



*Imperial County*

*Agricultural Briefs*



**University of California**  
Agriculture and Natural Resources

**Features from your Advisors**

*April 2016*

**Table of Contents**

**SOME INSECT-TRANSMITTED VIRUSES CAUSE DISEASE IN LOW DESERT MELONS AND WATERMELONS.....Eric T. Natwick - 2 -**

**WINDS CAN CREATE PROBLEMS FOR LETTUCE .....Jose Luis Aguiar - 6 -**

**CIMIS REPORT AND UC DROUGHT RESOURCES .....Khaled M. Bali and Sharon Sparks - 8 -**

**AGRONOMIC CROPS AND WATER CONSERVATION FIELD DAY AGENDA APRIL 13, 2016..... - 9 -**

**DROUGHT AND WATER CONSERVATION WORKSHOP AGENDA APRIL 14, 2016..... -11-**

**CAPCA DESERT VALLEYS CHAPTER - 2016 CONTINUING EDUCATION MEETING NOTICE..... -12-**

## **SOME INSECT-TRANSMITTED VIRUSES CAUSE DISEASE IN LOW DESERT MELONS AND WATERMELONS**

*Eric T. Natwick, Entomology Advisor, UCCE Imperial County*

### **APHID-TRANSMITTED**

There are several aphid transmitted potyvirus, such as *Watermelon mosaic virus* (WMV) *Papaya ringspot virus* (PRSV-W) and *Zucchini yellow mosaic virus* (ZYMV) that can cause substantial economic damage in the low desert. Symptoms of WMV include a green mosaic pattern, foliar distortions and blisters on leaves. Fruits can be distorted, especially with early infections. Symptoms however can vary widely depending with environmental conditions, melon variety and viral strain. The disease is most damaging with infections early during plant development. WMV can be transmitted by at least 35 different aphid species and the virus host range includes many wild and cultivated plants including cucurbit species, cotton, and cheese weed. Foliar symptoms ZYMV in melon and watermelon leaves include a mosaic pattern, blisters with a narrowing of the leaves and necrosis. Fruits can be distorted, color abnormally, net improperly, and star shaped cracks may form on the fruit. It is vectored by nine aphid species, seven of which are in Imperial County. Cucurbit species are common host plants in Imperial County. Infection of melons and watermelon with PRSV-W display an intense mosaic with a narrowing of the leaves and severe cases can result in a shoestring effect. When a young melon or watermelon plants become infected with PRSV-W, they do not produce fruit, while plants infected at an older development stage will produce fruit but may show distinct changes in color and are deformed rendering them unmarketable. All three viruses are found in volunteer and cucurbit plants overwintering in the desert and WMV may also occur in several weed species found in the low deserts such as cheeseweed, goosefoot, lambsquarters, and Russian thistle. A very few sources of one of these potyviruses can quickly spread through much of the low desert production areas when aphid vectors are abundant.

Another aphid-transmitted virus causing mosaic symptoms in melons and watermelon in the low deserts is *Cucumber mosaic virus* (CMV). All cucurbit species except watermelon along with many crops grown in the low desert (beets, celery, peppers, potatoes, spinach, and tomato) and several weed species are hosts of CMV. The leaf symptoms of CMV include vein clearing and mottling or mosaic pattern of irregular dark green areas alternating with light green or yellow areas. Some cultivars of melons may be stunted reducing the yield potential and fruit malformations can occur. Elimination of plants harboring the viruses and aphids is the most effective

management technique for potyviruses and other aphid-transmitted mosaic virus found in Imperial County. Mid-bed trench tunnels or row covers can protect young plants from virus infection, but when the covers are removed, plants are susceptible once again to insect-transmitted viruses. Spraying with insecticides has not proven to be efficacious for protection of melon or watermelon from aphid-transmitted viruses, but some systemic soil applied insecticides may help slow the spread of the virus infection throughout the field. Once infected with a mosaic virus, little can be done for a melon crop. However, with careful management and cooperation among melon growers the incidence of aphid-transmitted virus diseases can be on the next year's spring melon crop.

### **LEAFHOPPER-TRANSMITTED**

The beet leafhopper (BLH), *Circulifer tenellus* is the vector of a group of viruses that cause curlytop disease. The viruses that cause curly top disease are Beet mild curly top virus (BMCTV), Beet severe curly top virus (BSCTV) and Beet curly top virus (BCTV). All three curly top viruses have a broad host range of over 300 plant species in 44 plant families and they infect several economically important crops including beans, beet (sugar and table), cucurbits (cucumber, melon, pumpkin, squash), flax, pepper, spinach, and Swiss chard. Virus acquisition occurs quickly when BLHs feed on curly top infected plants, but the most efficient transmission occurs after a 48-hour acquisition period. Beet leafhoppers can remain viruliferous for more than 3 months. Curly top disease symptoms in melon crops include stunting caused by shortened internodes, leaves roll upward, darker green than normal leaves and crinkled appearance. When seedling stage melon plants are infected they die prematurely. When more mature melon plants become infected, they may eventually turn yellow and die.

The BLH also has a broad host range including many wild plant species, crop species and weeds. The insect has three or more generations per year depending on the climate. The winged adult BLH can be moved long distances by wind currents. Using piercing-sucking type mouth parts, the BLH can cause direct feeding injury to plants by injecting salivary fluids and removing plant sap, but the feeding causes relatively minor damage that is rarely of economic importance. The pest status of BLH is elevated due to transmission of the viruses causing beet curly top disease; a disease that can be destructive to melons and many vegetable crops grown in California. Area wide insecticide programs to control beet leafhoppers on overwintering weed hosts is a proven, efficacious and economical management strategy for beet leafhopper and curly top disease and has been used in California and other western states for several decades. However, there are still some years when a severe outbreak of curly top disease occurs. Therefore, monitoring and management of this pest is essential for production of crops susceptible to curly top disease.

## WHITEFLY-TRANSMITTED

Two whitefly-transmitted virus diseases are common in Imperial County melon crops, *Cucurbit leaf crumple virus* (CuLCrV) and *Cucurbit yellow stunting disorder virus* (CYSDV). CuLCrV is a whitefly-transmitted begomovirus that causes leaves to crumple and cup toward the petiole and irregular yellow areas may also be present. Both cantaloupe and watermelons may show symptoms; however, cantaloupes rarely suffer economic injury and watermelon crops are only mildly injured. Often, cantaloupe canes show severe crumpling symptoms for several inches or up to a foot and a half and the plant apparently arrests the disease and the remainder of the cane will be symptomless. The disease caused by CuLCrV causes mild damage to cantaloupe and water melons but is devastating to most squash.

There several whitefly-transmitted viruses causing disease in melons and watermelons in the low desert production areas of California and Arizona including *Squash leaf crumple virus* (SLCV) and *Cucurbit leaf crumple virus* and (CuLCrV) both in the genus *Begomovirus*. During the fall melon season of 2006, severe loss due to cucurbit yellow stunting disorder (CYSD) disease first occurred in Arizona and California. CYSD is caused by infection with the whitefly-transmitted *Cucurbit yellow stunting disorder virus* (CYSDV) in the genus *Crinivirus*. CYSDV can be a devastating disease of several melon and squash crops and caused such substantial damage to fall melons in the Imperial Valley of California that fall melon production has been eliminated. The symptoms on melons squash and cucumber are expressed first on crown leaves as a yellow mottling. The yellow spots soon coalesce into a general yellowing between veins which remain green. Infection with CYSDV early in the plants life cycle can lead to severe loss of yield through reduced set, and reduced fruit size. There can also be a quality loss due to reduced sugar in the fruit of melons. The vector of CYSDV in Arizona and southeastern California is the Sweetpotato whitefly, *Bemisia tabaci* biotype B. The virus is not seedborne nor mechanically transmitted. The virus is transmitted by whiteflies in a semi-persistent manner. The whitefly adult must feed for at least 2 hours to acquire this crinivirus and can remain infectious for 7 to 9 days. Natural infections have been reported in cucurbit crop and weed species and in several other non-cucurbit crops and weed hosts.

The newest insect transmitted virus found in California is *Squash vein yellowing virus* (SVYV) a whitefly-transmitted ipomovirus (family *Potyviridae*) that first discovered in Florida in 2003. SVYV was first discovered near Holtville, CA in pumpkin during the fall of 2014. In Florida, SVYV causes a devastating disease in watermelon called watermelon vine decline (WVD). So far, the only reported hosts of SVYV are Cucurbitaceous crops and weeds. Even though SVYV has been detected in both the spring and fall in southeastern California,

there has been no loss to watermelon crops due to WVD to date. However, growers and PCAs should be diligent with sanitation practices to eliminate crop residues immediately after harvest is completed, eliminate volunteer Cucurbitaceous crops and weeds and eliminate crop residues and weeds that harbor the SYVY vector, the Sweetpotato whitefly biotype B.

## WINDS CAN CREAT PROBLEMS FOR LETTUCE

*Jose Luis Aguiar, Vegetable Crops Advisor, UCCE Riverside County*

A problem in a romaine lettuce field in the Coachella Valley was brought to my attention recently. The problem was weather related and is not too uncommon in our valley. Dr. Gerald Holmes, who used to be a plant pathologist at UCCE Imperial County, described this problem many years ago. The picture he too depicting this problem appeared in the 1997 Compendium of Lettuce Diseases. Such problem occurs once lettuce fields are thinned. Lettuce thinning crews are trained to leave the lettuce with the proper in row plant spacing for head development. In this process of thinning (removing excess plants), the soil surface crust is disturbed around the remaining young plants. When the wind blows, it can whip the plants around leading to a girdling of the taproot around the soil line.

Soon after the winds blow through a field, the grower may observe a collapse of plants. The plant population can be significantly reduced. Plants like in Figure 1 can be observed in a lettuce field a few days after experiencing strong winds. Here, young plants are collapsing; the symptoms observed include wilting, yellowing and stunting. When the plants are carefully dug out, a girdling or constriction of the main taproot can be observed. The girdling of the main taproot of lettuce is shown in Figure 2.



Figure 1. Strong winds cause yellowing and collapsing of some romaine lettuce plants.



Figure 2. Girdling at the soil line is apparent when the young plants are carefully dug up.

When the affected plants are dug up, the taproot breaks away from the plant, leading one to suspect a damping off disease that may look like plants shown in Figure 3. Plant samples sent to a laboratory in Monterey for diagnosis of a pathogen, only showed secondary pathogens on them.

The affected plants are easy to spot in a field. The dying plants will be randomly spread out and one must walk a field to see where they are more concentrated. Affected and normal plants are shown in Figure 4 for your comparison.

Richard Smith and Steve Koike (Farm Advisors in Monterey County) recently wrote an excellent article in Salinas Valley Agriculture Blog where they described this exact problem: **“Wind Whip Issues for Salinas Valley Lettuce”**. Their article is available at <http://ucanr.edu/blogs/SalinasValleyAgriculture/>. They also provide diagnostic observations for identifying similar symptoms in:

Wind Whip, Fusarium Wilt, Sclerotinia Drop, Verticillium Wilt and Ammonium Toxicity. These are all serious problems that can



Figure 3. In some plants there is a complete girdling of main taproot from the plant



Figure 4. Healthy romaine lettuce plants next to stunted plant with root girdling.

## CIMIS REPORT AND UC DROUGHT RESOURCES

*Khaled M. Bali, Irrigation & Water Mgmt Advisor, Director UCCE Imperial County  
Sharon Sparks\*, Imperial Irrigation District*

California Irrigation Management Information System (CIMIS) is a statewide network operated by California Department of Water Resources. Estimates of the daily reference evapotranspiration ( $ET_0$ ) 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  $ET_0$  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 <http://wwwcimis.water.ca.gov/>

Table 1. Estimates of daily Evapotranspiration ( $ET_0$ ) 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.

## Water and Drought Online Seminar Series

The latest research-based advice on weathering a drought is now available free online. The UC Division of Agriculture and Natural Resources is working to help farmers cope with the unwelcome outcome of historically low rainfall the last three years. UC scientists, with support from the California Department of Water Resources, have recorded video presentations on high-priority drought webpages.

Each presentation is about one half hours in length and is available at the link below:

<http://ciwr.ucanr.edu/>

Then click on the drought resources link.





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IMPERIAL COUNTY  
1050 E. HOLTON ROAD  
HOLTVILLE, CALIFORNIA 92250-9615



Telephone: (760) 352-9474 FAX Number: (760) 352-0846  
<http://ceimperial.ucanr.edu>

## Agronomic Crops and Water Conservation Field Day

**When:** Wednesday, April 13, 2016 (7:00 AM to 12:30 PM)  
**Where:** University of California Desert Research & Extension Center  
1004 E. Holton Rd., Holtville, CA 92250

7:00 AM: Registration  
7:30 AM: Welcome to UC Desert Research & Extension Center – Jairo Diaz, Director

**Agenda:** *Talks are scheduled for 10 minutes*

### **Stop 1 (Area 60) – Crop Nutrition**

- Tools for assessing in-season N needs in wheat – Mark Lundy, UC Davis
- Information resources for sustainable nutrient management - Sonja Brodt, UC Sustainable Agriculture Research and Education Program, UC Davis
- How to assess the cost and benefits of pest control or other agricultural inputs - Eta Takele, UC Cooperative Extension, Riverside County

### **Stop 2 (Area 80) - Water Conservation and Crop Production**

- Alfalfa production progress under subsurface drip irrigation (SDI) - Dan Putnam, UC Cooperative Extension, UC Davis
- California drought update – Daniele Zaccaria, UC Davis
- UC Coordinated efforts to address the drought - Faith Kearns, California Institute for Water Resources, University of California, Oakland
- Climate change and its impact on crop production - Tapan Pathak, UC Merced - Sierra Nevada Research Institute, Merced
- Economics of producing alfalfa under subsurface drip irrigation – Ali Montazar, UC Davis
- Drip irrigation maintenance issues (FAQ's - Use of Chlorine, Acid & Triflorine for root intrusion) - Bryan Foley, Toro Micro-Irrigation
- System Components and Typical Layouts of Subsurface Drip Irrigation systems - Patrick Fernandes, NETAFIM

### **Stop 3 (Area 90 East) - Variety Trials and Deficit Irrigation**

- Alfalfa variety trial, water use and deficit irrigation - Dan Putnam, UC Cooperative Extension, UC Davis
- Alfalfa evapotranspiration and crop coefficients under flood and subsurface drip irrigation (SDI) – Richard Snyder, UC Davis
- Practical applications of crop coefficients – Cayle Little, CA Department of Water Resources
- Deficit irrigation practices on alfalfa – Dan Putnam, UC Cooperative Extension, UC Davis
- Alfalfa insect pest management – Eric Natwick, UC Cooperative Extension, Imperial County
- Pest management of the southwest desert grown alfalfa - Ayman Mostafa, University of Arizona, Cooperative Extension

*Agenda continued on next page...*

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Inquiries regarding ANR's nondiscrimination policies may be directed to John Sims, Affirmative Action Contact, University of California, Davis, Agriculture and Natural Resources, One Shields Avenue, Davis, CA 95616, (530) 750-1397

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1004 E. Holton Rd., Holtville, CA 92250.

7:00 AM: Registration  
7:30 AM: Welcoming remarks & Commencement of Field Day

**Agenda:** *continued*

### **Stop 4 (Area 90 North) – Other Forage Crops**

- Kura clover for forage and seed production – Dan Putnam, UC Cooperative Extension, UC Davis and Oli Bachie, UC Cooperative Extension, Imperial, Riverside & San Diego Counties

### **Stop 5 (Area 90 West) – Agronomic Grain Crops**

- Evaluation of stress resistance in wild and cultivated sunflowers & Salinity management - Khaled Bali, UC Cooperative Extension, Imperial County
- Insect pest of low desert sunflower - Eric Natwick, UC Cooperative Extension, Imperial County
- Renewed interest in sorghum in California - Jeff Dahlberg, UC Kearney Agricultural Research & Extension Center

### **Stop 6 (Area 70) – Irrigation, Nematodes & Drones**

- Update on automated irrigation systems - Alan Jackson, Rubicon Water & Khaled Bali, UC Cooperative Extension, Imperial County
- Precision farm water management – Philip Reh, Observant Inc.
- Drones to spot agricultural crop troubles - Frank Taylor, Community Safety Consulting Group
- The cyst nematode and coded variety and nematicide trials - Oli Bachie, UC Cooperative Extension, Imperial, Riverside, & San Diego Counties

### **Stop 7 (Area 21) – Rhodes Grass**

- Rhodes grass adaptability test – Oli Bachie, UC Cooperative Extension, Imperial, Riverside, & San Diego Counties

**Lunch will be served at noon (Sponsored by RDO).** For additional information on the field day, please contact Khaled Bali, [kmbali@ucanr.edu](mailto:kmbali@ucanr.edu) or Oli Bachie, [obachie@ucanr.edu](mailto:obachie@ucanr.edu)

*To pre-register for field day please send an email in advance to [aiestrada@ucanr.edu](mailto:aiestrada@ucanr.edu) with full name of attendee(s).*

### Approved CEU hours:

*Certified Crop Adviser - 5 hrs. (#CA 54000), CA DPR - 1.0 hr. (#M-0636-16)  
& AZ Dept. of Ag - 1.0 hr. (#EXC-080-16A)*

*Please feel free to contact us if you need special accommodations.*

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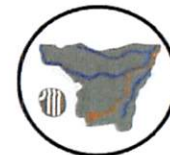
**DROUGHT AND WATER CONSERVATION WORKSHOP**

**When:** Thursday, April 14, 2016 (8:00 AM to 2:10 PM)  
**Where:** Distrito de Riego S de RL, Rio Colorado  
 Km 1.5 Carretera Mexicali-San Felipe

8:00 AM: Registration  
 8:30 AM: Welcome and workshop opening:  
 Manuel Valladolid, Secretary of Agriculture at Baja California State.  
 Oscar Zepeda, President of Distrito de Riego S de RL.  
 John Renison, Supervisor of Imperial County, District 1.

**Agenda:** *Talks are scheduled for 15 minutes and 5 for questions*

- 9:00-9:20 Implementation of the technified flood irrigation program (RIGRAT) in Mexicali Valley. Luis Manuel Pérez Valencia. RIGRAT, 2016.
- 9:20-9:40 The salinity of the water and its influence on availability for irrigation of crops. Angel Lopez Lopez, Instituto de Ciencias Agrícolas de la UABC, 2016.
- 9:40-10:00 Agronomic management of cotton crop in planted in double rows in Mexicali Valley. Jose Luis Herrera. INIFAP-CEMEXI, 2016.
- 10:00-10:20 Management and results of irrigation subsurface drip irrigation in Alfalfa for Mexicali Valley. Sergio Payan. INIFAP-CEMEXI, 2016.
- 10:20-10:40 Impacts to Agriculture from Renewable Energy Development in Imperial County. Andy Horne. County of Imperial, Deputy County Executive Officer Natural Resources Development
- 10:40-11:00 California drought update. Daniele Zaccaria, UC Davis
- 11:00-11:30 Break**
- 11:30-11:50 UC Coordinated efforts to address the drought. Faith Kearns, California Institute for Water Resources, University of California, Oakland
- 11:50-12:10 Climate change and its impact on crop production. Tapan Pathak, UC Merced - Sierra Nevada Research Institute, Merced.
- 12:10-12:30 Management strategies to cope with drought and limited water supplies in the lower Colorado River Basin – Khaled Bali, UC Cooperative Extension, Imperial County
- 12:30-12:50 Alfalfa production progress under subsurface drip irrigation (SDI). Dan Putnam, UC Cooperative Extension, UC Davis
- 12:50-13:10 Economic of producing alfalfa under subsurface drip irrigation. Ali Montazar, UC Davis
- 13:10-13:30 Advances in Evapotranspiration measurements. Rick Snyder, UC Davis
- 13:10-13:30 Alfalfa Crop Coefficients. Cayle Little, California Department of Water Resources
- 13:30-13:50 “4-H, Forming leaders... a brilliant future for Baja California”. Claudia P. Diaz Carrasco, UC ANR Riverside; Araceli Saucedo UC ANR Imperial County, and Michelle Dojaquez, SEFOA.
- 13:50-14:10 Work shop final comments. Carlos R Orozco, Secretariat of Agriculture of Baja California State, and Roberto Soto, UABC.
- 14:10 Adjourn.**



Distrito de Riego, Rio Colorado, S de RL

# **CAPCA Desert Valleys Chapter**

*CAPCA / IID Meetings*

## **2016 Continuing Education Meeting Notice**

Desert Valleys Chapter Members,  
IID Employees, all non-CAPCA members & growers

*Are Welcome to Attend*

**Thursday, April 14<sup>th</sup> - 9:00 AM – 12:00 Noon, Brawley**

Del Rio Country Club, 102 East Del Rio Road, Brawley  
Continuing education meeting starts at 9:00 AM, lunch to follow

**Thursday, May 12<sup>th</sup> - 12:00 Noon – 4:30 PM, El Centro**

Imperial Irrigation District Auditorium - Location: 1285 Broadway, El Centro  
Luncheon & meeting starts at 12:00 Noon

**Thursday, June 9<sup>th</sup> - 12:00 Noon – 4:30 PM, Blythe**

Location: Palo Verde Community College, 1 College Drive, Blythe  
Luncheon & meeting starts at 12:00 Noon

**Thursday, July 28<sup>th</sup> - 12:00 Noon – 4:30 PM, La Quinta**

Location: Imperial Irrigation District Office, 81600 Avenue 58, La Quinta.  
Luncheon & meeting starts at 12:00 Noon

**Thursday, November 10<sup>th</sup> - 11:30 AM – 4:30 PM, El Centro**

Imperial Irrigation District Auditorium - Location: 1285 Broadway, El Centro.

*Desert Valleys Chapter Annual Member Appreciation BBQ*

*Note: luncheon starts at 11:30 AM, CE meeting starts at 12:00 Noon*

Lunch provided at all meetings / meetings start at 12:00 Noon, except November meeting

Arizona, California & CCA CE credits requested

CAPCA Members / IID employees *no charge*. All Others: \$25.00

For more information contact Marie Barrett 760-427-7006 / [mariebarrett@roadrunner.com](mailto:mariebarrett@roadrunner.com)

Thank You!

**Desert Valleys Chapter California Association of Pest Control Advisers**

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