

FARMER TO FARMER

REPORTS FROM THE FIELD

FALL 2005

Enhancing Biological Control in Central Coast Vegetables

By BILL CHANEY, FRANKLIN DLOTT, SAM EARNSHAW, HUGH SMITH

A short course for PCAs and growers about enhancing biological control in vegetables was held on September 8 at the Agriculture Land-Based Training Association in Salinas. It was sponsored by UCCE, UC SAREP, US EPA, CAFF, and ALBA.

Introduction to biological control of insects

UCCE Salinas Farm Advisor Bill Chaney gave an introduction to bio-control of insects. In classical biological control, a single natural enemy is introduced into an area which has a pest with no natural control. For example, over 100 years ago, the introduced vedalia beetle saved the California citrus industry from cottony cushion scale. Biological control agents may also be used as an inundative release, such as ladybugs against aphids, or in an inoculative way, as in the early release of predator mites in fields where spider mites are expected to develop.

When lettuce aphids discovered California, observant organic growers noticed that when larvae of syrphid flies were around, there was a dramatic decrease in aphids. To attract the flies, growers planted flowers and hedgerows. This method is called conservation bio-control.

Lettuce aphid and syrphids

UCCE Entomologist Franklin Dlott gave a presentation on identifying aphids on lettuce and celery. In the Salinas valley, there are black bean aphids (*Aphis fabae*), cotton melon aphids (*A. gossypii*), green peach aphids (*Myzus persicae*), lettuce aphids (*Nasonovia ribis-nigri*), and potato aphids (*Macrosiphum euphorbiae*).

Understanding aphids' living preferences can help us manage these pests. For example, leaf-feeding aphids (cotton melon, green peach, and potato aphids) are typically found in older, outer leaves, and heart-feeding aphids (lettuce aphid and black bean aphid) tend to inhabit the growing tips and are found more often in the center of lettuce or celery.

Pesticide impacts on beneficial insects

Franklin defined "ecological backlash," or how pesticide applications can impact crop ecosystems in ways that are not expected or

intended. The three Rs of ecological backlash are resistance, resurgence, and replacement. Resistance is when a pesticide is no longer effective on the target pest. Pest resurgence is when the target pest population increases to greater levels after pesticide application. Pest replacement, also known as secondary pest outbreak, is when the target pest is replaced by a new pest species. The latter two Rs can be traced to the impacts of pesticides on beneficial insects.

A prime example of replacement in the Salinas Valley involves the lettuce leafminer (*Lyriomyza langeii*), a major pest in many cool season vegetables. Pest resurgence can occur even in organic systems. Spinosad (the active ingredient in Success and Entrust) effectively controls lepidopterous pests (worms). However, spinosad can also



Searching for beneficial insects at the Central Coast short course in September.

affect fly larvae. Studies with organic growers who use hoverfly larvae to control lettuce aphid have found large numbers of aphids in lettuce after application of spinosad.

Insectary crops and hedgerows

Sam Earnshaw, CAFF, gave a talk on farmscaping with hedgerows, windbreaks, filter strips, and other habitat plantings. Hedgerows have been planted in farming and rural situations for thousands of years. Fields were enclosed as early as the Bronze Age (3,000 B.C.—

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Call Sam Earnshaw (831) 722-5556 for further information.

From the Farm...

Here's a glimpse of farm happenings on the Central Coast this season. All excerpts are taken from local CSA newsletters.

Live Earth Farm (Com)Post

Sept 26 – Oct 2, 2005

What's Up on the Farm: More chickens, more egg and non-polluting "tractoring." We are currently building a new chicken coop, and plan to increase the size of our flock from 15 to approximately 60 chickens. An important aspect of achieving a more sustainable farming system is to allow nature to multi-task. The presence of livestock is key to accomplishing this, and chickens are especially suitable to creating a more sustainable farm system, especially on a smaller area of land. Chickens in our 'chicken tractors' can turn down winter cover crops and post-harvest crops while ferreting out insect pests and distributing plant-ready fertilizer in the form of nitrogen and phosphorous. We can employ this wonderful workforce to pay for its own upkeep through eggs, meat and compost material, and hopefully create some income by selling a limited number of egg shares sometime next season. We'll keep you posted! (Deb Palmer)

Tel: (831) 763-2448

www.liveearthfarm.com

Green Oaks Creek Farm & Retreat

August 16, 2005

Last night as I crawled into bed, my wife Steph put my hand on her growing pregnant belly. Soon I felt little short bulges emerging from where a little baby girl was kicking. It was the first time I had felt



her movements and I was thrilled! Besides helping John, Tara and Ariel keep the farm going, we are remodeling our house, getting it ready for a new being to enter our lives. Sometimes it feels a little overwhelming to be trying to accomplish everything at once. Once in awhile I think, wouldn't it be so much easier to just get a 9-5 job and forget about this farming bit, with its long hours, little pay, and worries about crops and pests and the like. Then I start thinking what my life would be like in such a job and what kind of job I could get that gives me the same "perks" that I presently am rewarded with. Namely, living much of my life outdoors in a beautiful, awe-inspiring place, being almost always available to my 20-month old daughter and wife, working with wonderful committed people inspired to give farming their best, the fulfillment of having satisfied customers and the ability to creatively build a business from the ground up (no pun intended). I start realizing that there is no place where I could find all this in a "regular" job so I keep plugging away. (Paul Pfluke)

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1,000 B.C.), and references to hedgerows exist back to 547 A.D. in Great Britain. Ancient hedgerows were used to confine livestock, define property lines, shelter farmland and dwellings from wind, provide food, medicine and fodder, and supply structural and fuel wood. The reorganization and industrialization of farmland in Great Britain led to the removal of approximately 200,000 miles of hedgerows between 1947 and 1993. In the U.S., windbreaks have been encouraged and used for climate modification and other conservation objectives since the 1930s. In the 1970s and 1980s the International Tree Crops Institute USA promoted multi-purpose hedgerows, and Bill Crepps and Robert L. Bugg researched hedgerows at the UC Davis, developing lists of insectary plants. John Anderson began installing multi-species native hedgerows in 1978 at Hedgerow Farms in Winters, California. The Natural Resources Conservation Service (NRCS), Resource Conservation Districts (RCDs), and organizations like CAFF have been active in conservation plantings, and many hedgerows have been planted on farms in California. Filter strips and grassed waterways are effectively controlling runoff and non-point source pollution from entering waterways.

Hedgerows can serve as habitat for beneficial insects, pollinators and other wildlife; provide erosion protection and weed control; serve as windbreaks; stabilize waterways; reduce non-point source water pollution and groundwater pollution; increase surface water infiltration; buffer pesticide drift, noise, odors, and dust; act as living fences and boundary lines; increase biodiversity; and provide an aesthetic resource. The inclusion of income producing plants in hedgerows and windbreaks can broaden the scope and appeal of farm-scaping. Pomegranate, persimmon, mulberry, citrus, pineapple guava, rosemary, oregano, lavender, sage, thyme, lemon verbena are a few of the crop species that can be considered.

Unintended destruction of hedgerows by tractors or work crews has been the number one cause of failure in plantings, and can be prevented with good signage. Other causes for the loss of hedgerow plantings are: deer and rodent damage; too many weeds; too much or too little water; water-sensitive plants not planted on raised beds or ridges; too much fertilizer; improper location or spacing of the planting; plant material too small or young to be planted; and lack of availability of desired plants leading to improper substitution of other plants.

Over time, hedgerows and farmscape plantings will generally require less care as they grow more established. However, these plantings do need some attention and should be thought of as a "crop" in their own right—one of the elements that contributes to productivity on the entire farm. Once established, a thriving hedgerow, windbreak or grassed waterway brings a wide array of benefits to an agricultural operation, and adds beauty and diversity

to the farm. A resource guide, *Hedgerows for California Agriculture*, can be downloaded from the CAFF Web site, www.caff.org.

Parasitoids and common predators

Hugh Smith, UCCE Entomologist, gave a presentation that reviewed the different groups of natural enemies and emphasized the importance of being able to identify natural enemies in all of their life stages. The major natural enemies affecting insects that attack agricultural crops are predators, parasitoids, and pathogens.

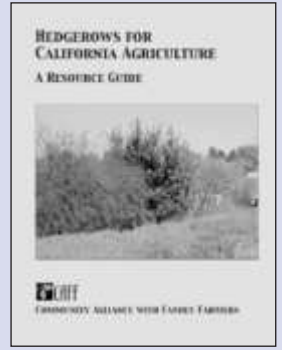
Common beneficial predators include ladybird beetles, lacewings, and big-eyed bugs, which attack several prey throughout the course of their life cycle. Beneficial parasitoids are mostly small wasps and flies that lay their eggs in or on the host and complete their development in one individual, usually killing it when they exit the body to pupate. Beneficial pathogens are diseases such as viruses, fungi and bacteria that kill insects. The activity of certain natural enemies such as syrphid flies can be enhanced by planting insectary crops in agricultural fields. Insectary crops are usually flowering plants that provide nectar and pollen to adult syrphid flies, parasitic wasps, and other natural enemies. Under some circumstances, insectary crops encourage natural enemies to lay more eggs in nearby crops, increasing natural control of pests. Natural enemies are easily wiped out by insecticides, including some organically-approved insecticides.

Following Hugh's talk, the group went out to the native plant hedgerows growing on the ALBA site. We found syrphids visiting ceanothus (California lilac), and lots of syrphids and ladybird beetles in the bell peppers.

For further information, contact Bill Chaney, Hugh Smith and Franklin Dlott at the Salinas UCCE, (831) 759-7350. ■

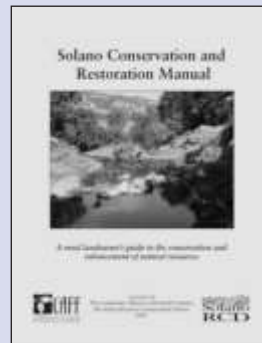
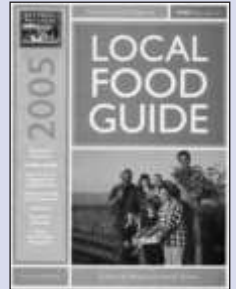
CAFF Publications

Hedgerows for California Agriculture. This manual will help you choose and care for regionally appropriate plants that attract beneficial insects and prevent erosion. It lists native plant nurseries and consultants/contractors specializing in hedgerow and other restoration projects. Download it at www.caff.org.



Making the Farm Connection. This manual is designed to let farmers know what to expect when hosting a farm visit. The booklet is also very useful for teachers and classes so that they may get the most out of their farm visit. Download at www.caff.org.

Central Coast Local Food Guide. A free booklet from the *Buy Fresh Buy Local* Campaign, this will tell you where to find seasonal, fresh, locally-grown food, including farmers' markets, CSAs, restaurants, and family farms. Available at various locations. Call (831) 761-8507 for details.



Solano Conservation & Restoration Manual. Do you constantly battle unwanted weeds on your land? Are you tired of watching the stream carry away your land? Worried about that gully that grows larger every year? Find the solutions to these and other resource concerns in this manual. Establishing native grasses, managing rangeland, pond habitat, hedgerows, grassed waterways, riparian practices, prescribed burns, and much more. 145 pages, easy to use, update and share. \$15. To order, e-mail marcia@caff.org.

BASIC Cotton Manual. Practical Lessons Learned from the Sustainable Cotton Project's Biological Agriculture Systems in Cotton (BASIC) Program, San Joaquin Valley, California, 2001 to 2004. This manual describes management and marketing options for cotton production systems that use bio-intensive, integrated pest management to reduce chemical inputs. \$15. To order, e-mail marcia@caff.org.



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Sponsored by ALBA, UCCE, CAFF

For more information call Rebecca Thistlethwaite at (831) 786-8760,

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Pheromone Mating Disruption

An Alternative Codling Moth Control

BY KIMBERLY STEINMANN AND MINGHUA ZHANG, UC DAVIS DEPARTMENT OF LAND, AIR & WATER RESOURCES
The Agricultural Geographic Information Service laboratory at UC Davis, in collaboration with UC Cooperative Extension, CAFF, Nature Conservancy, California Department of Pesticide Regulation, and local walnut growers, is currently wrapping up its second year of research on pesticide use trends and low risk alternatives for codling moth control. This study was designed to help walnut growers in San Joaquin and Tehama Counties understand how to best transition away from the use of Priority I category pesticides identified in the Food Quality Protection Act (FQPA). From the pesticide use trend assessment, low pesticide-use growers could be identified and their techniques promoted and shared as successful farming examples.

Analyses have shown that overall pesticide use has decreased from 1993 to 2002 for both counties, despite many fluctuations in use annually and variations of pesticide types and amounts by county. In addition, both counties demonstrated that more than half of all growers used low amounts of FQPA-targeted insecticides (Tehama: 78%; San Joaquin: 67.3%). Although these trends of low use bode well environmentally, growers are still burdened with a heavy reliance on pesticides that may be restricted or eliminated in the near future. In addition, many commonly used insecticides are losing effectiveness as pests rapidly develop resistance.

A promising alternative is pheromone mating disruption, a control that limits successful codling moth mating. The current technology of sprayable pheromone has decreased in cost, but, according to UC Integrated Pest Management experts, efficacy is limited to growers with low to moderate codling moth pressure and trees less than 35 ft. tall to ensure good spray coverage. Analysis of a recent survey showed that approximately 61% of growers have low to moderate pressure. The remaining growers would need to employ low amounts of broad spectrum insecticides such as Lorsban® in conjunction with pheromone during a transitioning phase.

Although pheromone is often more expensive than current broad spectrum codling moth controls, it has the potential to decrease overall costs. Broad spectrum pesticides have a harmful effect on beneficial insects, resulting in secondary pest outbreaks of mites, aphids, and scales that may require treatment. The project analyzed growers' pesticide use and found that an increase in use of broad spectrum pesticides reflected a corresponding increase in use of miticides. In addition, results of the grower survey showed that nearly half of a grower's insecticide costs are spent controlling secondary pests, mainly mites. For growers who meet the criteria for pheromone efficacy and also have high secondary pest costs, pheromone may indeed be the better economic alternative. ■

For more information, visit <http://agis.ucdavis.edu>.



Codling moth photo credit: UC IPM.