Imperial County Agricultural Briefs

Features **From your Farm Advisors**

October, 2012

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THRIPS CONTROL IN ICEBERG LETTUCE SPRING OF 2012
Eric T. Natwick

The objective of the study was to evaluate the efficacy of insecticides for control of western flower thrips (WFT) on iceberg head lettuce under desert growing conditions. Head lettuce (GRIZZLY) was direct seeded on 19 October 2011 at the University of California Desert Research and Extension Center, El Centro, CA into double row beds on 40 inch centers. Stand establishment was achieved using overhead sprinkler irrigation, and irrigated with furrow irrigation thereafter. Plots were four beds 13.3 ft wide by 50 ft long and bordered by one untreated bed. The experiment included seven insecticidal treatments and a water treated check. Four replications of each treatment were arranged in a RCB design. Insecticidal compounds, formulations and application rates, along with treatment dates, are provided in Table 1. All insecticide treatments were foliar sprays applied with a Lee Spider Spray TracTractor 4-row sprayer with three TJ-60 11003VS nozzles per row, a total of 12 nozzles that delivered a broadcast application at 25 psi and 50.6 gpa. The adjuvant, DyneAmic (Helena Chemical Co.), was added to all insecticidal spray mixtures at 0.25% vol/vol. Numbers of WFT from ten plants per replicate were recorded on each sample date. The sampling dates included: 10 & 23 Jan, 2 & 15 Feb 2012 which were pre-treatments (PT), 5 days after treatment (DAT) 1, 8DAT2 and 8DAT3, respectively. All lettuce heads were harvested from 13.1 row ft (0.001 acre) on 17 Feb 2012 and examined for thrips feeding damage, for market quality heads (no thrips damage), were weighed and data were recorded as total heads, thrips damaged heads, marketable heads, kg of marketable heads, and percentages of market quality heads were calculated. Data were analyzed using ANOVA. Differences among means on each sampling date and in each experiment were determined using Least Significant Difference Test (*P*=0.05).

WFT population levels were moderate during this trial. There were no differences among the treatments for WFT larval means resulting from the PT or 8DAT13 (Table 2). All insecticide treatments except the two Assail treatments and the Athena treatment had fewer thrips larvae than the water check 5DAT1. All insecticidal treatments except Assail + Silwet-L77 had lower WFT larval means than the water check on 8DAT2. All insecticide treatments except the two Assail treatments had fewer WFT larvae than the water check for their post-treatment averages (PTA). There were no differences among the treatments for WFT adult means resulting from the

PT or 8DAT13 (Table 3). All insecticide treatments except the two Assail treatments had fewer thrips adults than the water check 5DAT1. The water check had more adult thrips than any of the insecticide treatments for the 8DAT3 samples and for the PTA. There were no differences among treatments for total numbers of lettuce heads (Table 4). Only the insecticide treatments MustangMax f/b Lannate LV, Radiant and Athena had fewer thrips damaged lettuce heads than the water check. Only the Radiant, MustangMax f/b Lannate LV, and Athena treatments had more market quality heads and higher percentages of market heads than the water check. Only Radiant and Athena treatments had more kg of market heads than the water check. No phytotoxicity symptoms were observed following any of the insecticide treatments. This research was supported by industry gifts. This research was supported by industry gifts.

Table 1.

Treatment	fl oz/acre	Application date
1. MustangMax* f/b	4.0 f/b	18Jan, 7 Feb
Lannate LV*	40.0	25 Jan
2. Assail 70 WP + Silwet-L77	1.7 + 0.10% vol/vol	18, 25 Jan, 7 Feb
3.Assail 70 WP + Induce	1.7 + 0.25% vol/vol	18, 25 Jan, 7 Feb
4. Radiant*	7.0	18, 25 Jan, 7 Feb
5. Hero EW*	11.2	18, 25 Jan, 7 Feb
6. Beleaf* + Mustang*	2.8 + 4.3	18, 25 Jan, 7 Feb
7. Athena*	17.0	18, 25 Jan, 7 Feb
8. Water Check	--------	------------

f/b = followed by

*Dyne-Amic @ 0.25% v/v (37.9 ml/4 gal) added to foliar spray mixture.

Table 2.

Treatment	oz/acre	WFT larvae per plant				
		PT[x]	5DAT[y]1	8DAT2	8DAT3	PTA[z]
MustangMax f/b Lannate LV	4.0 f/b 40.0	2.58	0.63 d	0.38 d	0.80	0.60 c
Assail 70 WP + Silwet-L77	1.7 + 0.10% vol/vol	2.70	1.85 ab	1.33 abc	1.18	1.45 a
Assail 70 WP + Induce	1.7 + 0.25% vol/vol	1.75	2.08 a	0.95 bc	0.70	1.24 ab
Radiant	7.0	2.53	7.00 cd	0.35 d	0.55	0.53 c
Hero EW	11.2	1.50	3.50 d	0.45 d	0.85	0.55 c
Beleaf + Mustang	2.8 + 4.3	2.08	1.03 bcd	0.45 d	0.63	0.70 c
Athena	17.0	2.28	1.55 abc	0.60 cd	0.45	0.87 bc
Water Check	--------	2.23	2.23 a	1.73 a	1.00	1.65 a

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

[x] PT = pre-treatment; [y] DAT = days after treatment; [z] PTA = post treatment average

Table 3.

Treatment	oz/acre	WFT adults per plant				
		PT[x]	5DAT[y]1	8DAT2	8DAT3	PTA[z]
MustangMax f/b Lannate LV	4.0 f/b 40.0	11.83	7.80 b	4.85 c	4.98	5.88 c
Assail 70 WP + Silwet-L77	1.7 + 0.10% vol/vol	12.45	10.98 a	13.00 b	6.55	10.18 b
Assail 70 WP + Induce	1.7 + 0.25% vol/vol	13.33	9.73 ab	13.10 b	6.43	9.75 b
Radiant	7.0	12.40	4.20 c	2.98 c	4.70	3.96 d
Hero EW	11.2	11.20	2.75 c	5.18 c	7.13	5.02 cd
Beleaf + Mustang	2.8 + 4.3	10.28	4.08 c	5.05 c	4.90	4.68 cd
Athena	17.0	13.93	4.20 c	5.08 c	4.53	4.60 cd
Water Check	--------	12.25	12.43	16.70 a	6.98	12.03 a

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

[x] PT = pre-treatment; [y] DAT = days after treatment; [z] PTA = post treatment average

Table 4.

Treatment	oz/acre	Total heads	Thrips damage	Market heads	Kg market heads	% Market heads
		Numbers of Thrips Damaged, Market, and kg Market Heads per 0.001 acre, and Percentages of Market Heads				
MustangMax f/b Lannate LV	4.0 f/b 40.0	14.40	8.43 b	5.23 c	5.78	6.48 c
Assail 70 WP + Silwet-L77	1.7 + 0.10% vol/vol	15.15	12.83 a	14.33 b	7.73	11.63 b
Assail 70 WP + Induce	1.7 + 0.25% vol/vol	15.08	11.80 a	14.05 b	7.13	10.99 b
Radiant	7.0	14.93	4.90 c	3.33 c	5.25	4.49 d
Hero EW	11.2	12.70	3.10 c	5.63 c	7.98	5.57 cd
Beleaf + Mustang	2.8 + 4.3	12.35	5.10 c	5.50 c	5.53	5.38 cd
Athena	17.0	16.20	5.75 bc	5.68 c	4.98	5.47 cd
Water Check	--------	14.48	14.65 a	18.43 a	7.98	13.68 a

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

Pest Alert: Cotton Mealybug on Okra

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The solenopsis or cotton mealybug, *Phenacoccus solenopsis* Tinsley (Hemiptera; Pseudococcidae) has recently been found and identified on okra (*Abelmoschus esculentus*) in the Coachella Valley. Specimens collected from the field were identified by Dr. Gillian Watson a specialist on mealybug taxonomy at the California Department of Food and Agriculture. While this pest develops on a large number of plant species, it is particularly damaging to those in the Malvaceae family, such as cotton, okra, and hibiscus. Solanaceous crops such as tomato and peppers and members of the Cucurbitaceae family (melons, cucumbers) can be infested as well. Okra growers should be aware that it could become a significant pest unless it is well monitored and preventative measures are taken, including crop rotation. Okra is produced on 656 acres in Riverside and 332 acres in Imperial Valley and all are potentially at risk if control measures are not taken immediately. This mealybug has already begun to spread from the original infested fields to other nearby fields.

IDENTIFICATION

The solenopsis mealybug has short to medium sized waxy filaments around the body, anal filaments about one-fourth the length of the body and two dark stripes on either side of the middle “ridge” of the body. Long glassy rods are present on its dorsum (back surface). The adult females range from 2 to 5 mm (~1/12-1/5 inch) long and 2 to 4 mm in width (1/12-1/6 inch).

Dark strips on either side of dorsal ridge may be hard to see.

SOLENOPSIS MEALYBUG LIFECYCLE

The mature female lays eggs in a sac with as many as 600 eggs produced per female. The eggs are small and up to 0.3 to 0.4 mm in length. Egg Hatch occurs from 3 to 9 days producing the crawler stage, which is given this name because it is the main dispersal stage. Crawler nymphs resemble the adult females and the female develops though three nymphal instars before becoming an adult. Females have piercing sucking mouthparts and cause plant damage when high levels are present. The male develops through two nymphal instars the prepupa and pupal instars develop within a cocoon of mealy wax. The males have one pair of wings, long antennae and four white waxy caudal filaments (typical of *Phenacoccus* spp.). The adult male has no mouthparts and cannot feed on the plant.

One generation of egg to adult can take as long as 81 days at 64°F but like most insects this mealybug develops faster under warmer conditions, e.g., it takes 24 days at 86°F. There may be as many as 10 generations per year. Adult females can live about 45 days. Mealybugs can survive low temperatures particularly as gravid females stage on the plant and in the soil. In warm climates the insects reproduce all year round.

The first instars or crawlers are the main dispersal stage of the solenopsis mealybug. The waxy strands covering the body allow the specimens to be transported by wind or water to new locations. The crawlers can be dispersed by wind for either short or long distances.

Another important way new infestations get started is through people unintentionally transporting infested host plant material on trucks and harvest bins. The waxy coating covering the body can also adhere to passing animals or the clothes of people, allowing crawlers to be transported from the original infestation site onto uninfested sites. Workers harvesting the fruit can unknowingly spread the female crawlers as they move from field to field because the crawler can attach to their clothing.

DAMAGE

Mealybug damage symptoms can show up at any time during crop growth. Mealybugs have piercing sucking mouthparts and feed on the plant phloem, especially near rapidly growing regions of the plant this type of feeding is the type that most often leads to plant stunting. Leaves will become yellow and deformed resulting in leaf drop. Infested plants will produce smaller, abnormally shaped fruit and this may also lead to fruit drop.

The solenopsis mealybug (like other mealybugs) also produces honeydew that can drip onto the lower leaves of the plant leading to the development of sooty mold. Honeydew and sooty mold on the fruit leads to fruit discoloration and such fruit is often unmarketable. High mealybug densities may cause fruit and leaf distortion, stunting, wilting, and eventually plant dieback. Reduced root growth can also occur. The developing okra pods are an excellent food source for the mealybugs because the plant mobilizes nutrients to that part of the plant at a rapid pace.

MANAGEMENT

Cultural

Crop residues in infested fields should be disked and plowed under as soon as possible. This will prevent the residue from serving as shelter and a food source limiting the future spread of mealybugs. Weeds should also be controlled in and around the field. Equipment, including harvest bins (carried by the workers during harvest), should be sanitized before moving onto uninfested fields. Bins should not be moved from field to field without a thorough cleaning. Harvesting crewmembers should check for leaves or mealybugs that may be sticking on their clothing. Mealybug infested fields should be harvested last and work clothes should be washed every day. The harvest crews will need to be instructed in these essential management practices.

Managing ants will also help by maximizing natural enemies to attack the mealybugs without interference from the protective ants. Predators and parasitoids can reduce mealybug levels except on rapidly growing plants parts such as the fruit.

The best management of this mealybug is to practice crop rotation to a non-host plant. Planting the same field repeatedly to okra or other susceptible host crops will result in a build-up of the mealybug population. They will maintain themselves at low levels in the soil and plant trash, coming back when the new crop starts to grow rapidly. When choosing a rotational crop, avoid those in the Malvaceae, Solanaceae, Asteraceae, Euphorbiaceae, Amaranthaceae and Cucurbitaceae families. Possible choices for the low desert include snap beans and cowpeas in the Fabaceae (legume family), Chinese broccoli, cauliflower, and plants in the Brassicaeae family to list a few.

Biological

Okra plants taken to UC Riverside were examined for biological control activity and a considerable number of the mealybugs were found to be parasitized. However, due to the heavy infestation of mealybugs and the high level of ants, the natural enemy population was not keeping up with the growth of the mealybug population.

When mealybug infestations are quite high, a combination of biocontrol agents and chemical control may be needed to suppress this pest.

Chemical Controls

Always ***READ and follow the LABEL.***

Mealybugs are notoriously difficult to control chemically and pesticides should only be used when their use is economically justified. Most foliar applied insecticides will only provide limited mealybug control due to the waxy coating on the insect. Good coverage is also required and mealybugs may be feeding in hard to reach areas thereby limiting pesticide effectiveness. However, if they are selective (of limited impact on natural enemies) they may be effective enough to decrease the mealybug population to a level that will allow the natural enemies to maintain the pest at reasonable levels. Where there is evidence of biocontrol, use an insecticide that has minimal impact on the natural enemies such as contact insecticides with a short residue. Systemic insecticides such as those containing imidacloprid can be used to control heavy infestations selectively.

All stages of cotton mealybug on an okra fruit.

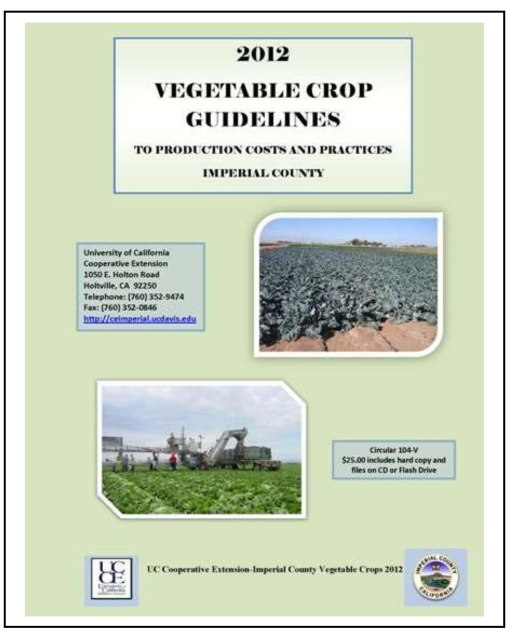
Ant feeding on the honeydew and providing protection of the mealybug from natural enemies.

2012 GUIDELINES TO PRODUCTION COSTS AND PRACTICES IMPERIAL COUNTY- VEGETABLE CROPS

Khaled M. Bali

The new 2012 Guidelines to Production Costs and Practices in Imperial County - Vegetable Crops are now available from the UC Cooperative Extension, Imperial County office. The information presented in the vegetable crops guidelines allows one to get a "ballpark" idea of field crop production costs and practices in the Imperial County. Most of the information was collected through verbal communications via office visits and personal phone calls. The information does not reflect the exact values or practices of any one grower, but are rather an average of countywide prevailing costs and practices. Exact costs incurred by individual growers depend upon many variables such as weather, land rent, seed, choice of chemicals, location, time of planting, etc. No exact comparison with individual grower practices is possible or intended. The budgets do reflect, however, the prevailing industry trends within the region.

The cost of the Guidelines to Production Costs and Practices for Imperial County Vegetable Crops circular (104-V) will be $25. This includes a hard copy of the Guidelines, electronic version on a CD or USB thumb drive (Text in PDF and budget files in Excel format) and shipping cost. The publication is available from the UCCE. If ordering by mail, please make checks payable to: UCCE-Imperial County and mail to Annette Tietz, UCCE, 1050 E. Holton Rd. Holtville, CA 92250. Please specify if you want a CD or USB thumb drive in addition to the hard copy. Please feel free to call (760-352-9474) or email (kmbali@ucdavis.edu) if you have any questions.



Join us for the Desert Research and Extension Center Centennial Celebration 1912-2012

Thursday, October 25, 2012
5:00 p.m. to 8:00 p.m.

4:30 p.m. and 5:00 p.m.
Farm Tour

5:00 p.m. – 8:00 p.m.
Hors d'oeuvres & Desserts
Self-Guided Centennial Time Walk

6:30 p.m. – 7:15 p.m.
Welcome
Centennial Proclamation
and Celebratory Remarks

For More Information and to RSVP:

atietz@ucdavis.edu
or
760-352-9474 (Annette)

Please RSVP by October 10, 2012

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 October 1 to December 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	October		November		December	
	1-15	16-31	1-15	15-30	1-15	16-31
Calipatria	0.23	0.19	0.14	0.10	0.07	0.07
El Centro (Seeley)	0.23	0.17	0.13	0.09	0.06	0.06
Holtville (Meloland)	0.23	0.18	0.13	0.10	0.06	0.06

* Imperial Irrigation District

Link to UC Drought Management Publications

http://ucmanagedrought.ucdavis.edu/