

The
IR-4
Project

Pest Management Solutions for Specialty
Crops and Specialty Uses



Biopesticides and
Organic Support Program

IR-4 assisting growers for over 50 years



About IR-4's Biopesticide & Organic Support Program

The EPA classifies products as biopesticides when they are derived from natural materials such as microorganisms, plants, and certain minerals, as well as biotechnology products. The primary objective of the IR-4 Biopesticide and Organic Support Program is to further the development and registration of biopesticides for use in pest management systems for specialty crops or for minor uses on major crops.

In keeping with this objective, IR-4 administers a small grants program to fund efficacy research on biopesticides and provides regulatory assistance to public sector scientists and small businesses in navigating the EPA registration process.

The grant program provides funding for research in one of three stages: Early, Advanced and Demonstration. Early Stage is research for products whose core data packages have not been submitted to EPA. Advanced Stage is research for products that have been registered by EPA or are in the registration process but require additional data to expand the registration for use on new crops or new pests. Demonstration is research on large scale plots to gather data and provide outreach supporting biopesticides as a useful tool in pest management systems.

IR-4 assists university researchers, government agencies and small businesses in obtaining EPA registrations and establishing tolerances for biopesticides. A registration of note is the registration for bacteriophage of *Clavibacter michiganensis* subsp. *Michiganensis* on tomato. There is no effective alternative to control bacterial canker disease in a commercial tomato production greenhouse facility. The grower's only option is to prune plants, and in many cases, destroy all plants in a bay. Bacteriophage is a virus that infects specific bacteria, in this case, bacterial canker disease. IR-4 was instrumental in moving this project through the discovery phase, worked with a registrant that had a potential solution, funded greenhouse efficacy trials, and submitted the completed package to the EPA. Bacteriophage for the management of fireblight in organics is also under development.



Clavibacter on tomato.
Photo by David Ingram

The IR-4 Biopesticide and Organic Support program is involved in securing registrations with a variety of other projects, such as the following:

Birds

Cranes and other birds pull up corn and other crop seedlings to eat the germinated seed. Following up on requests from the International Crane Foundation, Audubon Society, and the University of Wisconsin, the IR-4 Project has been developing data needed to register anthraquinone which deters feeding and prevents damage to the crop without injury to the birds.



Photo by
Tom Lynn

Honeybees

The IR-4 Biopesticide Program has had a long history of success in obtaining registrations for managing pests in honeybees. The following is a list of products in which IR-4 played a role in their registration. Almost all in-hive pest management products have been registered through the Biopesticides and Pollution Prevention Division (BPPD) of EPA.

- *Bacillus thuringiensis* (Bt) on Wax moth
- Formic acid on Varroa mite
- Thymol, Eucalyptol on Varroa mite
- Menthol on Tracheal mites
- Coumaphos on Varroa mite, small hive beetle
- Cinnamaldehyde on Varroa mite
- Sucrose Octanoate on Varroa mite
- Oxalic acid on Varroa mite



Photo by Scott Bauer

The “Best New Biopesticide” Award

Giant knotweed, *Reynoutria sachalinensis* is native to Northern Japan where it is utilized as a local vegetable. It was later discovered that extracts of giant knotweed could control powdery mildew and other diseases in crop plants. It was initially developed as a biopesticide in Germany and then the US by Dr Hans von Amsberg, who formed the company KHH Bioscience and marketed the extract under the trade name MILSANA. The IR-4 Project prepared the data package and submitted the tolerance petition to EPA and registration was approved in 2005. The registration was transferred to Marrone Bio Innovations who further developed the product under the current trade name REGALIA and won the “Best New Biopesticide” Award from AGROW in 2010.

AF36

The Arizona Cotton research Council a farmer-based organization worked with IR-4 to achieve the EPA Biopesticide registration of AF36. This registration of the aflatoxin control product AF36 for use on cotton and corn represents a milestone in the development and commercialization of atoxigenic strain technology for the mitigation of aflatoxin in a variety of agricultural crops.



AF36
Photo by Peter Cotty

IR-4 was requested to assist and help secure an Experimental Use Permit on corn in Arizona and Texas, and also helped format the information that Dr Peter Cotty of USDA-ARS developed and submitted it for a full registration. It has subsequently been registered on pistachios, and is being expanded to almonds and figs.

The Texas Corn Growers Association has recently been involved with IR-4 on the development of 4 new strains to combat aflatoxin.

Honeysweet Plums

Plum Pox Virus (PPV) is a plant disease that infects stone fruit trees including peach, nectarine, plum, apricot and cherry. PPV is an economically devastating disease.



Photo by Peggy Greb

In the early 1990's Dr. Ralph Scorza of USDA-ARS, successfully transformed plum with the coat protein of PPV, enabling the plum to resist the virus through a process known as post-transcriptional gene silencing. The new plum is called Honeysweet Plum. In 2006, after further development of the plum and considerable vetting of the fruit through regulatory agencies, the USDA's Office of Technology Transfer contacted IR-4 and asked for assistance in developing a submission petition for Honeysweet Plum. IR-4 and USDA met with EPA, and by June of 2007, IR-4 made a regulatory submission to the Biopesticides and Pollution Prevention Division of EPA. In May 2010, the EPA approved the registration. HoneySweet Plum is the first fruit tree that has gone through the full EPA process and is the first tree of any kind that has been registered solely through the efforts of governmental organizations. Registrations of RNAi based pest management is another form of newer biotechnology where IR-4 has been involved.

Organic Pest Management

Organic growers face many challenges and needs for pest management in organically grown crops. Weed control is one of the major problems in organic production. IR-4 submitted the registration for acetic acid (a strong form of vinegar) for weed control which causes rapid drying of weed leaves (see photo). IR-4 is also responsible for



Photo by Eric Johnson

major expansion of the microbial Bt onto fruits and vegetables. Spinosad is a natural insecticide product produced by a microbe. IR-4 developed several efficacy and residue projects resulting in new registrations. IR-4 also helped obtain EPA registration for Kaolin clay which is an organic mineral coating used to protect fruit trees and ornamentals from insects and sunburn.

Brown Marmorated Stinkbug

Pheromones are natural scents which are used to attract insects including the Brown Marmorated Stinkbug, Codling Moth, Carob Moth and Poplar Clearwing Moth. IR-4 in cooperation with EPA has funded on-farm demonstration projects for the use of pheromones to manage pests. IR-4 has also recently registered an Oriental Beetle pheromone for use in turf, ornamental horticulture, blueberries and other crops.



Photo by Steven Ausmus

To learn more:

visit ir4.rutgers.edu or contact Michael Braverman, Program Manager at 732.932.9575 x 4610 or braverman@aesop.rutgers.edu.

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