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Entomology Seminar 2014

## FOLIAR BLIGHTS OF CARROT IN COASTAL CALIFORNIA

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UC Cooperative Extension

In the 2014 season in coastal California, carrot foliar blights have been commonly encountered problems. In most seasons, incidental and occasional carrot leaf blight concerns are present but not widespread. However, in this current season the foliar blight issues are much more prevalent and in some cases damaging. Carrots grown in our coastal region are subject to three foliar blights. These three distinct problems are difficult to differentiate in the field because the symptoms of all three diseases closely resemble each other. Diagnosis is further complicated because a particular carrot planting can be co-infected with more than one of these pathogens, or heat and wind damage to foliage may resemble one of the blights. Precise identification of the pathogen will require laboratory examination and testing.

**Alternaria leaf blight (Fig. 1).** *Alternaria* leaf blight is one of the more important foliar diseases of carrot and occurs worldwide. Severe epidemics reduce carrot root size and yields, though serious outbreaks in Monterey County are not common. Initial symptoms are greenish-brown, water-soaked, angular spots. These spots become dark brown to black and may be surrounded by a yellow halo. Lesions often occur on or near the edge of older leaflets. Extensive spotting results in an overall general browning and yellowing of the entire leaf. As lesions enlarge and coalesce, the leaf may die. Severely affected crops exhibit large patches where the foliage has a scorched or blighted appearance. Dark, rectangular, elongated lesions are also produced on the petioles. The pathogen is the fungus *Alternaria dauci*. For laboratory diagnosticians, this pathogen is readily identified via the typical *Alternaria*-type conidium (olive brown color, ellipsoid shape with both transepta and longisepta) that has a distinctively long terminal beak (Fig. 2).

**Cercospora leaf blight (Fig. 3).** Yield losses can again take place if conditions favor *Cercospora* leaf blight development. The first symptoms are small (less than 1/8 inch in diameter), necrotic leaf flecks that tend to be angular in shape. These small flecks enlarge to form gray to tan spots that measure up to 1/4 inch in diameter and have yellow borders. As lesions increase in number and coalesce, leaves can wither and die. Petiole lesions are elliptical and brown with a paler center. Severely blighted foliage is weakened and snaps off during mechanical harvesting. The pathogen is the fungus *Cercospora carotae*. Spores of this pathogen are also distinctive and readily identified with a microscope (colorless conidia that are long and thin, straight, multi-septate, with thickened scars at the base) (Fig. 4).

**Bacterial leaf blight (Fig. 5).** This disease occurs in most carrot producing areas. Damaging outbreaks are associated with high rainfall or intensive use of overhead

University of California,  
U.S. Department of  
Agriculture, and  
County of Monterey  
cooperating

[English and Spanish versions of this statement can be downloaded from the ANR Affirmative Action Policy-related downloads page.](#)

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irrigation. The first symptoms are angular yellow leaf spots that later develop into irregularly shaped, brown, water-soaked spots. Yellow haloes may or may not be present. These lesions dry out and become brittle. Older lesions sometimes appear black. Lesions develop particularly at the leaf margins. Formation of a gummy exudate and browning of the petioles can occur in some situations. Bacterial leaf blight is caused by the bacterium *Xanthomonas campestris* pv. *carotae*.

**Abiotic damage from heat and other factors (Fig. 6).** Diagnosing the three foliar blights and distinguishing between the three of them is made even more difficult if there is leaf damage from abiotic factors. Heat, winds, water stress, and other environmental factors can result in leaves having dry, brown to tan, damaged areas. In general, the blights result in more of a true leaf spot symptom, especially early in the disease cycle. However, accurate diagnosis will require laboratory analysis.

**Common features.** For these blight diseases, all three pathogens are seedborne; this is a key feature that accounts for many outbreaks in production fields. All three pathogens can also survive in carrot leaf and stem debris in the soil. *Alternaria*, *Cercospora*, and *Xanthomonas* are all dispersed by splashing water from rains and sprinkler irrigation; such splashing results in spread of the disease between adjacent carrot plants. However, winds will spread only the spores of *Alternaria* and *Cercospora*. All three of these carrot pathogens are host-specific to carrot and are not known to infect other crops.

**Management strategies.** Use seed that has been tested and found to not have detectable levels of the pathogen, or that has a pathogen level below significant thresholds. If warranted, treat carrot seed with hot water or fungicides. Rotate carrots with non-susceptible crops so that infected carrot residues can decay and not serve as inoculum sources. Avoid placing new plantings next to older, possibly infected crops. Though most carrots are irrigated with overhead sprinklers, irrigating by other means can reduce disease severity. Regularly monitor carrot crops for foliar disease symptoms and apply fungicides (or copper for bacterial blight) in a timely manner. See our UC IPM website (<http://www.ipm.ucdavis.edu/PMG/selectnewpest.carrots.html>) and other sources for information on fungicides for carrots.

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Fig. 1. *Alternaria* leaf blight of carrot.



Fig. 2. Spore of *Alternaria dauci* from carrot.



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Fig. 3. *Cercospora* leaf blight of carrot.



Fig. 4. Spores of *Cercospora carotae* from carrot.

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Fig. 5. Bacterial leaf blight of carrot.



Fig. 6. Carrot leaves damaged from heat and wind.



## 2014 Plant Disease Seminar

**Thursday, November 13, 2014**  
**8:00 a.m. to 12:00 p.m.**

**\*\*County of Monterey Agricultural Center— Conference Room\*\***  
**1432 Abbott Street, Salinas, California**

- 8:00 – 8:30**      **Registration for morning session (no charge).**
- 8:30 – 9:00**      2014 plant disease developments in coastal California  
Steven Koike. UC Cooperative Extension, Monterey
- 9:00 – 9:30**      Weeds as pathogen reservoirs: INSV case study  
Richard Smith. UC Cooperative Extension, Monterey
- 9:30 – 10:00**    Iris yellow spot virus of onion: coastal and statewide update  
Tom Turini. UC Cooperative Extension, Fresno
- 10:00 – 10:30**    Break: Sponsored by CAPCA, Monterey Bay Chapter
- 10:30 – 11:00**    Challenges of spinach seed production  
Jay Schafer.
- 11:00 – 11:30**    Biology of *Fusarium oxysporum* & management of  
Fusarium wilt of lettuce  
Tom Gordon, University of California at Davis
- 11:30 – 12:00**    Pre-plant soil preparation post methyl bromide:  
where are we going from here?  
Mark Bolda. UC Cooperative Extension, Santa Cruz

Continuing education credits are requested. Call ahead (at least 24 hrs.) for special needs arrangements; efforts will be made to accommodate full participation. For more information, contact Steven Koike (831-759-7350; 1432 Abbott Street, Salinas, CA 93901) or visit our website at <http://cemonterey.ucdavis.edu>.

**Requirement from California DPR: Bring your license or certificate card to the meeting for verification when signing in for continuing education units.**



## 2014 Salinas Valley Weed School

**Tuesday, November 18**  
**8:00 a.m. to 12:00 noon**  
**Agricultural Center Conference Room**  
**(1432 Abbott Street, Salinas)**

- 8:00 Registration (no fee required) and Refreshments. Weed Identification Exhibit**
- 8:30 Evaluation of automated thinners and their impact on weed control**  
*Richard Smith, Vegetable Crop and Weed Science Farm Advisor, Monterey County*
- 9:00 Evaluation of an automated weeder and the use of Prowl in transplanted lettuce**  
*Steve Fennimore, Extension Vegetable Weed Specialist, U.C., Davis, Salinas*
- 9:30 Spinach weed control**  
*Ran Lati, Post Doctoral Researcher, U.C., Davis, Salinas*
- 10:00 Break and Weed Identification Exhibit**
- 10:30 Drip activation of herbicides for celery production**  
*Oleg Daugovish, Vegetable and Strawberry Farm Advisor, Ventura County*
- 11:00 Impact of Dominus fumigant on weed control**  
*Husein Ajwa, Extension Specialist, Emeritus*
- 11:30 Tomato weed control**  
*Lynn Sosnoskie, Weed Scientist, U.C., Davis*
- 12:00 Conclusion**

4.0 Continuing education credits have been applied for. Please call ahead for special accommodations. For more information call Richard Smith (831) 759-7357.



## Entomology Seminar 2014

Tuesday, December 2, 2014  
8:00 AM to 12:00 PM  
UC Cooperative Extension Auditorium,  
1432 Abbott Street, Salinas, CA



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**Tentative agenda. 4 hours of continuing education credits will be applied for.**

- 7:30 **Registration (no fees for morning session)**
- 8:00 **Biology and management of bagrada bug**  
*John Palumbo, Extension Specialist, University of Arizona, AZ*
- 9:00 **Research updates on springtail and aphid on lettuce in the Salinas Valley**  
*Shimat Joseph, IPM Advisor, Salinas, CA*
- 9:30 **Break (poster display)**
- 9:45 **Overview of major aphid species attacking crops**  
*Larry Godfrey, Extension Specialist, UC Davis, CA*
- 10:05 **Management of aphid species on lettuce in Yuma, Arizona**  
*John Palumbo, Extension Specialist, University of Arizona, AZ*
- 10:25 **Management of lygus bug and mites in strawberry**  
*Surendra Dara, Strawberry and Vegetable Crops Advisor, Salinas, CA*
- 10:45 **Pesticide residues in vegetable crops focusing cilantro**  
*Lisa Blecker, Pesticide Safety Education and OPIC Coordinator, Statewide IPM Program, University of California, Davis, CA*
- 11:15 **Recent research updates on lygus bug management in strawberry**  
*Shimat Joseph, IPM Advisor, Salinas, CA*
- 11:35 **Cabbage maggot research updates in brassicas**  
*Shimat Joseph, IPM Advisor, Salinas, CA*
- 12:00 **Conclusion**

For more information call Dr. Shimat Joseph (831) 759-7359 or email: [svjoseph@ucdavis.edu](mailto:svjoseph@ucdavis.edu), 1432 Abbott Street, Salinas, CA 95076. Continuing education credits will be applied for. Please call ahead for special accommodations.