Imperial County Agricultural Briefs

Features

From your Farm Advisors

University of California
Agriculture and Natural Resources

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YOUR SUPPORT IS NEEDED FOR NEW FARM ADVISOR POSTIONS IN IMPERIAL COUNTY

Khaled Bali

The UC Agriculture and Natural Resources (ANR) Division is in the early stages of reviewing Cooperative Extension (CE) Advisor and Specialist positions in California. The objective is to identify positions for strengthening and rebuilding the UC ANR network to address programmatic gaps and emerging needs. In response to this call, the Division received 123 new CE position proposals (they are ordered alphabetically and numbers were added to the titles for reference ease).

Our office submitted proposals for four Advisors to serve Imperial County. ANR is currently soliciting comments from the public on these positions. The public comment period is open through July 21, 2014. Please visit the link below to provide your comments of support for these positions in Imperial County. Please feel free to contact us by phone (760-352-9474) or email (kmbali@ucanr.edu) if you have any questions. Your support for these positions to address the critical agricultural and community development issues in Imperial County is greatly appreciated.

Proposed high priority Positions in Imperial County

016 Area Community Youth and Families Development Advisor - Imperial CE and DREC

017 Area Desert Livestock Advisor- Imperial County

051 Low Desert Weed Science Advisor-Imperial and Riverside Counties

056 Plant Pathology Farm Advisor-Imperial/Riverside/San Diego

Link to public comments

http://ucanr.edu/sites/anrstaff/Divisionwide_Planning/2014_Call_for_Positions/

Then please click on the position that you want to make comments on.

You can Google "**uc anr call for positions**" to get to the above link

Insect Vectors and Viruses Infecting Bell Peppers in the Low Desert

Jose Luis Aguiar[1], UCCE Riverside County
Oli Bachie[2], UCCE Imperial County
Eric Natwick[3], UCCE Imperial County

There are several diseases that can affect bell pepper productions in the low desert agricultural valleys of California; Coachella Valley in particular. The most common and severe disease problems of bell peppers in the Coachella Valley are caused by virus infections. This article deals with the most common bell pepper diseases caused by virus infections and the insects that transmit the viruses.

Many insect species are pests of bell pepper crops in the low desert production areas of southeastern California. The largest concentration of bell peppers is in Coachella Valley, CA. Several of the insect pests found on pepper crops are important vectors of viral diseases of peppers. Some insect pests impact bell pepper crop production through direct feeding injury; others cause injury only as virus vectors, while still others cause serious direct feeding injury in addition to transmission of disease causing viruses.

One of the most common and injurious insect vectors of viruses affecting bell pepper production in California is the sweetpotato whitefly, *Bemisia tabaci* biotype B (synonyms include: silverleaf whitefly, *B. argentifolii* and *B. tabaci* MEAM1). In addition to transmission of viral diseases of pepper, this pest can cause severe direct feeding injury by removal of plant sap causing symptoms of yellowing, stunting, leaf-drop. Whiteflies, when feeding, also produce sticky excrement called 'honeydew' that can contaminate pepper fruit. The honeydew also supports the growth of sooty molds that further reduce the marketability of the pepper fruit. A related pest of pepper is the greenhouse whitefly; however, it is usually not seen in low desert agriculture, preferring cooler climates such as California's coastal areas.

Several leafhoppers in the genus *Empoasca*, including the potato leafhopper western potato leafhopper, southern garden leafhopper, the leafhopper *Empoasca mexara*, can be pests on pepper through direct feeding damage, but some are also potential virus vectors. The *Empoasca* spp. leafhoppers cause injury through direct feeding, similar to whitefly feeding injury (yellowing, stunting and leaf-drop), but without the copious excretion of honey dew. However, leafhopper excrement can appear as dark specks on leaves and can contaminate pepper fruit. Beet leafhopper, *Circulifer tenellus* is the vector of curly top viruses, a very serious virus infecting peppers (Figure 1).

Several species of aphids, (e.g. blue alfalfa aphid, cowpea aphid, foxglove aphid, green peach aphid, melon aphid, pea aphid and potato aphid) are also significant pest of peppers as vectors of

viruses, but not all of these aphid species reproduce on pepper plants. Like whiteflies, aphids can cause severe direct feeding injury in addition to transmission of viral diseases of pepper. Injury from direct by aphids (e.g. yellowing, stunting and defoliation) can mimic virus disease symptoms. Aphid honeydew can contaminate pepper fruit supports the growth of sooty molds; as a resulted, contaminated fruit may be non-marketable.

Thrips are important vectors of *Tomato spotted wilt virus* (Figure 2), transmitted by western flower thrips, onion thrips, and the chili thrips. These thrips species can also cause direct feeding injury to bell pepper as well as fruit contamination from dark spots of excrement. The chili thrips in addition to being a virus vector can cause severe injury to peppers. Chili thrips prefer to feed on young leaves, buds and fruits. One serious feeding symptom is bronzing on tender leaves, buds, and fruits that may turn black in color with heavy feeding. Other symptoms include stunting, distortion of foliage as leaves curl upward, and defoliation.

Virus diseases of bell pepper are the pepper grower's most significant pest problem in the low desert. There are few effective pest management measures to protect plants in a bell pepper field from virus infections. Some insect vectored viruses of bell pepper are listed in the table below. Common symptoms that may be indicative of a virus infection in bell peppers include: mosaic patterns on the leaves with bleaching, yellowing, stunting, mottling, leaf cupping, leaf curling, leaf crumpling, enations, necrotic spots, leaf-drop, leaf death, malformed fruit, reduced yields and plant death. Symptoms of virus infections in bell pepper are not limited to those listed above and multiple symptoms may be displayed, especially when there is a mixed infection of two or more viruses. Some of these symptoms can also be indicative of other problems in peppers such as nutrient deficiencies, herbicide injury, cold injury, insect feeding damage, fungal, bacteria, or phytoplasma infections, as well as salt or drought injury. Therefore, a visual inspection is not enough to positively identify a particular virus disease problem. Commercially available Immunostrips® from Agdia Inc. are available for quick detection of some common pepper-infecting viruses and can be useful in disease diagnosis; Immunostrips® may be specific to a single virus or group of related viruses. Immunostrip® is a product from Agdia Inc. developed for rapid, in-the-field detection and identification of one or more specific viruses. There can sometimes be false positives of false negatives from an Immunostrip®, so an accurate diagnosis still requires confirmation by a plant pathology laboratory. Local UC Cooperative Extension Advisors can assist you with diagnosis of nutrient deficiencies and disease problems found in commercial bell pepper production fields. However, to get the final diagnosis, it is imperative to have pepper plants with virus like symptoms checked by serological procedures or PCR in a plant pathology laboratory. Most laboratories request specific information about the crop and field to be sent with the sample, (e.g. host plant, date collected, location of the crop field, etc.) that has been given to a Farm Advisor assisting with the diagnosis of local plant disease problems.

Bell pepper viral infections can occur at seedling emergence, at or shortly after transplanting, during vegetative growth or at harvest. The earlier a pepper plant is infected, the more severely symptoms are likely to be expressed with a greater impact on fruit yield and quality.

There are two pepper seasons in Coachella Valley; the spring and fall, with a pepper-free period during the summer established to disrupt virus disease-cycles. Recently, the summer pepper-free period has been shortened as pepper growers are introducing cultural practices to reduce heat stress on newly transplanted peppers. Transplanting bell peppers at night, along with the use of sprinkler irrigation during the day, allows pepper transplants to establish root systems capable of keeping them alive long enough to overcome the heat stress. These practices allow pepper growers to establish the fall pepper crop earlier shortening the summer pepper-free period; however, they may also lead to earlier and more severe virus disease problems for Coachella Valley pepper growers in the future. A substantial break in the disease-cycle is needed to reduce movement of virus-carrying insects between old and new crops. If the break is too short to eliminate populations of virus-carrying, insects, the result will be more frequent and severe disease problems in bell pepper crops in the Coachella Valley.

Alfalfa is a common crop in the low desert valleys of southern California and is also a source of *Alfalfa mosaic virus* (AMV), an important virus affecting pepper plants (Figure 3). Several aphid species capable of feeding on both alfalfa and pepper may occasionally be found as winged adults in bell pepper fields. Several species of aphid pests common to alfalfa move as winged adults to crops such as bell pepper. Most of the alfalfa aphids do not reproduce on pepper plants but they all can be vectors of virus affecting peppers. Some aphids that can transmit viruses to pepper include the cowpea aphid, a common pest of alfalfa that shows up in late-October or November and persists through December and January. It has a broad host range preferring legumes but they also reproduce on peppers. These aphids can be a winter and summer pest and may move from legumes such as alfalfa to peppers. Cowpea aphids can transmit several viruses including *Alfalfa mosaic virus* (AMV). The blue alfalfa aphid is a serious pest of alfalfa during winter and springs months. It first appears in December or January and in the low desert valleys displaces the cowpea aphid in February and March. The winged adults are capable of transmitting viruses causing disease in peppers such as AMV. The pea aphid is a serious pest of alfalfa during spring. It may appears in January or February in the low desert valleys, eventually displacing the blue alfalfa aphid as temperatures climb and can persist into late spring months as it is a little heat tolerant. The winged adults are capable of transmitting viruses causing disease in peppers such as AMV. The spotted alfalfa aphid is the most heat tolerant of the low desert alfalfa aphids and can be found throughout the year but usually in low levels because alfalfa growers plant varieties with high host plant resistant to this pest. Additionally, parasitoids specific to this aphid may keep this aphid under control. The winged adults are capable of transmitting viruses causing disease in peppers such as AMV.

Some common aphids of cool season vegetable crops (e.g. leafy greens, cole crops, carrots) can also be important vectors of viruses infecting bell pepper including the green peach aphid, a common aphid on many weeds and winter vegetables including bell pepper during the cool season. This pest can cause direct feeding injury to bell pepper as well as transmit many viruses that infect peppers. Another aphid injurious to bell pepper is the potato aphid, a vector of several viruses including some injurious to bell pepper including *Potato virus Y* (PVY), Figure 4.

Some common viruses causing disease on bell pepper in the Coachella Valley and the low desert valleys in general are listed in the table below.

Pepper Infecting Viruses: There Vectors, Symptoms and Comments			
VIRUS	**VECTOR**	**SYMPTOMS**	**COMMENTS**
Alfalfa Mosaic Virus (AMV); alfamovirus group	Several species of aphids. The most common vector is the green peach aphid.	Distinct yellow or white mosaic on leaves, fruit may be stunted and misshapen.	The host range includes many crop and weeds. The virus is seed borne and can be transmitted mechanically. AMV is usually not a major problem if peppers are not planted near alfalfa.
Beet Curly Top Virus (BCTV) and related species	Beet Leafhopper	Yellow to light green leaves with upward rolling and upper portion of plants have a rosette appearance. Shortened internodes cause extreme stunting of plants. Fruit remain upright and small. Early plant death.	Affects beet, tomato, pepper, and numerous other crops and weeds. By the time the damage is noticed in the field, the leafhoppers are gone.
Cucumber Mosaic: *Cucumber mosaic cucumovirus* (CMV) symptoms are difficult to differentiate from those of potyviruses but are generally more severe. Mixed infections of CMV are common.	CMV can be seed borne, but infected weeds and other crops are the primary sources. CMV is easily moved to and within pepper fields by several species of winged aphids.	Overall lighter color with light and dark green mosaic patterns, zigzag distortion of main leaf vein, stunting, leaf curling, and mosaic, oak-leaf necrotic areas on mature leaves. Malformed fruit with conspicuous concentric rings or spots.	CMV has a host range of over 1,000 plant species. Currently there are no good sources of CMV resistance in peppers. Use reflective mulches to repel the insect vector and eliminate weeds around the pepper field.
Potyviruses that cause mosaic symptoms in pepper include: Pepper Mottle Virus (PepMov) Potato Virus Y (PVY) Tobacco Etch Virus (TEV)	Several aphid species including green peach aphid vectors but can be transmitted mechanically, or be seedborne.	Overall lighter color with mosaic patterns, especially on the younger leaves, stunting, leaf curling, and fruit distortion.	Pepper infecting potyviruses have broad host ranges including many Solanaceae crops and weeds. Mixed infections of one or more potyviruses and CMV are common. Pesticides are not effective so eliminate weeds and repel aphids with reflective mulches.
Tobacco Mosaic Virus (TMV)	Transmitted by human handling, plant to plant by direct contact, seed contamination.	Symptoms vary by strain, but can include mosaic symptoms, necrosis on any plant part, distortions on leaves, stems, and fruit, and defoliation.	Has a narrow host range. Can survive in plant debris for many years.
Tomato Spotted Wilt Virus (TSWV)	Vectors include:western flower thrips onion thrips and chili thrips.	Symptoms include: spotting, bronzing, and necrosis of leaves, and ringspots on fruit; symptoms may vary by cultivar, the stage of plant growth when infected, and vary with co-infections with other viruses.	TSWV has host range of over 900 crop and weedy species. The virus is spread only by thrips. TSWV occasionally occurs in Coachella Valley and Imperial Valley.

UC Davis operates a plant disease clinic. For more information, please refer to the attached form if you intend to send plant samples for disease diagnosis. Your local Farm Advisor could also give you more information about the plant disease clinic.

For further information, you may also read the following materials:

1) Toscano N, Castle S, Henneberry T, Castle N. 1998. Persistent silverleaf whitefly exploits desert crop systems. Calif Agr 52(2):29-33. DOI: 10.3733/ca.v052n02p29 Web Link here: http://ucanr.org/repository/cao/landingpage.cfm?article=ca.v052n02p29&fulltext=yes

2) Aphid Identification in Desert Produce Crops. 2014. Veg IPM Update. Vol 5. No. 1. http://extension.arizona.edu/sites/extension.arizona.edu/files/resources/010814%20Aphid%20Identification%20in%20Desert%20Produce%20Crops.pdf

3) UCIPM for Peppers link here: http://www.ipm.ucdavis.edu/PMG/selectnewpest.peppers.html

Figure 1. *Beet Curly Top Virus* on bell pepper showing yellowing, stunting with upward rolling and upper portion of plants have a rosette appearance. Shortened internodes cause extreme stunting of plants.

Figure 2. *Tomato Spotted Wilt Virus* on bell pepper showing symptoms of spotting, bronzing, and necrosis of leaves.

Figure 3. *Alfalfa Mosaic Virus* on bell pepper showing distinct sectors of light and dark green on leaves with mild leaf distortions. Fruit can also be distorted.

Figure 4. *Potato Virus Y* on bell pepper showing symptoms of distortion of on the younger leaves, stunting, and leaf curling.

Beleaf 50 SG Special Local Need 24(c) for Alfalfa Hay for Blue Alfalfa Aphid

Eric T. Natwick

On May 30, 2014 CDPR Approved a SLN 24(c) for Alfalfa Hay for use of Beleaf 50 SG for control of blue alfalfa aphid (BAA)on alfalfa grown for forage and hay. Through the IR-4 Program Beleaf 50SG had previously been granted a tolerance for hay and forage following use for lygus bug control on alfalfa grown for seed and then a label for use on alfalfa grown for seed allowing a preharvest interval for forage of 14 days and 62 days for hay. Because of the tolerance set by EPA based in IR-4 work done in Imperial county and other locals it was possible to Get the SLN for biredt application of Beleaf to alfalfa grown specifically for forage and hay,not for seed. The SLN label for alfalfa hay was sought to allow growers and PCAs with another safer insecticide product to combat the BAA outbreaks experienced throughout California over the past two springs alfalfa seasons. A facsimile of the Beleaf 50SG SLN can be seen below. The PCA and Grower must have an official copy in hand in order to recommend and use this product on alfalfa grown for seed for Lygus bug control in California for against BAA on alfalfa grown for forage or hay in California.

LABELING ACCEPTABLE
STATE OF CALIFORNIA
DEPARTMENT OF PESTICIDE REGULATION
PESTICIDE REGISTRATION
Date 5/30/14 Reviewer D. Trimble
Reg. No. 71512-10-ML
SLN # CA-140006

ISK BIOSCIENCES

FIFRA 24(c) Special Local Need Label (SLN)

For Distribution and use only in the State of California
For use on Alfalfa for control of Aphids and Lygus bugs

BELEAF 50SG Insecticide

EPA REG. No. 71512-10 **SLN No. CA-140006**

This label expires and must not be distributed or used in accordance with this SLN registration after **May 31, 2017**.

Directions for Use

- It is a violation of Federal law to use this product in a manner inconsistent with its labeling.
- This state-specific Section 24(c) labeling must be in the possession of the user at the time of application.
- Follow all applicable directions, restrictions, and precautions on the EPA registered label for EPA Reg. No. 71512-10 and this label.

Crop	Pest	Rate of Application
Alfalfa	**Aphids** **Lygus Bugs (nymphs and adults)**	**2.8 oz per acre**

Specific Directions for Use:

Begin applications before populations begin to build and before damage is evident, according to local pest management guidelines. Scout fields often and retreat as necessary to maintain populations below damaging levels. Rapidly growing plants may need retreatment.

To control Lygus Bugs and Aphids, apply Beleaf 50 SG Insecticide at the rate of 2.8 ounces (0.089 lb. active) per acre. Beleaf 50SG Insecticide controls aphids and Lygus bugs by contact and ingestion provoking rapid and irreversible feeding cessation. Aphids and other insects could remain on the plant until they desiccate.

Thorough spray coverage of plant foliage is essential for optimum control. Apply in sufficient water to ensure good coverage; use a minimum of 20 gallons of water per acre when applied by ground equipment; use a minimum of 10 gallons of water per acre when applied by air. Finished spray volumes should be increased under extreme pest populations of dense plant foliage. This product may be applied through irrigation systems. Refer to the EPA registered label for chemigation directions.

Follow the spray drift reduction advisory on the EPA registered label.

Specific Use Restrictions:

Do not apply more than 2.8 ounces (0.089 lb. active) per acre per application.
Do not make more than 2 applications in a crop year.
Do not apply more than 5.6 ounces (0.178 lb. active) per acre per season. Allow a minimum of 7 days between applications.
Do not allow foraging of fields within 14 days of the last application.
Do not allow harvest of hay within 62 days of the last application.
Rotational crops may be planted no sooner than 30 days after last application.

ISK Biosciences Corporation
7470 Auburn Road, Suite A
Concord, Ohio 44077
General Calls (440) 357-4100
Emergency Calls: (888)-484-7546

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 June 1to August 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, 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	June		July		August	
	1-15	16-30	1-15	15-31	1-15	16-31
Calipatria	0.39	0.40	0.39	0.38	0.35	0.32
El Centro (Seeley)	0.36	0.38	0.38	0.37	0.32	0.29
Holtville (Meloland)	0.38	0.39	0.39	0.38	0.34	0.31

* Irrigation Management Unit, Imperial Irrigation District.

Link to UC Drought Management Publications

http://ucmanagedrought.ucdavis.edu/