



Outreach: The FINAL GOAL



A stable integrated pest management program incorporates a balance of chemical and biological control (also known as biocontrol) components. For many years, IPM programs in western orchard systems were fairly stable, thanks to broad-spectrum pesticides that controlled key pests and natural enemies that became resistant to them. Then, legislatively mandated changes in pesticide use resulted in the unintentional disruption of natural enemies. Growers were faced with having to spray more to control outbreaks of secondary pests.

Over the past four years, we have evaluated effects of certain pesticides on a number of key natural enemies found in tree fruit orchards; we have developed and tested new monitoring tools for natural enemies; and we have teased out who eats codling moth in orchards. Now, in the project's final year, it is time to complete our work by getting the results into the hands of the industry.

Promoting biocontrol by engaging stakeholders.

by Wendy Jones, Angela Gadino, Ute Chambers, and Jay Brunner, Washington State University, Tree Fruit Research and Extension Center, Wenatchee

Overcoming real and perceived barriers

Growers who stated in surveys that they do not rely on biological control for even some of their secondary pests also stated that they lack the knowledge to effectively implement biocontrol. The good news is that, even without realizing it, these growers are probably already using IPM strategies that enhance biocontrol.

For example, integrated mite management avoids the use of nonselective miticides, sulfur fungicides, and other pesticides that would be toxic to mite predators as well as apple rust mite, the alternative prey of predatory mites.

Also, planting cover crops provides alternative food sources like pollen and nectar for many parasitic wasps and hover flies, both natural enemies of aphids.

Other practices, such as spot or alternate-row spraying, mating disruption, and the use of degree-day models for spray timing limit the exposure of natural enemies to potentially toxic pesticides.

How can stakeholders learn more about biocontrol?

Based on this, we focused our outreach goal on shrinking the knowledge barrier to adopting biocontrol practices by offering targeted training on how they can be an integral part of IPM programs and by providing information on how to enhance natural enemy activity.

To meet the need of further training on biocontrol, we initially targeted pest managers and crop consultants, since they directly influence pest management decisions. In response to surveys with apple and pear growers and crop consultants, we developed different information delivery methods. In addition to field day events, trade magazine articles, and presentations at grower meetings, we wanted to offer more in-depth and hands-on training experiences.

Hands-on activities

In February 2012, we invited pest managers and crop consultants to participate in an intensive two-day short course, held in Wenatchee and Pasco, Washington, and in Hood River, Oregon. During the course, the participants learned everything from the



Angela Gadino discusses natural-enemy monitoring techniques with Leo Garcia during a workshop preceding the WSU Sunrise Orchard Field Day last August.

basics of biocontrol to new information about pesticide effects on natural enemies. All presentations and handbook materials from this short course can be accessed at <http://enhancedbiocontrol.org>. Feedback from this short course inspired us to offer additional hands-on and interactive workshops that focused more closely on the biology and identification of natural enemies coupled with results from our project. During four-hour workshops held in February and March this year, the participants (mainly crop consultants) also learned about natural enemy monitoring and models, and how to select and use the newer pesticides to control pests while reducing impacts on biocontrol. Later this summer, we will have in-orchard, hands-on demonstrations of monitoring techniques and natural enemy identification during field days.

Online resources

Since not everyone can attend hands-on events and people have expressed a desire to learn more, we developed resources that are available on our project Web site (<http://enhancedbiocontrol.org>). Under "Features," the Web site contains all project reports, surveys, and a summary of the pesticide effects on natural enemies. There are also narrated presentations and handouts from our 2012 short course and identification guides with photos and descriptions that can be downloaded. Published project-related articles are listed and linked to for viewing. Under "Gallery," visitors can find photos of common natural enemies classified by spiders, parasitoids, and predators. The image gallery also includes videos of some methods used in the project, interviews with consultants on the use of biocontrol, and more.

Direct technology transfer

Our team also collaborated with crop consultants and orchard managers in testing new monitoring systems for natural enemies. The project provided lures and traps, while the consultants and



PHOTO BY ANGELA GADINO, WSU-TREC

Field horticulturists from Chelan Fruit Cooperative examine beneficial insects during a hands-on workshop offered in February.

managers checked the traps and counted natural enemies. Each collaborator selected two blocks in which to monitor natural enemies, allowing them to compare how different pest-control programs impacted numbers of natural enemies. The collaborators shared their experiences in video interviews accessible on our Web site (<http://enhancedbiocontrol.org>). We are repeating these activities with additional collaborators in 2013.

WSU Decision Aid System

A well-known and important outreach tool for the industry is the online Washington State University Decision Aid System. New information about pesticide effects on natural enemies generated by the project is being incorporated into DAS, which has been redesigned to make this information more apparent. In the near future, natural enemy models resulting from this project will be integrated with pest models in DAS. This linkage between pest and natural enemy models will allow users to select products and timings that will control pests while having the least negative impact on biocontrol.

Future outreach activities and resources

We are currently seeking funding to develop an online course that would interactively deliver information on the biology and function of natural enemies as well as how to monitor and enhance their activity. We also plan to create a natural enemy and pest identification guide that users could access either online or download as an application for iPhone and tablet computers. With these new tools, including advancements to DAS, we plan to continue engaging stakeholders in the adoption and promotion of biocontrol beyond this project. ●



PHOTO BY WENDY JONES, WSU-TREC

Break-out exercises were part of the two-day Biocontrol Short Course held in February 2012.

This is the final article in an eight-part series highlighting results of a five-year USDA Specialty Crop Research Initiative project to enhance biological control of orchard pests. The project involves researchers from Washington State University, Oregon State University, University of California Berkeley, and the U.S. Department of Agriculture in Yakima, Washington.

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