From your Farm Advisors

Features

March, 2006

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Thrips Control in Onions

Eric T. Natwick

Western flower thrips, *Frankliniella occidentalis*, and Onion thrips, *Thrips tabaci*, are the main thrips species that occur in onions. Thrips are very small elongate insects with two pairs of wings that are fringed with long hairs that are feather-like in appearance being their most distinctive characteristic. Adults of both onion thrips and western flower thrips are pale yellow to light brown in color. Thrips larvae have the same body shape as adults but are lighter in color and are wingless. The first instar larvae are whitish and the second instar larvae are yellowish. Both the prepupa and pupa are similar to the second instar larva in shape and color, but have small wing pads.

Western flower thrips are generally more difficult to control with insecticides than onion thrips. Therefore, it is important to correctly identify thrips to species. Because of their small size and similarities in color, identifying thrips can be very difficult. A 10X hand lens may not be adequate to see the characteristics needed for species identification. Western flower thrips have reddish-orange eye pigmentation and eight-segmented antennae. Adult western flower thrips are about 1/20 inch (1.5 mm) in length, larvae and pupae are generally light yellow in color. Onion thrips are slightly smaller than western flower thrips, being only 1/25 inch (1.2 mm) long, and their body is yellow with brown blotches on the thorax and abdominal segments called tergites. The legs are yellowish-brown, and the antennal segment I and the base of segments III to V are brownish-white, the rest of the antenna is brown. The eye pigment of onion thrips is gray, and they have seven-segmented antennae.

The host range of both onion thrips and western flower thrips are very extensive, many including cereals and broadleaf crops. Both species are injurious to onions. Onion thrips thrive in hot, dry conditions and are usually more damaging in areas where these climatic conditions prevail for most of the production season.

High populations of thrips can reduce both yield and reduce the storage life of onions. Leaf scaring is a serious problem on green onions, but thrips feeding during the early bulb development is most injurious to dehydrator onions and sweet onions.

Thrips injury is caused by their unique rasping-sucking mouthparts. They rasp the surface of the leaves and sucking up the liberated plant fluid. This injury removes nutrients needed for bulb development, causes scaring and reduces photosynthesis. Leaf scaring in a heavily thrips infested onion crop causes the entire field to take on a silvery appearance They cause damage during storage by feeding under the leaf folds and in the protected inner leaves near the bulb. Both adults and nymphs cause damage. The onion thrips can also cause injury through transmission of Iris Yellow Spot Virus.

Several natural enemies attack thrips, including predaceous mites, minute pirate bugs, and lacewings. However, the natural enemies may not be important in fields where insecticides have been used. If possible, avoid planting onions near grain fields. When onions are planted near grain, expect immigration of thrips into the onion field from the grain field. Some thrips suppression may be provided by overhead irrigation and rainfall, but treatments are usually still necessary to prevent economic injury.

For fresh market onions, thrips must be controlled before early bulb development to keep populations levels below economically injurious levels during bulb development. When the onion crop is nearing harvest, higher thrips populations can be tolerated. To scout for thrips in onions, randomly sample entire onion plants and evaluate thrips numbers and damage. Pull leaves apart and, using a hand lens, all the thrips on the inner leaves near the bulb can be counted as well as those under the leaf folds. Sample at least five plants from four separate areas of the field. Treat with an insecticide when there are 30 thrips per plant mid-season. The treatment level can be adjusted up or down depending on the crop development, lower for very young plants and higher for larger mature plants.

For processing onions, examine the entire top growth of 10 onion plant from four areas of the field, counting the number of thrips. Sample at least weekly and more often when counts exceed 20 thrips per plant. Cumulative thrips-days (CTD) can be calculate from the average number of thrips per plant on two successive sample dates, dividing the average by the number of days between samples to get the number of thrips per plant per day or thrips-days, and adding up the thrips-days during crop growth. When 500 to 600 CTD or more accumulate, significant yield loss can occur.

In the spring of 2005 an insecticide research trial for thrips control in White Creole dehydrator onions was conducted at Brawley, CA in a randomized complete block experiment with 14 treatments replicated four times. Treatments listed in Table 1, were applied with a handheld spray boom on February 28, March 11 & 24, and April 6 & 20, 2005. All insecticide treatment has significantly (P=0.05) fewer Western flower thrips and onion thrips for seasonal means compared to the untreated control, Table 1. Assail 30SG at 5.4 ounces per acre and Lannate LV at 36.0 ounces per acre plus Mustang 1.5 EW at 3.8 ounces per acre had the lowest seasonal means for Western flower thrips per plant with 2.43 and 2.48, respectively, compared to the control with 9.06. The best onion thrips control was also obtained from Assail 30SG at 5.4 ounces per acre and Lannate LV at 36.0 ounces per acre plus Mustang 1.5 EW at 3.8 ounces per acre with seasonal means for onion thrips per plant of 0.86 and 1.13, respectively, followed by Vydate 2L with 1.43 onion thrips per plant compared to the control with 8.16 onion thrips per plant for a seasonal mean.

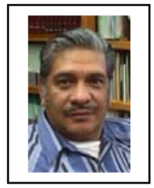
IYSV was present at the time of the first application. There were no significant differences among the treatments for the percentages of onion plants with IYSV-like symptoms, nor for numbers of IYSV lesions on symptomatic plants. However, the Assail 30SG treatments, Lannate LV plus Mustang 1.5 EW, and Carzol treatments were among the treatments with the lowest percentages of IYSV symptomatic plants and among the treatments with the lowest numbers of IYSV lesions on symptomatic plants.

Table 1. Seasonal Means of Western Flower Thrips and Onion Thrips per Plant, Percentages of Onions With Iris Yellow Spot Virus Symptoms and Average Numbers of Lesions on Iris Yellow Spot Virus Symptomatic Plants Following Various Insecticide Treatments for Thrips Control. Brawley, CA. 2005.

Treatment	Ounces/Acre	Western Flower Thrips	Onion Thrips	% with IYSV Symptoms[x]	Lesions per IYSV Symptomatic Plant[x]
Untreated	--------	9.06 a	8.16 a	65.0	6.87
Vydate 2 L	64.0 fl	2.98 cd	1.43 hij	45.0	1.88
Lannate LV + Mustang 1.5 EW	36.0 fl + 3.8 fl	2.48 d	1.13 ij	40.0	2.38
Warrior 1 CS	3.8 fl	3.98 bcd	2.91 bcde	52.5	3.33
Carzol 92 SP	16.0 dry	2.80 cd	1.78 ghij	30.0	3.17
Carzol 92 SP	20.0 dry	3.93 bcd	2.09 defgh	40.0	4.33
Assail 30 SG	4.0 dry	2.90 cd	1.93 fghi	30.0	1.15
Assail 30 SG	5.4 dry	2.43 d	0.86 j	50.0	2.07
Tesoro 4EC	0.64 fl	3.99 bcd	3.03 bcd	65.0	2.70
Tesoro 4EC	1.28 fl	5.60 b	2.73 cdefg	65.0	4.38
NNI-2302 15% EC	14 fl	5.43 b	3.12 bc	50.0	2.68
FujiMite 5 EC	32 fl	4.52 bc	2.80 bcdef	55.0	2.73
NAI- 2501 20 SC	12.7 fl	5.04 b	3.68 b	50.0	3.22
NAI- 2501 20 SC	19 fl	5.16 b	2.08 efgh	60.0	6.06

[x] There were no differences among the means, ANOVA ($P < 0.05$).

Supreme vs. Premium Hay



Juan N. Guerrero

In the Imperial Valley, alfalfa hay production from March through June represents about 60% of the annual hay yield and about 65% of the year's revenues. If profits are to made in the alfalfa hay business, spring time is crunch time; everything has to be right during this critical period of the year, irrigations, insect and weed control, and cutting schedules.

Often, producers are urged to produce the very highest quality alfalfa hay to meet the demands of California's exploding dairy industry. The very highest quality grade of alfalfa is Supreme. This type of hay has N weeds, and must have <27% ADF. To have such a low ADF test, the hay has to be cut in the bud or pre-bud stage of growth. In the Imperial Valley, during spring, this means about 21+ days after the last cutting. The next lower quality grade is Premium, which has an ADF test of 27-29%. Premium hay may be cut at the 10% flower stage of growth; usually cut at about 28+ days from the last cutting. Supreme hay is higher priced than Premium hay, because it has a higher feeding value. However, cutting the field at 21 rather than 28 days means that hay yields will be reduced from 0.3 to 0.5 t/acre, and if hay is repeatedly cut at a 21 day cutting schedule, stand persistence will be reduced.

Let us assume that for the April cutting I want to go after the big bucks and I want to bale Supreme quality hay. I normally bale about 1.8 t/acre for the April cutting. Let us assume that I can sell Supreme hay for $160/t and Premium hay for $150/t. Is it profitable for me to make Supreme hay under these conditions? Last December at the annual Alfalfa Symposium held Visalia, Dan Putnam of UD-Davis published a table (Table 1) that will help us out with this determination. We will assume that if I cut at 21 days, the yield reduction will be 0.3 t

Calculation:

(160 – 150) ÷ 150 = 6.7% difference

Looking at Table 1, under the 0.3 column and the 1.8 row, I must have a 20% increase in price to justify this scenario. Obviously, under the given conditions I will continue baling at a 28 day cutting schedule and continue making Premium hay.

Now let us assume all of the above, but Premium hay has decreased in price to $140/t.

Calculation:/acre.

(160 – 140) ÷ 140 = 14.3% difference

Again Table 1 tells me that $160 Supreme hay is not profitable for me. At $160 Supreme hay,

Premium hay would have to drop to $133/t before the 21 day cutting schedule would even be considered. Sometimes the best, highest, greatest or most is not always the most profitable.

Table 1. Minimum percentage price improvement required to justify a yield decline due to cutting schedule on a per- cutting basis

Starting	reduction in yield (per cutting t/ac)									
Yield	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
t/acre	Minimum price improvement required, %									
0.4	33.3	100	300							
0.6	20.0	50.0	100	200	500					
0.8	14.3	33.3	60.0	100	166.7	300				
1	11.1	25.0	42.9	66.7	100	150	233			
1.2	9.1	20.0	33.3	50.0	71.4	100	140	200		
1.4	7.7	16.7	27.3	40.0	55.6	75.0	100	133	180	
1.6	6.7	14.3	23.1	33.3	45.5	60.0	77.8	100	128.6	166.7
1.8	5.9	12.5	20.0	28.6	38.5	50.0	63.6	80.0	100	125
2	5.3	11.1	17.6	25.0	33.3	42.9	53.8	66.7	81.8	100
2.2	4.8	10.0	15.8	22.2	29.4	37.5	46.7	57.1	69.2	83.3
2.4	4.3	9.1	14.3	20.0	26.3	33.3	41.2	50.0	60.0	71.4
2.6	4.0	8.3	13.0	18.2	23.8	30.0	36.8	44.4	52.9	62.5
2.8	3.7	7.7	12.0	16.7	21.7	27.3	33.3	40.0	47.4	55.6
3	3.4	7.1	1.11	15.4	20.0	25.0	30.4	36.4	42.9	50.0

Evaluation of insecticides for Control of Egyptian Alfalfa Weevil

Eric T. Natwick

A field study was conducted in the spring of 2005 at the Desert Research and Extension Center on a stand of CUF 101 alfalfa using a randomized complete block design with four replications. Nine insecticide treatments were included along with an untreated control. Insecticide treatments and rates are listed in Table 1. Plots measured 35 feet by 50 feet and insecticide treatments were applied March 14, 2005, using a broadcast application with a tractor mounted boom.

Larval populations of Egyptian alfalfa weevil were measured in each plot with a standard 15-inch diameter insect net consisting of ten, 180° sweeps. Plots were sampled on March 11, 16, 21, & 28, 2005; 3-day pre-treatment (DPT), 2-days after treatment (DAT), 7-DAT, and 14-DAT.

No differences were found among the treatments for Egyptian alfalfa weevil larvae in the pre-treatment samples, (*P*>0.05), Tables 1. All of the insecticide treatments had means for Egyptian alfalfa weevil larvae that were significantly lower (P#0.05) than the untreated control means 2-DAT, 7-DAT, and for the post treatment means. All insecticide treatments had means for Egyptian alfalfa weevil larvae that were significantly lower than the untreated control means 14-DAT except for Proaxis. The insecticides that provided the best control of Egyptian alfalfa weevil larvae were Mustang Max, Furadan 4F, Mustang + COC, and Mustang + Furadan + COC.

Table 1. Mean Numbers[v] of Egyptian Alfalfa Weevil Larvae per Ten Sweeps, Holtville, CA, 2005.

Treatment	oz/acre	PT[w]	2 DAT[x]	7 DAT[y]	14 DAT	PTM[yz]
Untreated	--------	40.75 a	49.75 a	12.00 a	2.25 a	21.33 a
Mustang 1.5 EW + COC	4.3 fl + 1% v/v	27.25 a	1.00 b	0.25 c	0.00 b	0.42 d
Mustang 1.5 EW + Furadan 4F + COC	4.3 fl+ 4.0 fl + 1% v/v	49.50 a	1.50 b	0.50 bc	0.00 b	0.67 cd
Mustang Max 0.8 EW	4.0 fl	56.50 a	0.5 b	0.00 c	0.00 b	0.17 d
Warrior 1 EC + COC	3.2 fl + 1% v/v	41.00 a	4.5 b	1.50 bc	0.25 b	2.08 bcd
Warrior 1 EC + COC	3.5 fl + 1% v/v	52.25 a	0.75 b	1.75 bc	0.25 b	0.92 bcd
Proaxis + 0.497 CS COC	3.2 fl + 1% v/v	79.25 a	2.25 b	2.25 b	1.00 ab	1.83 bc
Steward 1.25 SC + Lorsban 4E	4.6 fl + 4.0 fl	78.75 a	2.75 b	0.25 c	0.00 b	1.00 bcd
Imidan 70W + Dimethoate 267E	16.0 dry + 18.0 fl	68.50 a	7.00 b	0.50 bc	0.25 b	2.58 b
Furadan 4F	16.0 fl	66.50 a	1.00 b	0.25 c	0.00 b	0.42 d

[v] Mean separations within columns by $LSD_{0.05}$.
[w] Pre-treatment.
[x] Days after treatment.
[y] Log transformed data used for analysis; true means reported.
[z] Post treatment means.



Fungicide Application Timing for Monosporascus Vine Decline: 2005 Trial Results

Thomas Turini, Michael Stanghellini and Ronald Cardoza

Monosporascus cannonballus, a soil-borne fungus that causes vine decline of melons, is very common and damaging in low desert production areas. Several weeks before harvest, this pathogen can cause a rapid collapse of the melon vine, possibly over the entire field. This may result in complete crop loss. The thick-walled spores of *M. cannonballus* survive in the soil for many years in the absence of a host. Chloropicrin is used to reduce the number of viable spores in the soil and decrease the likelihood that this disease will cause crop loss in high risk areas. Recently, Cannonball (fludioxonil) a fungicide by Syngenta became available to melon growers for the purpose of controlling this Monosporascus vine decline.

To compare effect of three application schedules of Cannonball against this disease, a study was conducted at the University of California Desert Research and Extension Center in Holtville. On 25 Aug, 'Impac' cantaloupe seed were sown on a Meloland clay loam in an area that had a history of the occurrence of this disease. Throughout the season, water was applied with a drip irrigation system buried 5 in below the surface.

The application timings of Cannonball at 4 oz/acre compared were as follows: (i) 7 days after planting (1 Sep), (ii) 7 and 28 days after planting (Sept. 22) and (iii) 7, 28 and 46 days after planting (10 Oct). An untreated control was also included. Prior to each application, the field was irrigated for 3 hours. For each application, Cannonball was mixed into 2.5 gal water and injected into the drip system over 50 to 70 minutes with a 1.7 amp electric metering pump (G.H. Stenner & Co., Inc.; Model no. 45M5).

The experimental design was a randomized complete block with four replications. Each plot consisted of one bed 80 inch wide and 250 feet long.

On 14 November, the melon vines were cut back and the roots were undercut mechanically at a depth of 6 to 7 inches, uprooted by hand, and roots of 30 plants per plot were collected. Roots were washed and rated on a scale of 1 to 4 (1=no symptoms, healthy; 2=less than 50% of root discolored, 3=more than 50% discolored, but not completely dead; 4= dead). The severity rating presented is an average of the thirty per plot and the incidence is percentage of the root systems that had some evidence of disease, which is a rating greater than 1. Analysis of Variance was performed and Student-Newman-Keul's Multiple Range Test ($P \leq 0.05$) was used for mean separation.

Under the conditions of this study, the severity and incidence of root rot was lower in areas treated with Cannonball as compared to the untreated control, but all treatments receiving Cannonball applications were similar regardless of the number of applications (Table 1). *M. cannonballus* perithecia (the structure that contains the spores) were present on roots of all treatments.

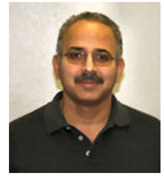
Although five insecticide applications were made, unusually high whitefly population densities in fall 2005 contributed to the decline of the vines in all plots. Therefore, it was not possible to reliably rate vine decline caused by *M. cannonballus* or collect yield data.

Table 1. The effect of Cannonball (fludioxonil) application timing on root rot severity and incidence in fall plated Impac cantaloupes in 2005 at Desert Research and Extension Center, Holtville, CA.

Character Rated Rating Unit	severity (1-4)	% incidence	HEALTHY 1	<50% 2	>50% 3	DEAD 4
Treatment Name						
one application of Cannonball – 7 days after first irrigation	2.512 b[z]	73.637 b	8.0 a	7.5 a	6.0 a	8.5 b
two applications of Cannonball – 7 and 28 days after first irrigation	2.149 b	64.042 b	10.8 a	8.3 a	6.3 a	4.5 b
three applications of Cannonball – 7, 28 and 46 days after first irrigation	2.241 b	68.754 b	9.5 a	10.0 a	4.8 a	6.0 b
Untreated control	3.185 a	95.857 a	1.3 b	5.5 a	10.5 a	13.8 a

[z] Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

Estimating Suspended Sediment Concentration in Drainage Waters from Turbidity Sensors



Khaled M. Bali

In general, suspended sediment load in runoff water is estimated from runoff water discharge rate and the average concentration of suspended sediment (C) in runoff water. C is commonly estimated from standard operation procedure for the determination of total suspended solid (TSS). The standard procedure requires a minimum of 200-500 ml of runoff water samples then the amount of suspended sediment is determined in the laboratory using the filtration/gravimetric method. The method is costly, time extensive, and does not provide real-time estimate for the load or concentration of suspended sediment. A large number of samples are needed to estimate the average concentration of sediment in runoff water due to the large variability in the concentration of suspended sediment in any single irrigation events. The use of turbidity (T) as a mean to estimate the concentration of suspended sediment is more efficient and cost-effective as compared to standard method.

Various optical sensors have been manufactured to monitor continuous sediment concentration in situ, which greatly improves the accuracy of estimating sediment concentration or load in water as compared to the standard water sampling method. Optical sensors such as optical backscattering (OBS) sensors have been widely used to measure continuous suspended sediment concentration in marine environment and continental shelves. OBS sensors have also been used by hydrologists to estimate suspended sediment concentration in surface waters.

OBS sensors can be calibrated to measure turbidity or suspended solids directly. However, the measurement of turbidity also introduces various problems. Turbidity measures the degree to which infrared light is scattered or absorbed by suspended particulate material and soluble colored compounds in water. Therefore, turbidity measurement is an indirect measurement of C, the accuracy of which depends on how well turbidity can represent C. Considerable studies have demonstrated that many factors other than suspended sediment particles may affect the value of turbidity. Among these factors, heterogeneous distribution of particle sizes is the most significant one that affects turbidity values. For a given C, samples with different particle size may result in turbidity values that are 10 times in difference. In addition, turbidity is more sensitive to fine particles than coarse particles. Although many studies have been conducted to quantify and offset the effect of particle size variability, no general method can be developed to correct for such effect. Furthermore, the bio-fouling, physical disturbance, and hydrodynamic spike also generate lots of noise in turbidity time series recorded by real-time in situ turbidity sensors. The values of turbidity could misrepresent the real values of C in spite of its numerous advantages. Therefore, OBS sensors must be calibrated with suspended solids from the waters to be monitored and because there is no standard turbidimeter, comparison of turbidity data acquired with an OBS sensor to data from another turbidimeter require inter calibration with a turbidity standard.

So here we go again…Drought, rising costs and for how long?

Rick Bottoms

Maybe it is my age and keen memory (I doubt it) and not taking so many things for granted or maybe it is a greater frequency of weather and or energy related benchmarks that stand out in my memory over the last 15 years. What ever it is causes me to view change as more then just a seasonal event.

Living in the desert, one learns to appreciate the seasonality of weather events. Did you take notice to those circumstances, unusually abnormal drought conditions? For many people in the Imperial Valley it appears to be the norm. So here we go again…Drought, rising costs and for how long?

According to the National Drought Mitigation Center, which monitors weather conditions and provides current, short and long term drought monitor forecasts. We are experiencing and will continue to experience near normal temperatures the next 3 months. On the other hand, we will also be experiencing below normal precipitation, causing continued drought conditions to have potentially positive effects on the yield and quality of a wide range of vegetable crops. Yes, you heard me, right! Unlike most parts of the country that rely on precipitation to provide all or a portion of the required water for growing crops we are blessed with plenty of sunlight for great growing conditions and dependable water resources through our portion of Colorado River water.

The drought aside, we know a continual availably of supplemental efficient irrigation is necessary every year for successful vegetable crop production. Mr. Doug Cox of the Imperial Irrigation District (IID) indicates this year's water resources appear to be available at levels comparable to last year. Unlike last year with snow pack shortages in the north and above normal water resources in the south basin of the Rockies, this year the north basin states will provide the much needed water resources and make up for the droughty southern basin.

Known to most, vegetable production requires living with costs higher than most other crops. Among the reasons are dealing with volatile market risk and the need for producing commodities with optimum levels of appearance, consistent supplies and qualities in the marketplace. Even with recent USDA predictions (Wall Street February 11, 2006) for net farm income to tumble 23% due to rising costs from fuel to fertilizer and more, our producers continue to refine their strategies for the next growing season.

In this season of ever dwindling marginal return it is important for producers to capitalize on implementing strategies that maximize efficiency. Taking steps to conserve water and to manage irrigation practices carefully, more efficiently will pay big dividends down the road. For producers using cultural practices that conserve soil moisture and at the same time allow plants to use water more efficiently means greater returns are possible.

Vegetable crop water requirements range from about 6-12 inches of water per season for radishes to 24-36 inches for tomatoes and watermelons. Precise irrigation requirements can be predicted based on crop water use and effective precipitation values. Lack of water influences crop growth in many ways. The effect depends on the severity, duration, and time of stress in relation to the stage of growth.

Nearly all vegetable crops are sensitive to drought during two periods: during harvest and two to three weeks before harvest. More than 38 different melon and vegetable crops are grown and harvested commercially in the Imperial Valley from 104,176 acres that generate nearly 516 million dollars in reported sales in 2004. Although all vegetables benefit from irrigation, each class responds differently.

Remember, moisture deficiencies occurring early in the crop cycle may delay maturity and reduce yields. Shortages later in the season often lower quality as well as yields. However, over irrigating, especially late in the season, can reduce quality and post harvest life of the crop.

Leaf vegetables. Cabbage, lettuce, and spinach are generally planted at or near field capacity. Being shallow rooted, these crops benefit from frequent irrigation throughout the season. As leaf expansion relates closely to water availability, these crops, especially cabbage and lettuce, are particularly sensitive to drought stress during the period of head formation through harvest. Over watering or irregular watering can result in burst heads.

Broccoli and cauliflower, although not grown specifically for their leaves, respond to irrigation much as the leaf vegetables do. Broccoli and cauliflower are sensitive to drought stress at all stages of growth, responding to drought with reduced growth and premature heading.

Root, tuber, and bulb vegetables. In, carrots, onions, and potatoes yield depends on the production and translocation of carbohydrates from the leaf to the root or bulb. The most sensitive stage of growth generally occurs as these storage organs enlarge. Carrots require an even and abundant supply of water throughout the season. Stress causes small, woody, and poorly flavored roots. Uneven irrigation can lead to misshapen or split roots in carrots, second growth in potatoes, and early bulbing in onions.

Fruit and seed vegetables. Cucumbers, melons, pumpkins and squashes, lima beans, snap beans, peas, peppers, sweet corn, and tomatoes are most sensitive to drought stress at flowering and as fruits and seeds develop. Fruit set on these crops can be seriously reduced if water becomes limited. An adequate supply of water during the period of fruit enlargement can reduce the incidence of fruit cracking and blossom-end rot in tomatoes. Irrigation is often reduced as fruit and seed crops mature.

The periods of crop growth when an adequate supply of water is critical for high-quality vegetable production are shown in Table 1.

For more information on the drought monitor visit:
http://www.drought.unl.edu/dm/monitor.html

Next month I'll share some vegetable irrigation practices and strategies.

Cooperative Extension Program serves all residents of the Imperial Valley.

Table 1. Critical Periods of Water Need by Crops

CROP	CRITICAL PERIOD
Asparagus	Brush
Beans: lima	Pollination and pod development
snap	Flowering and pod enlargement
Broccoli	Head development
Cabbage	Head development
Carrots	Root enlargement
Cauliflower	Head development
Corn	Silking and tasseling, ear development
Cucumbers	Flowering and fruit development
Eggplants	Flowering and fruit development
Greens	Continuous
Lettuce	Head development
Melons: Cantaloupes & watermelons	Flowering and fruit development
Onions: dry	Bulb enlargement
Peas	Seed enlargement and flowering
Peppers	Flowering and fruit development
Potatoes: white	Tuber set and tuber enlargement
Radishes	Root enlargement
Spinach	Continuous
Squash: summer	Bud development and flowering
Tomatoes	Early flowering, fruit set, and enlargement
Turnips	Root enlargement

Spring 2005 Whitefly Insecticide Efficacy Trial on Cantaloupe Melons

Eric T. Natwick

A field study was conducted in the spring of 2005 at the Desert Research and Extension Center on a stand of Esteem cantaloupe melons planted on March 17, 2005. Ten insecticide treatments were included along with an untreated control using a randomized complete block design with four replications. Insecticide treatments and rates are listed in Table 1. Plots measured 13.33 feet by 50 feet and insecticide treatments were applied as listed in Table1, using a broadcast application with a tractor mounted boom.

Adult silverleaf whitefly populations were counted on ten leaves from the 5th node position down from cane tips in each plot weekly from April 18 through June 14. Plots were also sampled by removing ten leaves per plot and counting the whitefly eggs and nymphs within 1.65 cm^2 discs cut from the lower left hand quadrant of each leaf weekly from April 21 through June 14.

All of the insecticide treatments except Venom 70 SG and Belay 16 WSG at 20 oz per acre had seasonal means for whitefly eggs that were significantly lower (P#0.05) than the untreated control seasonal mean (Table 2). All insecticide treatments had seasonal means for whitefly nymphs that were significantly lower than the untreated control seasonal mean. The seasonal mean for silverleaf whitefly adults was significantly greater for the untreated control compared to the insecticide treatment seasonal means for adults. The insecticides that provided the best control of whitefly nymphs and adults were Oberon at 8.5 oz per acre and Admire 2F at 16 oz per acre followed by Oberon at 7.0 oz per acre.

Table 1. Insecticides Efficacy Against Whitefly In Cantaloupe Melons, Holtville, CA, 2005.

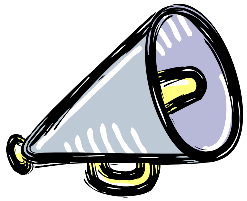
Treatment	**lb ai/acre**	**Oz/acre**	**Treatment date**
1. Untreated	-----------	----------	--------------------
2. *Venom 1G	**0.26**	**411.6 dry**	**17 Mar**
3. *Venom 2G	**0.26**	**205.8 dry**	**17 Mar**
4. **Venom 70 SG	**0.29**	**6.53 dry**	**28 Mar**
5. **Belay 16 WSG	**0.15**	**15 dry**	**28 Mar**
6. **Belay 16 WSG	**0.20**	**20 dry**	**28 Mar**
7. **F106464 2SC	**0.11**	**7.0 fl**	**28 Mar**
8. **Admire 2F	**0.25**	**16.0 fl**	**28 Mar**
9. **Admire 2F f/b ***Oberon 2SC	**0.25 0.11**	**16.0 fl 7.0 fl**	**28 Mar 9 May, June 6**
10. ***Oberon 2SC	**0.13**	**8.5 fl**	**9, 31 May**

* In-furrow injection. ** At-planting drip irrigation injection. *** Foliar spray

Table 2. Seasonal Means[x] for Silverleaf Whitefly Adult per Leaf, Eggs and Nymphs per cm^2 Following Various Insecticides, Holtville, CA, 2005.

Treatment	Oz/acre	Eggs	Nymphs[z]	Adults
Untreated	**----------**	**1.23 a**	**9.62 a**	**7.38 a**
Venom 1G	**411.6 dry**	**0.35 de**	**2.72 cd**	**5.08 bc**
Venom 2G	**205.8 dry**	**0.63 bcd**	**4.58 b**	**4.81 bc**
Venom 70 SG	**6.53 dry**	**0.85 ab**	**4.34 b**	**4.90 bc**
Belay 16 WSG	**15 dry**	**0.30 e**	**4.19 b**	**4.53 bc**
Belay 16 WSG	**20 dry**	**0.74 abc**	**4.85 b**	**5.33 b**
F106464 2SC	**7.0 fl**	**0.43 cde**	**3.97 bc**	**4.46 cd**
Admire 2F	**16.0 fl**	**0.36 de**	**2.69 cd**	**4.61 bc**
Admire 2F f/b Oberon 2SC	**16.0 fl 7.0 fl**	**0.50 bcde**	**1.62 de**	**3.68 de**
Oberon 2SC	**8.5 fl**	**0.37 de**	**1.22 e**	**3.26 e**

[x]Means within columns followed by the same letter are not significantly different by ANOVA and LSD (P=0.05).
[z] Log transformed data used for analysis, reverse transformed means reported.



Announcements

The 38th California Nematology Workshop, Tuesday, March 28, 2003, 8 AM - 4:30 PM, at the University of California Extension Center, 1200 University Ave, Riverside, CA 92507-4596.

This annual workshop offers pest management professionals and growers the latest information on problems caused by plant-parasitic nematodes and on their potential solutions. Target audience for this program includes pest control advisors and operators, growers, pesticide and bio-control industry representatives, landscapers, municipal and state employees, parks and recreation personnel, educators and consultants. A superb lineup of speakers and workshop presenters will share their expertise concerning nematode-related issues. Posters will inform about the latest Nematology research activities at the University of California, CDFA, USDA and industry. Breakout session will give the audience an opportunity to sharpen their skill in nematode and identification, disease diagnostics, and sampling procedures.

For info and registration: www.nematology.ucr.edu or contact antoon.ploeg@ucr.edu, 951-827-3192.

RODENT MANAGEMENT IN AGRICULTURAL SYSTEMS
March 1, 2006
Farm Bureau
1000 Broadway, El Centro, CA

Organizers: **University of California Cooperative Extension**
Imperial County Farm Bureau
Imperial Agricultural Commissioner's Office
2 hours of California continuing education credit has been requested

9:00 Registration

9:15 Introduction & a brief history of rodent problems in Imperial Valley – **Eric Natwick**

9:30 Rodent Management in crop production and in feedlots – **Dr. Terrell P. Salmon, UCCE Director, San Diego County & Statewide Vertebrate Pest Control Specialist**

10:30 Comments on laws and regulations concerning rodent control in agriculture – **Staff from the Imperial County Agricultural Commissioner's Office**

11:00 Discussion

11:30 Adjourn

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 March 1 to May 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	March		April		May	
	1-15	16-31	1-15	15-30	1-15	16-31
Calipatria	0.18	0.22	0.26	0.29	0.32	0.36
El Centro (Seeley)	0.16	0.20	0.24	0.28	0.31	0.34
Holtville (Meloland)	0.17	0.21	0.25	0.28	0.32	0.35

* Irrigation Management Unit- Imperial Irrigation District