% of all weed populations. Other broadleaf weeds including *Chenopodium album* (common lambsquarters), *Solanum nigrum* (black nightshade), *Amaranthus species* (Amaranth), *Malva nicaeensis* (bull mallow), *Sonchus oleraceus* (annual sowthistle), *Convolvulus arvensis* (field bindweed), *Capsella bursa-pastoris* (shepherd's-purse) and *Erodium cicutarium* (redstem filaree).

Urtica urticaurens (burning nettle) and *Oxalis corniculata* (creeping woodsorrel) were observed in some plots, but rarely. The grassy weed species *Echinochloa crus-galli* (barnyardgrass) and *Eragrostis barrelieri* (Mediterranean lovegrass) occurred very sporadically. The results also showed that either cowpea or marigold used as summer cover crops could effectively suppress weed population densities in the subsequent cash crop. Cover crop weed suppression was more pronounced on broadleaf than grass weeds and the suppression increased with increasing years of cover cropping rotations, indicating that repeated cover cropping is more effective than a single season rotation. Comparing among the cover crops, fewer weeds were observed when the cover crop was a cowpea than marigold. The relatively stronger weed suppression by cowpea could be due to its being leguminous and hence nitrogen fixing ability. The subsequent vegetable crop may have benefitted from such supply and made enhanced growth, allowing the vegetable crops to be more competitors to emerging weeds.

Weed suppression at early growth stage of a vegetable is particularly desirable as most crops may suffer serious weed competition during their early growth stages. Crops that had overcome early resource competion could have vigourous growth and suppress subsquent weeds on their own Yet, the cover crops did not provide complete control of weeds and needed supplemental weeding strategies. However, less weed population as a result of cover cropping would mean reduced requirement of supplemental weeding. Therefore cover crops should not be considered as sole weed control strategy, but useful as an integrated weed management option. In addition to weed suppression potentials, cover crops are ecologically desirable. While cover cropping may particularly be appealing in organic crop production systems where chemical weed management is not an option, it can also be useful as an integrated weed management strategy in the conventional weed control systems.

Table 1. Weed population density per m^2 for the early, mid, and harvest time sampling for 2007*

Weed species	Weed sampling time and cropping treatments								
	Early			Mid			Harvest		
	mg	cp	fw	mg	cp	fw	mg	cp	fw
Portulaca oleracea	34[a]	82[a]	370[b]	2	10	36	0	8	36
Chenopodium album	3	3	7	12	4	10	9	3	8
Solanum nigrum	6	5	18	0	0	2	2	0	2
*Amaranthus spp***	6	2	0	0	1	0	0	0	0
Malva nicaeensis	13	10	10	8	6	3	6	6	7
Sonchus oleraceus	1	1	0	5	3	6	5	1	6
Convolvulus arvensis	0	0	0	0	0	0	0	2	2
Tagetes patula	2	1	1	3	1	0	1	1	0
Other broadleaves	3	2	5	1	2	1	2	2	5
Echinochloa crus-galli	2	0	0	3	2	20	0	0	20
Other grass	20	5	24	2	4	6	2	2	2
All broadleaves	65[a]	105[a]	409[b]	29	26	57	23[a]	21[a]	64[b]
All grasses	22	5	24	5	6	26	2	2	21
All Weeds	87[a]	110[a]	433[b]	33a	32a	82b	25[a]	23[a]	85[b]

* Horizontal mean values for each weed species within each sampling time followed by different letter are significantly different from each other. Data not shown with letter values are not significantly different from each other. mg = marigold, cp = cowpea and fw = fallow.

** Some of the common *Amaranthus* species were *A. albus*, *A. sinosus* and *A. retroflexus*.

Table 2. Weed population density per m^2 for the early, mid, and harvest time sampling for 2008*

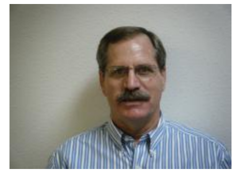
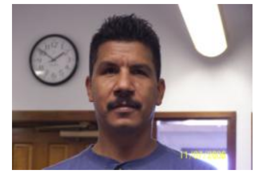
	Weed sampling time and cropping treatments								
	Early*			Mid			Harvest		
Weed species	mg	Cp	fw	mg	cp	fw	mg	cp	fw
Portulaca oleracea	96a	85a	331b	7a	10ab	40b	6a	9a	63b
Chenopodium album	7	10	15	0	0	5	0	0	6
Solanum nigrum	1	3	13	0	1	3	0	0	1
*Amaranthus spp***	0	0	3	0	0	1	0	0	0
Erodium cicutarium	12	0	10	0	0	2	15	0	1
Sonchus oleraceus	6	8	17	0	1	3	2	3	5
Convolvulus arvensis	0	0	3	0	0	0	0	1.5	0
Capsella bursa-pastoris	0	7	3	0	0	0	0	0	0
Other broadleaves	6	4	12	4	3	4	11	4	13
Eragrostis barrelieri	5	15	20	3	0	1	1	1	3
Echinochloa crus-galli	-	-	-	0	0	4	0	0	0
Other grass	5	0	3	0	2	0	5	1.5	4
All broadleaves	128a	115a	415b	11a	14a	58b	33a	17a	87b
All grasses	9	15	23	3	2	5	5.5	2.0	7
All Weeds	137a	130a	437b	14a	16a	62b	39a	19a	94b

*Horizontal mean values for each weed species within each sampling followed by different letters are significantly different from each other. Data not shown with letter values are not significantly different from each other. mg = marigold, cp = cowpea and fw = fallow.

Table 3. Weed population density per m^2 for the early, mid, and harvest time sampling for (2009)*

	Weed sampling time and cropping treatments								
	Early			Mid			Harvest		
Weed species	mg	Cp	fw	mg	cp	fw	mg	cp	fw
Portulaca oleracea	32a	16a	197b	5a	3a	11b	0.3	0.5	0.0
Chenopodium album	3.0	0.5	6.3	0.3	0.5	2.0	0.0	0.0	0.5
Solanum nigrum	0.0a	0.0a	4.5b	0.0	0.0	1.5	0.3	0.0	0.0
*Amaranthus spp***	1.3a	0.8a	9.8b	0.0a	0.3ab	2.3b	0.5	0.0	0.0
Malva nicaeensis	9.5	4.8	11.3	8.0	4.8	6.5	1.8	0.5	1.8
Sonchus oleraceus	2.3ab	0.8a	9.0b	1.3	1.8	2.0	0.5	0.0	0.0
Capsella bursa-pastoris	4.3	0.0	11.0	4.8	0.8	3.3	3.5	1.0	1.8
Erodium cicutarium	1.8a	0.0a	6.8b	0.3	0.3	1.8	0.5	0.0	0.0
Urtica urticaurens	1.3	1.3	7.5	2.3	1.8	5.8	4.0	0.8	7.8
Oxalis corniculata	1.5	0.0	1.3	1.3	0.3	1.5	1.5	0.0	3.0
Eragrostis barrelieri	7.3	0.0	16.0	1.3	0.0	0.5	0.3	0.0	0.3
Echinochloa crus-galli	1.0	0.0	5.3	0.8	0.0	0.0	0.0	0.0	0.3
Other grasses	0.0	0.0	1.8	0.3	0.0	1.5	0.0	0.0	0.0
All broadleaves	64a	24a	281b	26ab	14a	44b	13ab	3a	15b
All grasses	1.0	0.0	7.3	2.4	0.0	2.0	0.3	0.0	0.6
All Weeds	65a	24a	288b	28ab	14a	46b	13ab	3a	16b

* Horizontal mean values for each weed species within each sampling time followed by different letters are significantly different from each other. Data not shown with letter values are not significantly different from each other. mg = marigold, cp = cowpea and fw = fallow.

ALFALFA SEED PRODUCTION INSECTICIDE EFFICACY TRIAL, 2012

Eric T. Natwick and Martin I. Lopez

The objective of the study was to evaluate the efficacy of insecticides used against adults and nymphs of LB and SB on alfalfa grown for seed production under desert growing conditions. An insecticide efficacy trial was conducted at the UC Desert Research and Extension Center on a stand of CUF-101 alfalfa on beds of 40 inch centers; the stand was clipped-back on 13 Apr 2012 to initiate seed production. The experimental design was RCB using 4 replicates with 5 insecticide treatments and an untreated check. Plots were 50 ft wide by 70 ft long, with 5 ft buffers between replicate blocks. The insecticide treatments were applied on 4 Jun and 14 Jun at the specified rate equivalencies listed in the tables. Insecticide treatments were broadcast sprays, applied using a Lee Spider Spray Trac, Tractor mounted spray boom, equipped with 15 nozzles (TJ-60 11003VS) operated at 20 psi, and delivering 30.1 gpa in a 25 ft wide spray swath. Hasten, a modified vegetable oil surfactant (Wilber-Ellis Company) was applied at 0.25% vol/vol in tank mixtures with each insecticide treatment. The pre-treatment (PT) insect population data were collected on 29 May. Post treatment data were collected on 7, 12, 18, 21, 25, and 28 Jun, and 2 and 5 Jul 2012. During each evaluation, ten 180° sweeps per plot were collected with a standard 15-inch diameter sweep net. Sweep net samples were bagged, labeled and frozen for later counting of small LB nymphs (1^{st} through 3^{rd} instars), large LB nymphs (4^{th} and 5^{th} instars) and LB adults, in the laboratory. On 9 Jul 2012, mature seed pods were stripped from a few plants at random in each plot, pods were hand-threshed to prevent loss of damaged seed, and 100 random seeds from each plot were examined under a binocular microscope for LB damage, SB damage, ASC damage, chewing insect damage, water damage, green seed and good seed. Treatment means were analyzed using 2-way ANOVA and means separated by a protected LSD ($P \leq 0.05$).

Pre-treatment numbers of small LB nymphs, large LB nymphs and adult LB were similar among insecticide treatments and the untreated check (Table 1-3). There were no differences among the treatment means for small LB on 12, 25, and 28 Jun, 2 and 5 Jul. All of the insecticide treatments had fewer small LB nymphs than the untreated check on 7, 18 and 21 Jun and for the post treatment average (PTA); Transform @ 2.25 oz/acre had the lowest mean for small LB on each of the aforementioned sampling dates and for the PTA.

There were no differences among the means for large LB on 29 May, 28 Jun and 5 Jul (Table 2). On 2 Jul there were no differences among the treatment means and check for large LB except for the Orthene 97 treatment that had significantly more, large LB than the check and more than all other insecticide treatments. All of the insecticide treatments had fewer large LB nymphs than the untreated check on 7, 12, 18, 21, and 25 Jun. The check had more large LB nymphs than any of the insecticide treatments for the PTA and the Transform @ 2.25 oz/acre treatment had the fewest large LB nymphs.

There were no differences among the treatments for LB adults on 29 May and on 12 Jun (Table 3). All insecticide treatments had fewer LB adults than the check on 25 Jun and for the PTA. On 7 Jun only the insecticide treatments with Orthene 97, Transform @ 1.5 oz/acre and Rimon 0.83 EC did not have fewer LD adults than the check. All insecticide treatments had fewer LB adults than the check on 18 Jun except the Orthene 97 treatment. On 21 Jun all insecticide treatments except Orthene 97, Transform @ 1.5 oz/acre, Lorsban 4E, and Sivanto had fewer LB adults than the check. On 28 Jun all insecticide treatments except the two Transform treatments had fewer LB adults than the check. All insecticide treatments had fewer LB adults than the check on 2 Jul except the treatments with Orthene 97, Transform @ 1.5 oz/acre, Belay, and Lorsban 4E. All insecticide treatments had fewer LB adults than the check on 5 Jul except the treatments with Carzol 92 SP, Orthene 97, Rimon 0.83 EC, Lorsban 4E and Sivanto. The check had more LB adults than any of the insecticide treatments for the PTA. There were no differences among the treatment means for SB on any of the sampling dates or for the PTA except on 5 Jul Transform 2 2.25 oz/acre had more SB than the check and all other insecticide treatments (Table 4). All insecticides treatments except Beleaf and Transform @ 2.25 oz/acre had significantly lower percentages of LB damaged seed than the check (Table 5). None of the insecticide treatments had lower percentages of SB damaged seed, ASC damaged seed, damage from chewing insects or water damaged seed compared to the untreated check.

Table 1.

Treatment	oz/acre	Small LB nymphs per ten sweeps									
		29 May	7 Jun	12 Jun	18 Jun[x]	21 Jun	25 Jun	28 Jun	2 Jul	5 Jul	PTA[z]
Check	--------	1.25 a	32.25 a	36.00 a	22.00 a	13.25 a	8.50 a	2.50 a	0.25 a	0.25 a	14.38 a
Beleaf 50 SG	2.8	1.00 a	6.25 b	15.25 a	3.50 bc	1.75 c	3.00 a	1.00 a	0.25 a	0.00 a	3.88 bc
Carzol 92 SP	8.0	2.50 a	3.00 b	10.25 a	0.75 d	0.75 c	0.00 a	0.75 a	0.00 a	0.00 a	1.94 bc
Orthene 97	16.0	3.00 a	1.75 b	22.00 a	4.25 bc	2.00 bc	3.50 a	5.25 a	0.25 a	0.50 a	4.94 bc
Transform WG	1.50	3.00 a	4.50 b	22.75 a	1.25 bcd	2.75 bc	2.50 a	2.00 a	0.25 a	0.00 a	4.50 bc
TransformWG	2.25	0.75 a	1.25 b	6.00 a	1.00 cd	1.00 c	2.25 a	0.25 a	0.00 a	0.00 a	1.47 c
Belay Insecticide	2.8	2.25 a	8.75 b	26.25 a	3.75 bc	5.75 b	4.00 a	2.25 a	0.25 a	0.00 a	6.38 b
Rimon 0.83EC	12.0	2.50 a	5.25 b	26.00 a	3.75 bc	3.50 bc	3.25 a	0.00 a	0.00 a	1.00 a	5.34 bc
Lorsban 4E	32.0	0.75 a	3.50 b	15.00 a	5.75 b	2.25 bc	2.00 a	1.75 a	0.00 a	0.00 a	3.78 bc
Sivanto	14.0	1.25 a	21.75 b	10.50 a	4.00 bc	3.00 bc	1.75 a	0.50 a	0.00 a	0.00 a	5.19 bc

Means within columns followed by the same letter are not significantly different; *P*>0.05, LSD.
[x] Log_{10} (X+1) transformed data used for analysis, but non-transformed means are reported.
[z] Post treatment averages.

Table 2.

Treatment	oz/acre	Large LB nymphs per ten sweeps									
		29 May	7 Jun	12 Jun	18 Jun	21 Jun	25 Jun	28 Jun	2 Jul	5 Jul	PTA[xz]
Check	--------	1.75 a	34.00 a	34.75 a	19.25 a	11.50 a	12.25 a	3.00 a	1.25 b	1.75 a	14.72 a
Beleaf 50 SG	2.8	1.00 a	4.00 b	8.00 b	4.25 c	3.00 b	1.50 bc	1.75 a	0.25 b	0.25 a	2.88 bcd
Carzol 92 SP	8.0	1.50 a	2.50 b	4.75 b	6.25 c	2.00 b	0.75 bc	0.50 a	1.00 b	0.50 a	2.28 cd
Orthene 97	16.0	3.25 a	2.75 b	2.25 b	4.50 c	3.75 b	2.50 bc	3.75 a	3.50 a	1.75 a	3.09 bc
Transform WG	1.50	1.25 a	5.50 b	7.00 b	1.75 c	3.75 b	2.75 bc	4.50 a	0.50 b	0.50 a	3.28 bcd
Transform WG	2.25	1.50 a	1.50 b	3.00 b	1.25 c	1.75 b	0.00 d	2.00 a	1.00 b	0.25 a	1.34 d
Belay Insecticide	2.8	2.75 a	8.75 b	16.25 b	5.00 c	3.00 b	1.00 bc	4.00 a	1.00 b	1.00 a	5.00 b
Rimon 0.83EC	12.0	0.50 a	8.00 b	11.00 b	5.25 c	2.25 b	2.75 bc	1.75 a	0.25 b	0.75 a	4.00 bc
Lorsban 4E	32.0	1.00 a	4.25 b	7.00 b	13.25 b	3.00 b	3.25 b	3.25 a	0.50 b	0.50 a	4.38 bc
Sivanto 200SL	14.0	3.00 a	4.75 b	15.75 b	4.50 c	3.25 b	2.50 bc	3.50 a	0.50 b	0.50 a	4.41 bc

Means within columns followed by the same letter are not significantly different; *P*>0.05, LSD.
[x] Log_{10} (X+1) transformed data used for analysis, but non-transformed means are reported.
[z] Post treatment averages.

Table 3.

Treatment	oz/acre	LB adults per ten sweeps									
		29 May	7 Jun[x]	12 Jun	18 Jun	21 Jun[x]	25 Jun	28 Jun	2 Jul	5 Jul	PTA[z]
Check	--------	40.75 a	22.00 a	43.25 a	12.25 a	22.50 a	17.25 a	7.75 a	8.75 a	12.75 a	18.31 a
Beleaf 50 SG	2.8	40.50 a	10.00 bc	16.50 a	3.25 cd	9.50 bcd	6.25 b	0.50 e	2.50 c	7.75 bc	7.03 b
Carzol 92 SP	8.0	58.25 a	5.25 c	11.75 a	5.50 bcd	7.00 cd	6.75 b	1.00 de	3.25 c	11.00 ab	6.44 b
Orthene 97	16.0	54.50 a	11.25 ab	13.75 a	5.50 cd	11.25 abcd	7.50 b	2.00 cde	7.25 ab	8.75 abc	8.34 b
Transform WG	1.50	47.25 a	12.00 ab	21.00 a	6.00 bcd	12.25 abc	5.50 b	6.75 ab	6.00 abc	5.50 c	9.38 b
Transform WG	2.25	47.75 a	17.25 bc	17.25 a	3.00 d	9.00 bcd	5.75 b	5.00 abc	4.00 bc	7.50 bc	7.44 b
Belay Insecticide	2.8	48.25 a	9.75 bc	19.75 a	5.50 bcd	7.25 bcd	5.75 b	3.75 bcd	5.75 abc	6.75 bc	8.03 b
Rimon 0.83EC	12.0	35.25 a	13.00 ab	18.75 a	9.50 ab	5.50 d	5.25 b	1.50 de	3.25 c	12.75 a	8.69 b
Lorsban 4E	32.0	38.50 a	8.25 bc	10.50 a	7.50 bc	12.25 abcd	4.75 b	3.00 cde	5.75 abc	9.25 abc	7.66 b
Sivanto 200SL	14.0	43.00 a	10.50 bc	26.00	5.25 bcd	17.75 ab	5.50 b	2.00 cde	3.50 bc	9.25 abc	9.59 b

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

[x] Log_{10} (X+1) transformed data used for analysis, but non-transformed means are reported.

[z] Post treatment averages.

Table 4.

Treatment	oz/acre	SB per ten sweeps								
		7 Jun	12 Jun	18 Jun	21 Jun	25 Jun	28 Jun	2 Jul	5 Jul	PTA[z]
Untreated	--------	0.25 a	0.00 a	0.75 a	1.25 a	0.50 a	1.00 a	0.50 a	0.75 b	0.63 a
Beleaf 50 SG	2.8	0.00 a	0.00 a	0.00 a	0.25 a	0.25 a	0.00 a	0.75 a	0.50 b	0.22 a
Carzol 92 SP	8.0	0.00 a	0.00 a	0.25 a	1.50 a	0.50 a	0.00 a	0.50 a	0.00 b	0.34 a
Orthene 97	16.0	0.00 a	0.00 a	0.00 a	0.25 a	1.00 a	0.00 a	1.25 a	0.75 b	0.41 a
Transform WG	1.50	1.00 a	0.25 a	0.00 a	0.50 a	0.00 a	0.75 a	0.00 a	0.25 b	0.34 a
Transform WG	2.25	0.00 a	0.25 a	0.50 a	3.25 a	0.50 a	0.25 a	0.50 a	2.00 a	0.91 a
Belay Insecticide	2.8	0.00 a	0.00 a	0.50 a	1.00 a	0.50 a	0.00 a	0.25 a	0.00 b	0.28 a
Rimon 0.83EC	12.0	0.00 a	0.00 a	0.00 a	1.75 a	1.50 a	0.25 a	0.25 a	0.25 b	0.50 a
Lorsban 4E	32.0	0.00 a	0.25 a	0.00 a	0.00 a	0.75 a	0.50 a	1.00 a	0.75 b	0.41 a
Sivanto 200SL	14.0	0.00 a	0.00 a	0.25 a	0.50 a	0.25 a	0.50 a	0.00 a	0.25 b	0.22 a

Means within columns followed by the same letter are not significantly different; $P>0.05$, LSD.
[z] Post treatment averages.

Table 5.

Treatment	oz/acre	Percentage of seed damaged from LB, SB, ASC and percentages of green seed and healthy seed						
		Lygus Bug	Stink Bug	Seed Chalcid	Chewing Damage	Water Damage	Green Seed	Good Seed
Untreated	--------	12.25 a	3.25	4.00 a	0.25 a	0.00 a	1.00 ab	79.25 a
Beleaf 50 SG	2.8	7.50 abc	2.00 a	2.50 a	0.25 a	0.00 a	0.00 c	87.75 a
Carzol 92 SP	8.0	6.00 bc	1.50 a	3.50 a	0.00 a	0.25 a	0.00 c	88.75 a
Orthene 97	16.0	5.00 bc	1.75 a	2.75 a	0.25 a	0.00 a	0.50 bc	89.75 a
Transform WG	1.50	2.50 c	0.75 a	3.00 a	0.00 a	0.00 a	0.00 c	93.75 a
Transform WG	2.25	8.50 ab	2.25 a	2.75 a	0.00 a	0.00 a	0.50 bc	86.00 a
Belay Insecticide	2.8	6.25 bc	2.00 a	2.75 a	0.25 a	0.00 a	0.75 abc	88.25 a
Rimon 0.83EC	12.0	5.25 bc	1.75 a	1.50 a	0.25 a	0.25 a	0.00 c	91.00 a
Lorsban 4E	32.0	3.75 bc	1.25 a	2.00 a	0.00 a	0.00 a	1.50 a	91.50 a
Sivanto 200SL	14.0	4.50 bc	1.25 a	2.00 a	0.00 a	0.00 a	0.00 c	92.25 a

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

CIMIS REPORT AND UC DROUGHT MANAGEMENT PUBLICATIONS

Khaled Bali and Sharon Sparks*

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 April 1 to June 30 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, Ag Water Science 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	April		May		June	
	1-15	15-30	1-15	16-31	1-15	16-30
Calipatria	0.26	0.29	0.32	0.36	0.39	0.40
El Centro (Seeley)	0.24	0.28	0.31	0.34	0.36	0.38
Holtville (Meloland)	0.25	0.28	0.32	0.35	0.38	0.39

* Ag Water Science Unit, Imperial Irrigation District.

Link to UC Drought Management Publications

http://ucmanagedrought.ucdavis.edu/