



Crop Notes

September / October 2009



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Food Safety for Harvest Operations

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

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cemonterey.ucdavis.edu](http://cemonterey.ucdavis.edu)

PLEASE NOTE - FURLOUGH DAYS 4TH FRIDAY OF EVERY MONTH

Because of the State's cuts to the University of California, Advisors and 4-H staff have been required to take furlough days. No advisors will be available to the public on the 4th Friday of every month. They will also be unavailable due to furloughs the week between Christmas and New Years.

The office will remain open, staffed by the County employees who are not on furlough. They will take messages and accept samples to be dealt with by the advisors upon their return. We regret any inconvenience to the public.

TRAPPING FOR SWD

Mark Bolda, University of California Cooperative Extension - Santa Cruz County

There has been significant discussion as of late as how to best trap for spotted wing drosophila, *Drosophila suzukii*. As a very small and mobile insect, detection and estimates of population can be challenging.

Although spotted wing drosophila lays eggs in yet unripe fruit, it is attracted to fermenting fruit to feed and thus this can be a useful medium for trapping. Additionally, there are several commercial formulations, including GF120 Fruit Fly Bait, for trapping many species of flies.

This past week, the following materials were tested as a comparison for spotted wing drosophila detection and enumeration:

1. Strawberry puree, two days old.
2. Plantain + beer, two days old.
3. One part molasses mixed with 4 parts water.
4. Filth fly trap mix (AgBio Inc.)
5. Methyl eugenol plug over soapy water to trap flies
6. Apple vinegar
7. One part GF120 Fruit Fly Bait mixed with 4 parts water
8. Sweep netting one side of 32 feet of raspberry hedgerow, canes tapped with stick to dislodge flies. Net is inverted into a solution of soapy water and flies counted.

100 ml of the first seven treatments were placed in a 500 ml Nalgene bottle and hung about 3 feet from the ground, well into the hedgerow. Bottles were placed in the morning of day 1, and collected for evaluation the following morning.

In summary, the methyl eugenol and molasses mixes were useless and captured no flies in two tries. Plantain + beer, apple vinegar and the filth fly mix, while capturing flies, caught fewer in comparison to the best treatments. On average they captured 3 flies in 24 hours in a heavily infested field. The beer and plantain mix is time consuming to make and is not worth the effort, in my opinion. The apple vinegar and filth fly mix are easier to use.

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GF120 and the strawberry puree were consistently effective of the baits, capturing on average 9 flies in 24 hours in a heavily infested field. The strawberry puree was more effective the second time around, since it had been around a little longer and was more fermented. Flies do not drown in the puree, thus the trap must be handled carefully prior to counting.

Finally, the sweep netting was far more effective in evaluating total numbers of flies in the field. On average, 40 flies were captured over the 36 feet of hedgerow in a matter of minutes in a heavily infested field.

In conclusion, while the baits will continue to be effective as sentinels to detect initial infestations of spotted wing drosophila, it appears that they will be clearly inferior to sweep netting when making evaluations comparisons of already established populations.

THE IMPORTANCE OF ENHANCED SANITATION FOR MANAGEMENT OF THE SPOTTED WING DROSOPHILA

Mark Bolda, University of California Cooperative Extension - Santa Cruz County

Previous posts have written about the use of chemical sprays or baits to control the recent onslaught of spotted wing drosophila, but growers should know that they have another very powerful tool in managing this pest: enhanced field sanitation.

Since spotted wing drosophila lays eggs in and develops in fruit, removal of the fruit, either by harvest or discarding, will remove the ability of the fly to reproduce. Furthermore, fruit, among other things such as fungal spores and pollen, is a source of food for spotted wing drosophila. Males do not lay eggs, yet are constantly seen wandering around on fruit, and flies are constantly with bodies filled with red fluid obviously extracted from fruit.

While we are not certain whether spotted wing drosophila females will oviposit on rotten fruit, we know that once they complete their lifecycle and pupate there, and that spotted wing drosophila feeds quite well on rotten fruit. Therefore, removing overripe and rotten fruit fulfills two goals of fly management: removing the source of food and removing the source of reproduction.

Sanitation for strawberry growers consists of the same strategies as those used for limiting Rhizopus rot and Botrytis grey mold. Overripe and rotten fruit are removed from under the plant canopy and deposited in the furrow. Passing over the fruit with the tractor from time to time will smash it, but more importantly will foment rapid desiccation of the fruit, which is fatal to spotted wing drosophila.

Caneberry sanitation is more complicated than for strawberries simply because of the great difficulty of introducing machinery into the field once harvest has begun. Up until the recent infestation of spotted wing drosophila, it has been common for pickers to deposit rotten or overripe fruit at the foot of the hedgerow. However, this situation is very advantageous to vinegar flies, since it allows fruit to fester for long periods in the shade and high humidity of the caneberry hedgerow. A change in how raspberry and blackberry harvest is conducted which includes the removal and destruction of cull fruit will result in a dramatic reduction of vinegar flies in the field.

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Piles of discarded fruit are very attractive to spotted wing drosophila, especially when kept moist.



Spotted wing drosophila male in vicinity of rotting fruit.

The following is the summary of results of a recent pesticide efficacy trial to control spotted wing drosophila (SWD) in raspberries.

USE OF CHEMICAL PESTICIDES TO CONTROL SPOTTED WING DROSOPHILA

Mark Bolda, University of California Cooperative Extension - Santa Cruz County

The following is the summary of results of a recent pesticide efficacy trial to control spotted wing drosophila (SWD) in raspberries. All materials in the test are registered for caneberries and have a one day pre-harvest interval.

Treatments:

Chemical	Treatment Rate per acre	Water Carrier Rate per acre
Mustang rotated with Malathion	4 fl oz rotated with 64 oz	179 gallons
Malathion	64 fl oz	179 gallons
Entrust	2 oz	179 gallons
Pyganic	647 fl oz	179 gallons
Untreated Control	-	-

First mix of materials was made with the addition of 32 oz/A LI700 acidificant. First application was made on August 19, 2009 with gasoline powered backpack sprayers in 1173 sq ft plots inside of tunnels. Second application of malathion was made to the first treatment begun with Mustang on August 24. The gallonage of water carrier was very much sufficient to achieve full coverage of the approximately six foot high raspberry hedgerow. Sampling for SWD was done as per the "sweep net method" in which a not to be resampled 20 foot section of hedgerow is agitated with a stick and flies collected by insect net. This method avoids tearing and soiling of the net, breaking canes and laterals, while collecting a good por-



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tion of the flies residing in the hedgerow. Most samples resulted in male SWD (distinguishable by the single large spot on the back of each wing) being a large proportion of the sample, in most cases at least half, so the assumption is that the other half were female SWD. While the chart below uses total numbers of vinegar flies collected, males and what were assumed to be females (but could in fact be regular vinegar flies since they were not sexed) were counted separately for later reference if necessary.

Treatment	Preapplication	Post 1 day	Post 5 days	Post 10 days	Post 14 days
Mustang rot with Malathion	75.67 a	10.67 c	5.00 b	1.00 b	11.00 a
Entrust	69.00 a	38.33 c	77.33 a	44.67 a	39.33 ab
Untreated control	68.33 a	142.33 a	130.67 a	46.33 a	128.67 a
Pyganic	65.00 a	76.33 b	86.67 a	63.33 a	80.00 ab
Malathion	45.00 a	11.67 c	14.33 b	1.33 b	7.33 b

Means followed by the same letter do not significantly differ ($P=0.05$, Student-Newman Keuls) The organically registered Pyganic and Entrust have efficacy over the short term, but the conventional materials show efficacy out to two weeks post application and offer a good solution to a serious outbreak of large numbers of SWD.

Additionally, three registered horticultural oils, Azadirect, Organicide and Ecotrol were tested in non-replicated fashion in the same area as the trial above. None offered any control of significance, however.

The collaborating grower applied Diazinon 50W to raspberries of discontinued harvest at the maximum rate of 2 lbs per acre to devastating result. While having similar levels of flies than the untreated check in the study before application, there were very few flies left after with many samples coming up zero, and this continued to be the case a week after.

There are several important topics to discuss concerning the results of these chemical efficacy trials.

Resistance: With such outstanding results as those above, it is easy to decide that one will go with one of the cheaper chemistries and continue until the flies are all gone. While this sentiment is understandable, it is imperative that pesticide users rotate the chemicals they are applying. Since one is pitting the chemical against what is quite likely several million flies per acre and the subsequent genetic diversity such a large number offers, the likelihood of the pest population becoming resistant and not controllable after continued use of the same chemical application after application is very high. History with other pests tells us that it can take only a few years to reach complete resistance. Rotate.

Effects on Non-target Species: Malathion and Mustang are broad spectrum pesticides, meaning along with killing flies they will kill most beneficial insects such as predators and parasitoids. While for the time being, these chemicals are providing a solution to a critical acute situation, over the long term other solutions integrating other methods (more in continuing posts, enhanced sanitation comes to mind first and foremost) will have to be sought. Although one may tend to think that the high numbers of SWD indicate that there is very little biological control going on, remember that SWD is only recently established here so it may take several years for native predator and parasite populations to adjust to this new and large source of food. The high densities of this fly in one place are just begging for disease outbreaks. One expert with experience with insect invasions in California predicts with a high level of confidence that the large numbers of SWD currently experienced will be much lower in two to three years because of natural

With such outstanding results as those above, it is easy to decide that one will go with one of the cheaper chemistries and continue until the flies are all gone. While this sentiment is understandable, it is imperative that pesticide users rotate the chemicals they are applying.

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control.

Raspberry and blackberry growers who use bees for pollination must be aware of what pesticides will do to foraging bees. Malathion and Mustang are unquestionably toxic to bees, Entrust less so once it has dried. Pyganic, while less toxic than the others, still requires some precautions. It is best not to apply at all when plants are flowering, and generally this period of time will not have many vinegar flies present anyway, since they are drawn to ripening fruit rather than flowers.

The following link by Pacific Northwest Extension is very useful and includes a pesticide safety chart when referring to pesticides and honey bees:

<http://extension.oregonstate.edu/catalog/pdf/pnw/pnw591.pdf>

There are several insecticides mentioned for control of vinegar flies in this article. Before using any insecticides, check with your local Agricultural Commissioner's Office and consult product labels for current status of product registration, restrictions, and use information.

TOBACCO RATTLE VIRUS: NEW VIRUS FOUND IN SPINACH

Steven Koike

Plant Pathology Farm Advisor

In 2009 in coastal California, commercially grown spinach showed characteristic symptoms of a virus disease. Symptoms consisted of general yellowing and the occurrence of bright yellow blotches and spots. Brown necrotic spots were also associated with the disease. For affected fields, disease occurred in small irregularly shaped patches. Overall disease incidence was very low and there was minimal economic impact. Subsequent examination revealed that the cause of this disease was *Tobacco rattle virus* (TRV).

Using a transmission electron microscope, rigid rod-shaped particles with a clear central canal were observed from plant sap of the symptomatic spinach; such particles are characteristic of TRV. Serological, molecular, and inoculation tests confirmed that the spinach disease was caused by TRV. Prior to this finding TRV had not been confirmed on spinach in California, though TRV has been found in spinach grown in England and Germany.

TRV is a well-studied virus that is known to naturally infect a number of plants, including beet, pepper, potato, spinach, tobacco, various ornamental plants, and some weeds. TRV has been found in lettuce in California but only on rare occasions. In contrast to most virus pathogens that infect crops in coastal California, TRV is not vectored by insects but is transmitted by soilborne nematodes. Various species of stubby root nematodes, in the genera *Paratrichodorus* and *Trichodorus*, harbor TRV. TRV has been shown to be seed transmitted in some weed species.

A few other virus pathogens are occasionally found on spinach in coastal California: Beet curly top virus (leafhopper vector), *Cucumber mosaic virus* (aphid vector), *Impatiens necrotic spot virus* (thrips vector), *Tomato spotted wilt virus* (thrips vector). It is not possible to positively identify a virus pathogen by only observing the symptoms of the infected plant. Therefore, submit suspect samples to a plant pathologist for analysis and identification. Unless there are new developments regarding this virus, we do not expect TRV to be an important pathogen for spinach in California.

The occurrence of Tobacco rattle virus on spinach appears to be a minor issue.



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On spinach, Tobacco rattle virus causes overall yellowing, yellow blotches, and brown spotting.

NEW WEBSITE ANNOUNCEMENT

Laura Tourte, Farm Management Advisor, Santa Cruz, Monterey & San Benito Counties

UC Cooperative Extension would like to announce a new website resource for agricultural operations along the Central Coast. The Farm Business and Market Place was specially designed to provide a 'one stop place' where owners and managers of small to mid-scale farms can access a wide variety of research based information to assist with business and marketing decisions and success. Please visit the website at:

<http://ucce.ucdavis.edu/farmbusinessandmarketplace>

The website features information from UC, as well as links to downloadable materials from universities across the country. All of the materials were selected with Central Coast farmers, crops, and conditions in mind. Two major categories, 'Planning and Management' and 'Marketing' have a number of subcategories that contain information on, for example, business and marketing plans, budgeting, marketing channels and strategies, and conducting market research.

The website also has easy-to-access links to government agencies and offices. For example, if you want to find the Agricultural Commissioner's contact information, it is located under the main category 'Government Programs', then 'County'. If you want to find other University of California programs and services, it is located on 'Government Programs', then 'California'. There you will first see a listing of California's regulatory agencies, and, after scrolling down the page, a number of UC website links. There are a substantial number of national websites listed under the 'United States'.

We will be adding more resources to the website in the future, including online presentations for various topics under the planning and management and marketing headings. That way, you can choose to download and read any number of publications or, if you prefer, view educational programs online, at your convenience. Also planned for the future are Spanish language publications and online presentations. So please visit the website from time to time to see what is new! We welcome comments you might have about the website's content and also any suggestions for improvement. We hope you will find the website a valuable resource, as well as the 'one stop place' for your farm business and marketing needs.





New Website Announcement



For:

The Farm Business & Market Place

The Place Where....

Central Coast farm owners and managers can access business and marketing information for fresh products.



Looking for help with....

- Business & marketing plans?
- Budgeting?
- Conducting market research?
- Marketing alternatives & strategies?

This one-stop website has it all, and more!

<http://ucce.ucdavis.edu/farmbusinessandmarketplace>

For more information contact:

Laura Tourte

Farm Management Advisor

Santa Cruz, Monterey & San Benito Counties

Telephone: (831) 763-8005

Fax: (831) 763-8006

Email: ljtourte@ucdavis.edu



University of California Cooperative Extension
Monterey County

Spinach Downy Mildew Meeting

Monday, October 12, 2009
8:00 a.m. to 12:30 p.m.

****Santa Lucia Room / Sherwood Hall****
Salinas Community Center
940 North Main Street, Salinas, California

- | | |
|----------------------|---|
| 8:00 – 8:30 | Registration (no charge). |
| 8:30 – 9:00 | Downy mildew diseases: the basics
Steven Koike. UC Cooperative Extension |
| 9:00 – 9:30 | Spinach resistance breeding: introduction and challenges
Jay Schafer. Schafer Ag Services |
| 9:30 – 10:00 | USDA spinach breeding program: what is needed for moving forward
Beiquan Mou. USDA-ARS, Salinas |
| 10:00 – 10:30 | Break |
| 10:30 – 11:00 | Spinach downy mildew: update, what we do not know, what is next?
Jim Correll. University of Arkansas |
| 11:00 – 12:00 | Fungicide products and registrations for downy mildews
Industry representatives, Koike moderating |
| 12:00 – 12:30 | Industry discussion: research directions, industry needs, etc.
Koike moderating |

Spinach cultivar information: Brochures and other handouts available at this meeting.

There is no fee for this meeting. Continuing education credits have been requested. Please call ahead (at least 24 hours) for arrangements for special needs; every effort will be made to accommodate full participation. For more information, contact Steven Koike (831-759-7350; 1432 Abbott Street, Salinas, California 93901). Or visit our website at <http://cemonterey.ucdavis.edu> for additional information.



UNIVERSITY of CALIFORNIA

Agriculture & Natural Resources

Cooperative Extension • Monterey County

University of California Cooperative Extension, Monterey County

Salinas Valley Weed School 2009

Tuesday, November 3

8:00 a.m. to 12:00 noon

Salinas Community Center, Santa Lucia Room
(940 North Main Street, Salinas, CA)

8:00 Registration (no fee required) and Refreshments. Herbicide Symptom Exhibit

8:30 Weed control options for leaf lettuce

*Richard Smith, Vegetable Crop and Weed Science Farm Advisor, Monterey County
Mary Zischke, CEO, California Leafy Greens Research Program*

9:00 Research updates on weed control for specialty vegetables

Richard Smith, Vegetable Crop and Weed Science Farm Advisor, Monterey County

9:30 Mechanical weed control: studies on robotic weeding

Steve Fennimore, Extension Vegetable Weed Specialist, U.C., Davis, Salinas

10:00 Break and Herbicide Symptom Exhibit

10:30 Alternatives to Soil Fumigation: weed control with steam

Steve Fennimore, Extension Vegetable Weed Specialist, U.C., Davis, Salinas

11:00 Managing and reducing herbicide spray drift

Kurt Hembree, Weed Science Farm Advisor, Fresno County

11:30 Symptoms of herbicide drift on grapes and impacts on yield

Kurt Hembree, Weed Science Farm Advisor, Fresno County

12:00 Conclusion

3.5 Continuing education credits approved. Please call ahead for special accommodations. For more information call Richard Smith (831) 759-7357.

Afternoon session sponsored by the Monterey Bay Chapter of CAPCA

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University of California Cooperative Extension
Monterey County

2009 Plant Disease Seminar

Thursday, November 12, 2009
8:00 a.m. to 12:00 p.m.

****Santa Lucia Room / Sherwood Hall****
Salinas Community Center
940 North Main Street, Salinas, California

This seminar will focus on a broad range of topics dealing with plant pathology and food safety research and information.

- | | |
|----------------------|--|
| 8:00 – 8:30 | Registration for morning session (no charge). |
| 8:30 – 9:00 | 2009 plant disease developments in coastal California
Steven Koike. UC Cooperative Extension |
| 9:00 – 9:30 | Strategies and examples for diagnosing plant problems
Richard Smith. UC Cooperative Extension |
| 9:30 – 10:00 | Update on Verticillium of lettuce and links to spinach
Krishna Subbarao. UC Davis |
| 10:00 – 10:30 | Break: Sponsored by CAPCA, Monterey Bay Chapter |
| 10:30 – 11:00 | Review of nematode problems & the future of nematode control
Ole Becker. UC Riverside |
| 11:00 – 11:30 | Challenges for the post-methyl bromide world: strawberry diseases
Tom Gordon. UC Davis |
| 11:30 – 12:00 | Introduction to Salmonella and leafy green vegetables
Trevor Suslow. UC Davis |

Continuing education credits have been requested. Please call ahead (at least 24 hours) for arrangements for special needs; every effort will be made to accommodate full participation. For more information, contact Steven Koike (831-759-7350; 1432 Abbott Street, Salinas, California 93901). Or visit our website at <http://cemonterey.ucdavis.edu> for additional information.

Afternoon session hosted by CAPCA, Monterey Bay Chapter.



Food Safety for Harvest Operations

**October 9, 2009
Hartnell College
Salinas, CA**



Who should attend:
⇒ labor contractors
⇒ field managers
⇒ crew leaders
⇒ harvest supervisors
⇒ growers

Program

- ◆ LGMA Perspective on Harvest Issues
- ◆ History-The Science Behind Food Safety
- ◆ SOP Internal Verification
- ◆ Habitat Assessment
- ◆ Understanding Microbiology at the Harvest Level

Program

- ◆ Harvest Equipment Cleanliness
- ◆ Sanitation of Equipment & Supplies
- ◆ Field Sanitation as Preventative Practice
- ◆ What do you do if you have a non-compliance reaction

The Ag. Business & Technology Institute is co-sponsored by: Hartnell College Foundation, Harden Foundation, Fresh Express, D'Arrigo Bros. Co. of CA, Tanimura Family Foundation, Taylor Farms, Driscoll Strawberry Associates, Growers Express, King City Young Farmers, Snow Seed, SoilServ, Grower-Shipper Association, Monterey Co. Farm Bureau, CA Farm Labor Contractors Alliance, Coastal Tractor, Reiter Affiliated Co., Salinas Land Co., CA Orchard Co., Smith-Monterey, LLC, and Pacific International Marketing



HARTNELL
COLLEGE FOUNDATION



Presenters

Dr. Phoebe Helm, President, Hartnell College

Larissa Daniel, Food Safety Administrator,
Misionero Vegetable

Dr. Barry Eisenberg, Vice President of Technical
Services, River Ranch Fresh Foods

Andrew Fernandez, Vice President for Raw Product,
Taylor Farms

Justin Kerr, Division Manager, Sanitation Specialists

Steven Koike, Plant Pathology Farm Advisor,
UC Cooperative Extension, Monterey County

Presenters

Afreen Malik, Food Safety Manager, Ocean Mist
Farms

Cosme Pina, Food Safety Manager, Taylor Farms

Francisco Valdés, Field Food Safety Manager, River
Ranch Fresh Foods

Kari Valdés, Director of Food Safety and Quality,
River Ranch Fresh Foods

Dr. Bob Whitaker, Chief Scientific Officer, Produce
Marketing Association

How to Enroll: Complete the Application for Registration and return it with payment to the Ag Business and Technology Institute, Hartnell College, 411 Central Ave., Salinas, CA 93901. Call (831) 755-6879 with registration questions.

***** Registration will be accepted on a first-come, first-serve basis as space permits. Walk-ins are welcome upon availability. Pre-registration recommended as attendance is limited.**

Fees: The registration fee is \$ 139.00-regular rate and \$159.00-walk-in and late registration (after 09/30/09). Fee must accompany your application, and includes all course materials, lunch and refreshments. A certificate of completion will be awarded at the conclusion of the course.

Location: Hartnell College— Learning Resource Center (Library Building) at the Distance Education Room, 411 Central Ave., Salinas, CA 93901

Schedule: Registration is from 7:00-7:30 a.m. Seminar begins at 7:30 am, and ends at 5:00 p.m. Please arrive 10 minutes before to pick up a daily parking permit, for parking regulations at Hartnell College please visit www.hartnell.edu, search for parking regulation.

Course Material—All course materials are provided as part of the registration fee.

**Food Safety for Harvest Operations
Application for Registration**

Name _____
(last) (first)

Date of Birth: ___/___/___ (mm/dd/yyyy)

Company _____

Address _____
Street

City State ZIP

Phone (____) _____

Email _____

To receive a registration confirmation and map

Fee: \$139.00—regular rate (for registration received by 09/30/09)

\$159.00—walk-in and late registration

Check or Money Order (Payable to Hartnell College Foundation- Food Safety)

Cash

Purchase Order (copy attached)

Credit Card: Visa Mastercard

Card # _____

Expiration Date ___/___/___ (mm/dd/yyyy)

Signature: _____

Phone (____) _____

Billing Address: _____

Fax or Mail Application to:

Ag. Business & Tech. Institute

411 Central Ave., Salinas, CA 93901

Phone (831) 755-6879 – Fax (831) 759-6045



Contact the office 72 hours in advance for special accommodations.

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University policy is intended to be consistent with the provisions of applicable State and Federal laws.

Inquiries regarding the University's nondiscrimination policies may be directed to the Affirmative Action/Staff Personnel Services Director, University of California, Agriculture and Natural Resources, 300 Lakeside Drive, 6th Floor, Oakland, CA 94612-3550, (510) 987-0096.



MONTEREY COUNTY

Crop Notes



September/October, 2009

To simplify information, trade names of products have been used. No endorsement of named products is intended, nor is criticism implied of similar products which are not mentioned.

Sonya Varea Hammond, County Director
University of California Cooperative Extension
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