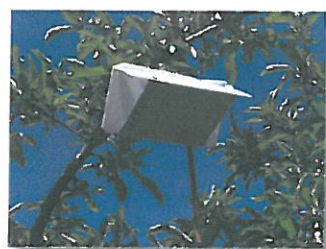


The
IR-4
 Project 

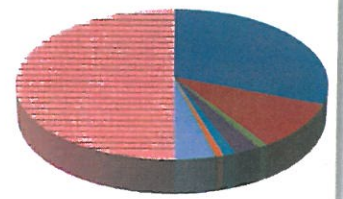


2013

Year End Summary



2013 Funding



The IR-4 Project Mission: To Facilitate Registration of Sustainable Pest Management Technology for Specialty Crops and Minor Uses

Friends,

I am proud to present the 2013 Year End Summary (YES) Document highlighting IR-4 activities and accomplishments in 2013.



This year, IR-4 celebrated its milestone 50th Anniversary. Many celebrations throughout the year gave an opportunity to reflect on the accomplishments achieved over the last half century. The importance of IR-4 to American agriculture was clearly articulated at the 50th Anniversary celebration in Washington DC on March 12, 2013, by keynote speaker Congressman Sam Farr of California. Congressman Farr and other speakers recognized that IR-4 is the model federal/state partnership and is extremely productive and efficient in facilitating the regulatory approval of pest management technology to help growers of fruits, vegetables, flowers and other specialty crops/minor uses manage destructive pests.

Throughout the pages of this YES Document you will read about some of IR-4's 2013 accomplishments. All four program areas, Food, Ornamental Horticulture, Biopesticide & Organic Support, and Public Health Pesticides, provided contributions to the overall success of IR-4. In late 2012, Michigan State University's Center for Economic Analysis published economic impact assessment values that showed IR-4 contributed \$7.2 billion dollars to the Gross Domestic Product and supported over 104,000 jobs. It is reasonable to expect the same economic impact from 2013 deliverables.

IR-4 still faces many pressing challenges. First and foremost is reduction in funding. Like other government funded research, IR-4 experienced deep funding cuts via the Budget Control Act of 2012 known as sequestration. These cuts forced IR-4 to reduce the number of new research proj-

ects that solve grower problems. Additionally, completion of some research projects was delayed, essential travel was reduced, planned laboratory equipment purchases were delayed and vacant positions were not filled. Complicating the funding cuts were large increases in operating expenses. Other challenges include loss of field trials due to adverse weather events, staff retirements, and new and increased paperwork required to ensure IR-4 data packages meet EPA's definition of being in the "Public Interest".

Looking forward, IR-4 has begun the process to map out strategic directions for 2014 and beyond. From September through November, IR-4 solicited participation in an electronic survey to gain stakeholder opinion of appropriate future directions. The response was great with 550 individuals providing feedback. The comments will be used in drafting IR-4's 2015-2020 Strategic Plan. The draft plan is expected in March with additional opportunities for input throughout the spring. It is anticipated that the Strategic Plan will be finalized by early summer in time for USDA review of IR-4. By the end of 2014, IR-4 will submit a 5-year Project Statement/Business Plan to the Directors of the State Agricultural Experiment Stations (SAES).

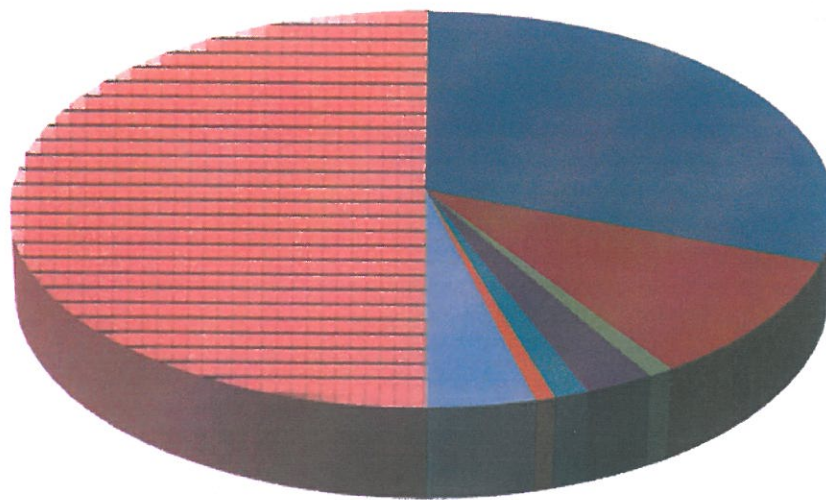
Please join me in recognizing the numerous contributions of the dedicated staff at the field sites, in the laboratory and at the Regional/Headquarters coordinating offices; the financial and technical support from partners including EPA, USDA (NIFA, ARS, FAS, APHIS), Department of Defense, SAES, and crop protection/pest management industry; and the full backing from the specialty crop/minor use stakeholders, including the IR-4 Commodity Liaison Committee and Minor Crop Farmers Alliance members. Finally acknowledgement is expressed to my associates on the IR-4 Project Management Committee for their leadership.

— Jerry

Our Stakeholders are... Growers and End Users of Pest Management Technologies and the General Public



2013 Funding



- USDA-NIFA, 11,006,000
- USDA-ARS, 3,570,000
- USDA-FAS & Global Efforts, 320,680
- USDA-APHIS (Invasive Species), 895,146
- Hatch Grant, 444,536
- DoD, 253,000
- Industry, 1,400,000
- In-Kind Support, 18,000,000 *

* In-Kind Support, includes Land Grant Universities and/or State Agricultural Experiment Stations, Crop Protection Industry, Regulatory Agencies (EPA-PRIA Fees, CA-DPR), and Agriculture and Ag-Food Canada

IR-4 Food Use Program

Since 1963, the IR-4 Project has been the primary resource in the United States for facilitating registration of conventional pesticides and biopesticides on specialty food crops (fruits, vegetables, nuts, herbs, spices) and non-food ornamental horticulture crops (greenhouse, nursery, landscape plants, and Christmas trees).

Successes

2013 was another successful year for the IR-4 Food Use Program. As a result of IR-4 submissions, EPA established a total of 187 permanent tolerances. Through extrapolation via crop grouping and crop definitions, these tolerances support 1032 new specialty crop uses that can be added to product labels. These new successes will bring the total number of food uses supported throughout the history of IR-4 to nearly 16,000 for U.S. specialty crop growers.

Research

The 2013 Food Use research program consisted of 84 new residue projects and a carry over of 7 projects that were started in 2012. Together with Canada, the 2013 studies were supported with a total of 534 field trials. Seventy-one data packages on 28 different pest control products were submitted to EPA; once reviewed and approved, these should support hundreds of new uses. While IR-4 continues to post significant numbers of new uses, there are still nearly 500 stakeholder requests that could be addressed if IR-4 had sufficient resources.

IR-4 also supports final labels by performing product performance and crop safety research. The data from this research supported over 20 new uses. This research was conducted in cooperation with U.S. and Canadian researchers.

In an effort to streamline timelines and increase efficiency, IR-4 launched an electronic QA reporting system (eQA) on October 7, 2013. This web based electronic reporting system allows paperless reporting of QA inspections and audits from IR-4 QA staff located throughout the U.S. to IR-4 GLP

researchers and cooperators. With the input from many IR-4 personnel, the eQA system has been customized to fit IR-4's unique needs. The eQA system is currently handling approximately 80 audits per month. It is saving paper, copying, mailing costs and most importantly, time.

Looking Toward 2014

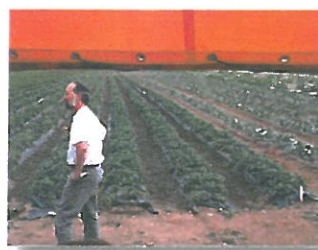
The outcome of the 2013 Food Use Workshop and subsequent discussions with stakeholders has resulted in a research plan for 2014 that includes 75 new magnitude of residue studies consisting of 447 field trials. The Canadian Minor Use Program, PMC, is cooperating on 22 of those studies and contributing 54 field trials. There will also be an additional forty four 2014 field trials to complete 20 ongoing studies from 2013.

International Efforts & Crop Grouping

In 2013, seven products were submitted to Codex international process for review that should support Maximum Residue Levels on nearly 25 different commodities.

IR-4 international partnerships continue to expand and provide IR-4 with additional support. It is estimated that IR-4 realizes as much as \$500,000 in savings in research dollars each year with our Canadian partnership. IR-4 has now initiated similar partnerships with Brazil (MOU signed in 2012) and more recently with Costa Rica (MOU signed in 2013) in hopes to further gain the benefits of such partnerships.

Crop group updates continue to move forward. The revised Leaves of Root and Tuber Vegetables, Legume Vegetable, and Foliage of Legume Vegetables were all submitted to the EPA over the past year; and the Cucurbit Vegetable Crop Group will be submitted in early 2014. It is expected that as EPA completes their reviews of pending crop group updates, additional final rules will be published in 2014. Equally important, the effort to update crop groups continues with Codex and it is expected that additional crop groups will be adopted in the near future.



IR-4 Ornamental Horticulture Program

The Green Industry — ornamental horticulture — has faced unprecedented economic challenges over the last few years. The largest sector, production of woody nursery crops, has suffered due to the lagging real estate industry. There have been fewer large installations of these crops around new homes or major landscape renovations around existing homes. Also, given tighter budgets, consumers have shifted toward buying 'color', in other words, annuals and herbaceous perennials with colorful flowers or interesting foliage.

Successes

Despite these changing times, the IR-4 Ornamental Horticulture Program continues to contribute to growers' efficiencies and crop loss avoidance by providing efficacy and crop safety data to support product labels and by providing an information bank for growers when they are making pest management decisions. During 2013, five new labels were registered by EPA covering disease, insect/mite and weed management issues. The web resources now include more than 5,600 research reports, 59 efficacy and crop safety research summaries, and management plans created with extension and research scientists. Since the start of the IR-4 Ornamental Horticulture Program, more than 160 product labels have been registered or amended, impacting more than 30,800 crop uses.

2013 Ornamental Horticulture Workshop

The 2013 Workshop established 2014/2015 research priorities and fostered discussions on a wide range of issues. In addition to discussing the merits of potential projects, topics included the need to augment protocols for integrated management strategies and how best to study biopesticides. After identifying important and achievable projects, research projects were selected: Thrips Efficacy, Armored Scale Efficacy, New Insecticide Crop Safety, Botrytis Efficacy, Leaf Spot & Anthracnose Efficacy, New Fungicide Crop Safety, Pre-Emergent Liquid Herbicide Crop

Safety (Tower EC and Dimension 2EW), and Ornamental Grass Herbicide Crop Safety (Dimension 2EW, Gallery, and Pendulum 2G).

Invasive Pests

In addition to managing the usual pests, growers often face new exotic organisms that can become invasive. Not every exotic organism wreaks havoc on growers' crops and/or native plants, but this remains as a significant concern for biosecurity. During 2013, the IR-4 Ornamental Horticulture Program collaborated with national and international researchers to study biology and mitigation of several diseases and insects. The gladiolus rust project that began in 2010 has identified gladiolus cultivars less susceptible to infection and demonstrated fungicide programs to eliminate disease expression. The research examining chrysanthemum white rust has illustrated that *Puccinia horiana* grows within chrysanthemum stems and can overwinter in crown tissues along with studying preventative and curative fungicide efficacy. Boxwood blight remains a growing issue with several new states observing the disease for the first time in 2013, including NJ, PA and DE. Research into this disease is multipronged: fungicide efficacy, use of sanitizers, characteristics of fungal spores such as stability under different temperatures, host resistance, population and genetic variability, and development of diagnostic tools. These efforts have already begun to influence grower practices in managing gladiolus rust and boxwood blight.

For 2014, the Ornamental Horticulture Program remains an essential supporter of the green industry and continues to ensure that growers have the tools they need to remain globally competitive through traditional research and new initiatives for invasive species.



IR-4 Biopesticide and Organic Support Program

The IR-4 Biopesticide program also continues to assist in product development both through the grant and regulatory assistance program.

Grant Program

The Biopesticide Research Grant Program has provided approximately \$6.7 million in grants to researchers since its inception. In 2013, this grant program funded one Early Stage, 14 Advanced Stage and eight Demonstration Stage projects. The demonstration stage grants were co-reviewed by EPA and IR-4. These were conducted by different universities and USDA research units on fruits and vegetables, tropical crops, forestry, honeybees, turf and ornamentals. Among the high profile invasive pests, the biopesticide program has supported projects involving spotted wing drosophila and brown marmorated stinkbug as well as red bay ambrosia beetle, medfly and phorid fly on mushroom.

Successes

IR-4 submissions for EPA biochemical classification included a package for propylene glycol alginate, which was approved. Registrations facilitated by IR-4 submissions to EPA included (Z,E)-7, 9, 11-Dodecatrienyl formate which is the pheromone of the carob moth. In addition, this was also supported through funding of efficacy studies of the pheromone in dates in California.

From efficacy research funded through the biopesticide grant program, there were 13 additions of crops to biopesticide labels. In addition, a total of 26 Emergency Exemptions for a bird repellent and 37 for hop beta acids for varroa mite management on honeybees were supported.

Submissions

In 2013, IR-4 submitted two new active ingredient registrations to EPA. Pollinator health is a top concern of the biopesticide program. Varroa mites continue to be serious management issue in honeybees due to pesticide resistance in mites and as a possible component of colony collapse disorder. A natural product derived from hop plants, the potassium salts of hop beta acids has been submitted to EPA for the management of varroa mites. In addition to managing varroa mite, it can assist by creating a new market for hop products as well.

The loss of methyl bromide in many specialty crops has left a void in nematode management. The biopesticide program has funded grants on several biopesticide products which are now registered for managing nematodes in food and ornamental crops. Propylene glycol alginate is a new active ingredient submission which is meant to target several species of nematodes when used at planting or transplanting food crops, ornamentals and turf. In addition there was an amended formulation of *Aspergillus flavus* AF36, named AF36 Prevail which should increase production efficiency and capacity of the work of the Arizona Cotton Research and Protection Council.

Trends

The trend of major crop protection companies purchasing biopesticide companies and/or developing their own biopesticide product lines continues. IR-4's Biopesticide and Organic Support Program will work with these and established biopesticide companies in providing assistance for bringing their products through the EPA approval process. This will give growers more options in dealing with pest pressures that threaten their crops.



IR-4 Public Health Pesticides Program

The public health pesticide toolbox — the set of chemical products used to combat arthropod vectors of human and animal disease — is undergoing major shifts in response to both regulatory requirements and recent innovations. The IR-4 Public Health Pesticides (PHP) Program is working in several distinct realms to help ensure the availability of an adequate supply of safe and effective vector control materials.

New Uses

IR-4 provided major support for new vector control uses for existing insecticides in 2013. In particular, after four years of work by a large IR-4 team, all-crop tolerances were published for the mosquito adulticide etofenprox in response to IR-4 data, analysis, and petitions; this substantially increases the usefulness of a new addition to the toolbox. In addition, field studies aimed at simulating an entire season of intensive mosquito control was conducted on three crops in California, with the hope that additional data, leading to a more refined risk assessment and a lower tolerance value, could allow a wider range of applications for this product.

The IR-4 PHP Program also supported another new mosquito adulticide with regulatory petitions requesting a supplemental label for sand flies that impact military operations overseas, a reduced risk finding to accelerate registration, and an explicit finding of exclusive rights to data to help encourage product development for this market. Another class of materials where IR-4 has supported new public health uses are volatile or spatial repellents and toxicants. These have not been used indoors in the U.S. but are under evaluation by the U.S. military and IR-4 for potential registration, with protection of sleeping soldiers a particular goal; IR-4 reviewed candidate materials and helped with protocols for efficacy data collection. Clothing that are factory-treated with insect repellents or toxicants do not currently have labels allowing retreatment, and IR-4 helped lead an effort to devise non-destructive methods to estimate or measure residual permethrin on clothing after wear and washing; our particular contribution was proof of viability for IR spectrographic methods. Work to date suggests these methods may also allow

evaluation of pesticide concentrations on treated bed-nets, allowing improved decisions on replacement

PHP Inventory

The development and maintenance of an inventory and database of materials used for vector control is a major focus for the PHP Program, with a particular emphasis on the identification of under-utilized materials with significant potential utility for vector control. During 2013 the PHP database was substantially revised and expanded to ensure that all data is explicitly connected to citations; to add information on key end-use products and product types (e.g. volatile/spatial repellents) as well as primary chemicals; and to support a wide range of queries regarding the specification, bio-activity, and regulatory status of potentially useful materials. The 2012 Inventory was reprinted in 2013, and preliminary work was completed which will lead to publication of a 2nd edition of the inventory and release of an expanded online database in 2014. These print and digital documents are increasingly recognized as authoritative standard works. One specific use for these documents, is tracking new data requirements for existing materials to support efforts by registrants to retain current vector control tools.

New Products

IR-4 also supported several new materials and products for vector control this year, including three truly novel approaches. We are representing developers of Attractive Toxic/Targeted Sugar Baits (ATSB) vs. mosquitoes and sand flies in EPA registration activities; major progress with these materials included clarification of efficacy data protocols and pollinator protection requirements for foliar applications of ATSB. IR-4 also supported ARS developers on novel products for disseminating volatile repellents from clothing attachments. Finally, IR-4 helped obtain Experimental Use Permits (EUP's) for work with sterile insect techniques for mosquitoes based on reproductive incompatibility between mosquitoes infected with differing strains of the endosymbiotic genus *Wolbachia*.



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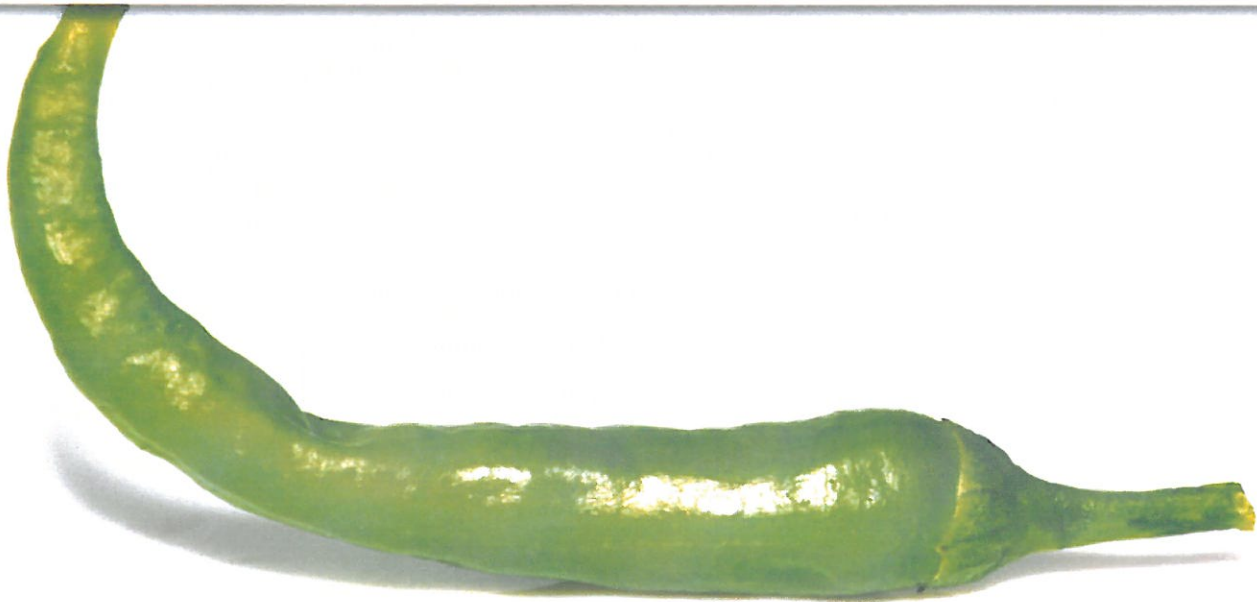
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