



The IR-4 Project



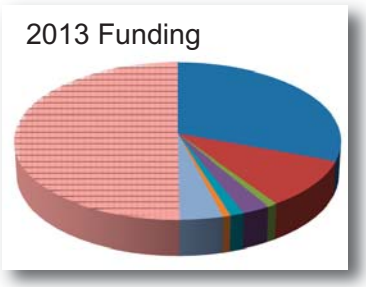
2013 Annual Report











The IR-4 Project

Pest Management Solutions
for Specialty Crops and
Minor Uses

IR-4 Headquarters
Rutgers, The State University of New Jersey
500 College Road East, Suite 201W
Princeton, NJ 08540
732.932.9575 fax 609.514.2612
www.ir4.rutgers.edu

Friends,

I am proud to present the 2013 Annual Report 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 Annual Report 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 projects 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.

Sincerely yours,

Jerry Baron, PhD
Executive Director
IR-4 Project

Major funding for IR-4 is provided by Special Research Grants and Hatch Act Funds from USDA-NIFA, in cooperation with the State Agricultural Experiment Stations, and USDA-ARS.

RUTGERS
THE STATE UNIVERSITY OF NEW JERSEY

ANNUAL REPORT OF THE IR-4 PROJECT (NRSP-4)
January 1, 2013 - December 31, 2013

*National Research Service Program No. 4 - Specialty Crop Pest Management

Background

The IR-4 Project (Interregional Research Project Number-4) was established by the Directors of the State Agricultural Experiment Stations (SAES) and the United States Department of Agriculture (USDA) in 1963 as a cooperative research program with the goal to support growers of fruits, vegetables, nuts and other small acreage specialty food crops by assisting with the registration of pesticides on these "minor crops". The IR-4 Project was needed because companies that develop and register pesticides concentrate their efforts on large acreage crops that provide adequate return on investment. These companies do not consider specialty crops and other minor uses of pesticides a priority business objective. Potential sales in these small markets do not justify the investment in development of the required data for registration. As a result, there are often many pest management voids in specialty crops and minor use markets. IR-4 fills the void by developing the magnitude of the residue and/or product performance data needed by US Environmental Protection Agency (EPA), the crop protection industry and/or other regulatory authorities to allow registrations on the specialty crops.

The same "minor use" problem exists in other segments of agriculture. In 1977, IR-4 expanded its core objectives to include registration of pesticides for the protection of nursery/floral crops and Christmas trees. In 1982, IR-4's mission was enhanced to include support for lower risk microbial and biochemical pesticide products. In 2009, regulatory support for minor use pesticides that manage arthropod pests which transmit disease to humans was added as a fourth IR-4 Project objective. In all four IR-4 Project areas, national coordination, technical guidance and funding are provided to develop the appropriate data and/or support registrations.

IR-4 has been successful; the research performed by the men and women of the IR-4 Project has facilitated over 27,000 registrations of conventional pesticides and biopesticides for food and ornamental crops. IR-4 has achieved this success because it works in close cooperation with many groups and associations to accomplish its mission. Resources are leveraged to their fullest potential. Some of the major partners/cooperators include specialty crop growers/commodity organizations, the SAES, the crop protection industry, the USDA units (including Agriculture Research Service-ARS; Foreign Agriculture Service-FAS; National Institute of Food and Agriculture-NIFA; Animal and Plant Health Inspection Service-APHIS), EPA, the Department of Defense-Deployed Warfighter Protection Program (DWFP), California's Department of Pesticide Regulation (CA-DPR), Canada's Pest Management Regulatory Agency (PMRA) and the Pest Management Centre in Agriculture and Agri-Food Canada (CN-PMC). These and other Cooperating Agencies, principal leaders of the project, technical managers and IR-4 State and Federal Liaison Representatives are shown in Attachment 1.

Further details about the IR-4 Project can be found on the IR-4 Project's website: http://ir4.rutgers.edu.

Food Program

The IR-4 Project remains committed to its original objective to provide regulatory approval of safe and effective plant protection products to assist in the production of food crops and give specialty crop growers the tools they need to be successful and competitive in local, regional, national and international markets.

Research Activities – Food Residue

Since 1963, IR-4 stakeholders have submitted 11400 requests for assistance to the IR-4 Food Program. Of these, 486 are currently considered researchable projects that remain documented needs of specialty crop growers. The others have been addressed through previous research and regulatory submissions or cannot be registered at this time. In 2013, a total of 117 new project requests were submitted to IR-4 by various stakeholders. As well, IR-4 staff added 96 requests to the IR-4 database to track the new crop group updates that will be bundled into future submissions to EPA. Therefore the total number of new requests added to the IR-4 tracking system during 2013 was 210 project requests.

IR-4's research priorities for 2013 were determined by IR-4 stakeholders during the September, 2012 IR-4 Food Use Workshop, in St. Louis, MO. Based on the outcome of that workshop and other priority setting mechanisms, IR-4 scheduled 91 studies consisting of 485 IR-4 field trials and 49 trials from our Canadian partners for a grand total of 534 field trials. Canada also served as Sponsor and Study Director for three of these studies. The specific studies for 2013, including test chemical and crop, are shown in Attachment 2.

The majority of field trials are assigned to IR-4 or CN-PMC/Field Research Centers and sample analyses to the IR-4 Analytical Laboratories. When necessary, other cooperating facilities or contractors are utilized to ensure projects are completed in a timely manner. In most studies, the test chemical is applied in the field in a manner that simulates proposed grower use of the pesticide on the target crop. When the crop is at the appropriate stage, samples of the crop are collected and shipped to the analytical laboratory where the amount of test chemical remaining in or on the crop is determined. Field and laboratory data from this research are compiled in a regulatory package and submitted to the EPA to request a pesticide tolerance or maximum residue limit (MRL).

Research Activities - Efficacy and Crop Safety (E/CS)

The need for IR-4 to develop product performance and crop safety data to support labeling of new uses for specialty crop pest management tools continues to be an important priority in the IR-4 research plan, and in many cases the data is required by registrants prior to actively marketing the new uses. For 2013 IR-4 planned trials requiring $92,000 in funding to support E/CS research. This funding supported research to address needs for 20 projects, including 28 state university trials and an additional 17 trials by ARS (see Attachment 3 – "2013 Efficacy/Crop Safety (E/CS) Research Program"). In addition, CN-PMC planned to conduct 3 E/CS trials. These trials can be used to support new uses in the U.S. which will benefit specialty crop stakeholders.

Submissions and Success

In 2013, IR-4 submitted data to EPA or the cooperating registrant for 28 chemicals involving 85 specific Requests for Assistance submitted by IR-4 stakeholders. Additionally, IR-4 submitted three petitions to EPA that proposed to add new crops (leaves of root and tuber vegetables, legume vegetables, and foliage of legume vegetables) to existing crop groups, as well as revise certain crop subgroups. Included in the pesticide submissions are packages that were submitted to cooperating registrants where they submitted our data with their submissions or for label amendments, conditional registrations, or to address registration review (re-registration) requirements to maintain the use of a product. See Attachment 4 for a comprehensive listing of data submitted.

The IR-4 Food Use Program continues to work smarter and more efficiently to deliver new plant protection products for specialty crop growers. In 2013, IR-4 made remarkable progress by shortening study timelines on very complex studies with a new novel fungicide DPX-QGU42 (oxathiapiprolin) where IR-4 and Canada's PMC program jointly conducted seven studies that were submitted with the initial submission of this new product which is part of a Global joint review.

IR-4 also submitted a large number of data packages to the Joint Meeting on Pesticide Residues (JMPR) in 2013 that will be used to establish Codex MRLs. These submissions included eleven active ingredients covering over 40 commodities. These submissions can also be viewed in Attachment 4.

IR-4 continues to post near record numbers of new uses. In 2013, EPA established a total of 187 permanent tolerances based on IR-4 submissions. These tolerances, considering crop grouping and crop definitions, will support up to 1032 new specialty crop uses that could be added to product labels. The 1032 new use registrations in 2013 bring the IR-4 50 year total of clearances to 15,878. A complete list of these new uses and new crop groups can be found in Attachment 5. In total, EPA reviewed 31 chemistries for IR-4 in 2013, which is similar to the number of reviews in 2012.

IR-4 continues to evaluate labels to determine if the new uses approved by EPA are indeed available to growers through labels registered in each state. In 2013, of the 1032 uses it has been determined that 232 uses now appear on product labels, which is only about 25% of the total possible uses. IR-4 has contacted the registrants to encourage them to add the uses to the marketing labels as soon as possible. In many cases, the IR-4 supported uses have not made it to product labels because they were granted late in 2013, in part due to the government shutdown. Ten chemicals were approved in the last quarter of the 2013, so it is expected that those marketing labels will still be available in many areas in time for the 2014 growing season. It should also be noted that some of the crops not

counted were for new crop group conversions, therefore some of the crops maybe listed on product labels, but not the newly listed crops that were added to crop groups. It is expected that many of those will be added at a later date. During the review of the labeling success of 2013 new uses, IR-4 also re-examined labels associated with 2012 approvals. We are pleased to report that nearly 200 more uses, not counted in 2012, now appear on product labels for a nearly 80% success rate of the 2012 tolerances. See Attachment 5 for details.

A listing of IR-4 projects in the queue for future submission to EPA is included as Attachment 6 or can be viewed on the IR-4 website at: http://www.ir4.rutgers.edu/FoodUse/Food_UseSimple.cfm?simple=1. EPA posts their Multi-Year work plan that includes IR-4 pending submissions at: http://www.epa.gov/opprd001/workplan/newuse.htm. IR-4 submissions are generally reviewed by EPA and a tolerance established within a 15 month review timeline. IR-4 continues to support EPA's goal of encouraging the use of pesticides that pose less risk to human health and the environment compared to existing alternatives. IR-4 continues to make requests of EPA that many of our submissions be classified as reduced risk. See Attachment 4 for a listing of 2013 Reduced Risk requests.

Regulatory Compliance

Good Laboratory Practice Standards (GLP's as noted in Chapter 40, *Code of Federal Regulations*, Part 160) compliance is paramount to the success of the IR-4 Project's Food Program. Key components of compliance are the activities of the IR-4 Project's Quality Assurance Unit (QAU). The QAU continues to provide monitoring and support to cooperating scientists throughout the United States. Audits of facilities and ongoing field and laboratory procedures provide assurance that IR-4's data is of the highest quality and will be accepted by the crop protection industry and EPA.

The Annual QA Planning Meeting was held on March 26-27, 2013 in Nashville, TN. At this meeting, the audit plan for 2013 was created. For calendar year 2013, regular inspections included 23 facility, 165 field in-life, 84 analytical in-life, 81 analytical summary report/data audits and field data book audits. During the 2013 calendar year, 98 final reports and amended reports were audited.

EPA conducted nine inspections in 2013 for GLP compliance and data integrity. A total of 140 IR-4 related facility inspections for GLP compliance have occurred since April 27, 1997. IR-4 facilities continue to maintain high standards and fully meet the GLP requirements.

IR-4 modernized reporting of QA audits through the use of the IR-4 eQA system. During 2013, the QAU completed testing, trained users and rolled out the eQA system. The eQA system was launched for program wide use on Oct. 7, 2013. During the last quarter of 2013, a total of 197 audits and inspections have been electronically generated and distributed to Testing Facility Management, Study Directors and other participants via this web based system.

Crop Grouping Initiative

IR-4 continues to expand and enhance crop groups and sub-groups. The revised Leaves of Root and Tuber Vegetables, Legume Vegetable (Succulent or Dried) 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 Committee of Pesticide Residues and it is expected that additional crop groups will be adopted in the near future.

International Activities:

IR-4 remains committed to assist US specialty crop growers and their desire to expand international markets by reducing pesticide residues in crops as a phytosanitary trade barrier.

In North America, IR-4 cooperates with CN-PMC who contributed 49 field trials to the joint program in 2013. Three of the studies were managed by CN-PMC, with them serving as Study Director and Sponsor and they utilized a number of IR-4 field research centers to complete the NAFTA data needs. The CN-PMC program continues to provide significant contributions to IR-4 efficacy and crop safety research and shares ornamental efficacy and crop safety. There also continues to be a good exchange of personnel, with CN-PMC participating in various IR-4 meetings and vice versa.

The joint review process by EPA and Canada's Pest Management Regulatory Agency continues to save resources on both sides of the border; since only one agency is reviewing the residue data. More importantly, both agencies are establishing maximum residue limits (MRLs) at the same level, at the same time. This prevents trade irritants before they happen. EPA and PMRA completed four joint reviews on IR-4/CN-PMC submissions in 2013 for the active ingredients spirotetramat, fomesafen, methoxyfenozide, and fenamidone.

IR-4 also made a number of data submissions to the Joint Meeting of Pesticide Residues (JMPR) and Codex Committee on Pesticide Residue (CCPR) that should support additional Codex Maximum Residues Levels (MRLs) in the future. These submissions included propamocarb, spirodiclofen, and fenamidone, propiconazole (see Attachment 4) and cover over 20 commodities. In addition, IR-4 worked with several manufactures to support the submissions of diclobenil, imazamox, mesotirone, metrafenone, thiamethoxam, pymetrozine, and dimethomorph to support another 20 minor uses.

At the request of EPA, IR-4 personnel continue to be included as part of the US delegations to both the CCPR and Organization for Economic Co-operation and Development (OECD) as well as the Working Group on Pesticides and the NAFTA Technical Working Group on Pesticides. IR-4 also plays a key role on the OECD Expert Group on Minor Uses, where a number of guidance documents have been prepared and released over the past few years with regard to minor use issues. IR-4 also assists other countries, both developed and developing, as they begin to establish minor use programs, especially with New Zealand, Brazil and Costa Rica. The knowledge and expertise of IR-4 is often sought and is highly valuable to these countries as their minor use programs evolve. IR-4 has also been working with EPA and Canadian authorities to implement the pesticide related areas in President Obama's initiative with Canada's Prime Minister Harper, known as the Regulatory Cooperation Council (RCC). Here IR-4 has been working with partners in CN-PMC to further develop and harmonize our processes, especially around data generation and submissions that will allow the US and Canadian regulatory authorities to share resources to review data to further eliminate trade barriers and technology gaps between the two countries.

Global Capacity Development, Residue Data Generation Project. This three-year project's objective is to enhance capacity of participating nations in Asia, Africa and Latin America to meet pesticide-related requirements based on international (Codex) standards to trade specialty crops. This goal is being achieved by a collaborative residue data generation projects that incorporate all technical aspects of these studies and is expected to provide broader national residue monitoring as well. The focus of the capacity building has been on developing the expertise to conduct field and laboratory pesticide residue studies under Good Laboratory Practices and to eventually provided data to local authorities and Codex for product registration. All three of the regions participating in this project have received Standards Trade Development Facility (STDF) and USDA Foreign Agriculture Service funding, which also provides support for IR-4's contributions to the project. Work in the three regions is progressing and is in various stages, with a commitment to start making submissions to JMPR in 2015. It is IR-4's vision, that at the end of this work, there will be a global network of capable minor use programs that can partner, when appropriate, with IR-4 to addressing domestic and international grower needs.

Ornamental Horticulture Program

The Ornamental Horticulture Program continues to support an industry valued at approximately $11.7 billion in annual sales (Horticulture Census, 2009, NASS). This industry is quite complex because growers cover many diverse markets including flowers, bulbs, houseplants, perennials, trees, shrubs and more. These plants are grown and maintained in greenhouses, nurseries, commercial/residential landscapes, interiorscapes, Christmas tree farms and sod farms.

Research Activities

In 2013, IR-4 conducted 715 ornamental horticulture research trials to support registrations. Of these 169 were efficacy trials designed to compare different products to manage pests, diseases and weeds or to measure the impact of growth regulators. The remaining trials were conducted to determine the level of phytotoxicity to crops with herbicides used to manage common weeds in and around nurseries. Please see Table 1 for a summary of research activities and Attachment 7 for a complete listing of 2013 field cooperators and Attachment 8 for research activities listed by project.

Table 1. Summary of IR-4's 2013 Ornamental Horticulture Program Research Activities.

Category	2013		
	Efficacy	Crop Safety	Total
Number of Studies (PR Numbers) with Planned Trials	99	353	452
Number of Trials	169	546	715

Submissions and Successes

During 2013, 19 data summaries were compiled based upon research reports submitted by researchers. See Attachment 9 for Abstracts from the individual reports. The summary reports include Acibenzolar Crop Safety, Cyflufenamid Crop Safety, Dimethenamid-p Crop Safety, Dimethenamid-p + Pendimethalin Crop Safety, Fusarium Efficacy, Indaziflam Crop Safety, Isoxaben Crop Safety, Metconazole Crop Safety, Oxyfluorfen + Prodiamine Crop Safety, Pyridalyl Crop Safety, Pyrifluquinazon Crop Safety, Pythium Efficacy, Scale and Mealybug Efficacy, F6875 (Sulfentrazone + Prodiamine) Crop Safety, Tebuconazole Crop Safety, Tolfenpyrad Crop Safety, Trifluralin + Isoxaben Crop Safety, and Triticonazole Crop Safety. Data from 3,721 trials contributed to the writing of these reports. Table 2 lists the number of trials by IR-4 Region that were used in the data summaries.

Table 2. 2013 Ornamental Horticulture Program Research Summaries.

Region	Number of Trials
North Central	515
North East	304
Southern	853
Western	732
USDA-ARS	1,315
Total	3,721

During 2013**,** 4 new products were registered with EPA using label directions based partially on the efficacy or crop safety data IR-4 generated: Empress SC Intrinsic Brand Fungicide (pyraclostrobin), SP3009/NNI-0101(pyrifluquinazon), Strike Plus 50WDG (triadimefon + trifloxystrobin), Trinity 2SC (triticonazole). IR-4 data also contributed to the commercial launch of Grandevo and its California registration. See Table 3 for details.

Table 3. Ornamental Horticulture Program Contributions to 2013 Registrations.

Category	2013		
	Efficacy	Crop Safety	Total
New US EPA Product Registrations [a]	4	0 [f]	4
US EPA Label Amendments [b]	0	0	0
State Registrations [c]	1	0	1
International	0	0	0
Number of Trials Contributing to Registrations [d]	74	132	206
North Central	10	48	58
North East	20	0	20
Southern	17	6	23
Western	24	14	38
USDA-ARS	3	64	67
Number of Impacted Crops [e]	1,506	29	1,535

[a] New products for the ornamental horticulture industry based on data collected through IR-4 and submitted to manufacturers in previous years.

[b] Label updates on existing products for the ornamental horticulture industry based on data collected through IR-4 and submitted to manufacturers in previous years.

[c] State registrations and special local needs registrations on federally registered products for the ornamental horticulture industry based on data collected through IR-4 and submitted to manufacturers in previous years.

[d] The total number of trials where data was utilized for registrations.

[e] The number of impacted crops is an estimate of the total plant species grown commercially for ornamental uses impacted by the IR-4 data. For two of the new products registered in 2013, SP3009/NNI-0101 and Trinity 2SC, IR-4 contributed both efficacy and crop safety data.

2013 Workshop

The 2013 Ornamental Horticulture Workshop was held at the Mayfair Hotel in Coconut Grove, FL to establish priorities for the 2014 to 2015 biennial research cycle. As in past workshops, during the first morning of the workshop, registrant representatives presented new active ingredients and highlighted opportunities for existing products. Then the results of the Grower & Extension Survey was presented, and the participants discussed the pro and cons for conducting efficacy or crop safety research on 36 current and potential new projects across entomology, pathology and weed science. To have these discussions flow smoothly, IR-4 staff created new handouts; Project Sheets summarizing the need, research and registrations to date, and 15 Product Lists outlining the key features of tools currently available for certain diseases and pests. The 31 project sheets were created to cover recently studied projects and potential new projects based on the annual Grower & Extension Survey and newly received project requests. Also, new projects for each discipline were raised as potential research avenues during the workshop. After the relative merits of each project were captured on poster-size paper and fastened to the walls, a sticker caucus was held so that workshop attendees could vote for the research projects IR-4 should undertake during 2014 – 2015. During the second morning of the workshop, the outcomes for each discipline were projected, and the research priorities were finalized after further conversations.

The Entomology Projects include Thrips Efficacy, Armored Scale Efficacy, and New Product Crop Safety. The Pathology Projects include Botrytis Efficacy, Leaf Spot & Anthracnose Efficacy, and New Product Crop Safety. For Weed Science, the Pre-Emergent Liquid Herbicide Crop Safety will be focused on Tower EC and Dimension 2EW, while the Ornamental Grass herbicide Crop Safety will screen Dimension 2EW, Gallery, and Pendulum 2G.

Invasive Species Research Activities

During 2013, the IR-4 Ornamental Horticulture Program continued to facilitate research activities for several invasive species impacting the Ornamental Horticulture Industry: Management of Invasive Arthropods during Shipping, Gladiolus Rust Biology and Management, Chrysanthemum White Rust Biology and Management, Boxwood Blight Biology and Management, and Impatiens Downy Mildew Biology and Management. Each project was funded under USDA-APHIS Farm Bill Section 10201 and encompassed key objectives to manage exotic invasive species by studying aspects of pathogen or pest biology and management tools (conventional or biopesticide as appropriate to the target organism) to enable growers to better implement mitigation strategies. Key elements of each project are listed in Table 4 below.

Table 4. Invasive Species Projects during 2013

Project Topic	Collaborating Researchers	Research Objectives	Projected Duration
Management of Invasive Arthropods	Lance Osborne, University of Florida Cindy McKenzie, USDA-ARS, Fort Pierce Jim Bethke, University of California Arnold Hara, University of Hawai'i	*Duponchelia fovealis* biology and management tools (conventional, biopesticide, predators) Prevention of arthropod development during shipping with applications of biopesticides and biorational materials immediately before shipping	2010-2014
Gladiolus Rust	James Buck, University of Georgia Alberto Valencia-Botin, University of Guadalajara Doug Luster, USDA-ARS Fort Detrick Mo Bonde, USDA-ARS Fort Detrick Steve Jeffers, Clemson University	Fungicide screening and rotational programs Screening for gladiolus cultivar resistance Overwintering/oversummering of *Uromyces transversalis* Development of serological and genetic assays	2009 - 2013
Chrysanthemum White Rust	Doug Luster, USDA-ARS Fort Detrick Mo Bonde, USDA-ARS Fort Detrick Oney Smith, Hood College, Kurt Heungens, ILVO, Belgium Bas Brandwagt, Royal van Zanten, The Netherlands JoAnne Crouch, USDA-ARS, Beltsville	Overwintering of *Puccinia horiana* Fungicide impact on sporulation Fungicide screening on whole plants Development of serological and genetic diagnostic tools Biology and development of *P. horiana* in chrysanthemum	2010-2014

Project Topic	Collaborating Researchers	Research Objectives	Projected Duration
Boxwood Blight	Sharon Douglas, Connecticut Agriculture Experiment Station (CAES) Robert Marra, CAES Jim LaMondia, CAES Margery Daughtrey, Cornell University Nina Shishkoff, USDA-ARS- Fort Detrick JoAnne Crouch, USDA-ARS, Beltsville Mike Benson, North Carolina State University Kelly Ivors, North Carolina State University Chuan Hong, Virgina Tech Anton Baudoin, Virginia Tech Norm Dart, Virgina Department of Ag. & Consumer Services Len Coop, Oregon State University Brad Hillman, Rutgers University	Fungicide screening and mitigation strategies Cultural control potentials Effect of sanitizers on conidia and mycelia Impact of fungicides on microsclerotium development Screening of potential biopesticides for microslerotium inactivation Development of isothermic LAMP detection assay Boxwood species and cultivar screen for resistance *Calonectria pseudonaviculata* host range (*Pachysandra* and *Sarcoccoca*) Development of infections under field conditions *Calonectria pseudonaviculata* population genetics Development of epidemiology model based on U.S. temperature and moisture conditions	2011 – 2014
Impatiens Downy Mildew	Margery Daughtrey, Cornell University Mary Hasubeck, Michigan State University Aaron Palmateer, University of Florida JoAnne Crouch, USDA-ARS, Beltsville Nina Shishkoff, USDA-ARS, Fort Detrick Lena Quesada, North Carolina State University Ann Gould, Rutgers University	Overwintering of *Plasmopora obducens* oospores Fungicide screening and rotational strategies Sporangia and oospore development and epidemiology *Plasmopora obducens* population genetics Development of genetic tools for downy mildews including Impatiens Downy Mildew, Cucurbit Downy Mildew, Hops Downy Mildew, Basil Downy Mildew	2012 - 2014

Biopesticide and Organic Support Program

The IR-4 Biopesticide and Organic Support Program has the goal of facilitating the registration of microbial, biochemical, plant incorporated protectant and other crop protection technology classified by EPA as Biopesticides. IR-4 has four major functions in the biopesticide arena including: (1) an "Early Stage" grants program to fund research proposals for products whose core data have not yet been submitted to EPA; (2) an "Advanced Stage" grants program to fund research proposals for products that have been registered by EPA or are in the registration process and additional data is needed to assist with expansion of the registration to new crops or to new pests; (3) a "Demonstration" grants program to fund large-scale demonstration plots to gather information and provide outreach indicating that biopesticides can be a useful tool in pest management systems; and (4) a registration assistance program to provide university and USDA researchers as well as small biopesticide companies with regulatory advice and petition preparation assistance.

Research Activities

In 2013, the biopesticide grant program funded 1 Early Stage, 14 Advanced Stage and 8 Demonstration Stage projects (see Attachment 10). These were conducted by different universities and USDA research units and on fruits and vegetables, tropical crops, honeybees, turf and ornamentals. The demonstration stage grants were co-reviewed by EPA and IR-4. 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. The Biopesticide Research Program has provided competitive grant funding of projects, amounting to over $6.7 million in grants to researchers since its inception.

Submissions and Successes

In 2013, IR-4 submitted two new biopesticide active ingredient registration packages to EPA. (1) A natural product derived from hop plants, the potassium salts of hop beta acids for the management of varroa mites. This package is critically important because varroa mites continue to be a serious management issue in honeybees due to pesticide resistance in mites and as a possible component of colony collapse disorder. In addition to managing varroa mite, it can assist by creating a new market for hop products as well. The other submission, 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. The loss of methyl bromide in many specialty crops has left a void in nematode management. In addition to the above submissions, there was an amended formulation of Aspergillus flavus AF36, named AF36 Prevail which should increase production efficiency and capacity of the Arizona Cotton Research and Protection Council. IR-4 submissions for EPA biochemical classification included packages for alginate (see Attachment 10). 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 (see Attachment 10). In addition, a total of 26 Emergency Exemptions for 9,10 Anthraquinone were supported in 2013 including Avipel Liquid for Corn (10 states), Avipel Dry formulation for Corn (13 states), AV-1011 for rice in Louisiana and Florida and the Avipel Liquid in Sunflower in South Dakota.

The Public Health Pesticides Program

The IR-4 Public Health Pesticide (PHP) Program, which was initiated in 2008, assists in the development and registration of pesticide minor uses that protect the public from vector-borne diseases (e.g. West Nile virus, Lyme disease, malaria, or dengue fever) and from the nuisance and economic costs caused by mosquitoes, ticks, and similar public health pests. Funding for the IR-4 PHP Program is primarily from the Deployed Warfighter Protection Program (DWFP), a collaboration of the U.S. military and USDA-ARS, which are collaborating on development of improved vector management methods and materials. The DWFP functions both as a PHP research consortium and, increasingly, as a product development program, and IR-4 serves as a regulatory consultant and representative for many of the new materials and methods that have been identified as candidate vector control tools in this effort. In addition, the Department of Defense (DoD) and ARS have engaged IR-4 to help maintain and expand the vector control toolbox by identifying potential new or underutilized vector control tools; providing regulatory support for other new active ingredients and PHP products of interest to the military, regardless of their origin; and supporting the continued registration of older useful products. One particular charge for the IR-4 PHP Program is development and maintenance of a database of current and potential PHP's and their regulatory status.

In its first five years, the IR-4 PHP program has effectively built on IR-4's traditional expertise in assisting pest management in small agricultural markets, and has become a key player linking researchers, the vector control user community, commercial partners, and regulators in the development of new chemical tools for vector control, including toxicants, repellents, attractant-baited traps, and pesticide-treated fabrics. The PHP program has also worked with these groups to retain existing tools facing new data requirements, and in the search for underutilized chemicals from other realms which might be repurposed effectively for vector control at relatively low cost.

During 2013, the IR-4 Public Health Pesticides Program provided major support for an expanded use of the mosquito adulticide, etofenprox with the publication of the all-crops tolerance. The all-crops tolerance allowed the registrant to remove the restriction of using this product near agriculture lands and pastures. This project involved four years of work by a large IR-4 team, EPA published tolerances 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 etofenprox.

In other 2013 activities supporting new uses for existing pesticide materials, the IR-4 PHP Program assisted in the introduction of a new mosquito adulticide based on deltamethrin (Deltagard), and specifically collaborated on development of a supplemental label for sand fly control that should assist U.S. military operations overseas. IR-4

also supported new public health uses for volatile/spatial repellents and toxicant, collaborating in efforts to inventory and evaluate six AI's potentially useful for repelling or killing vectors in both outdoor and indoor settings with minimal human risk. While these products have not yet been registered for indoor use in the U.S., we are working with military, industry, and other researchers on potential registration, with protection of sleeping soldiers a particular goal. Finally, clothing that are factory-treated with permethrin as an insect repellents and 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 pyrethroid 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.

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 development and possible registration in the U.S. and globally for novel products that disseminating volatile repellents and that can be attached to the outside of clothing. Finally, we 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*.

The development and maintenance of a database of materials used for vector control is a major ongoing focus for the PHP Program, and we particularly emphasize the identification of underutilized chemicals with significant potential utility for organized vector control programs. During 2013 the IR-4 PHP database (http://ir4.rutgers.edu/PublicHealth/publichealthDB.cfm) was substantially revised and expanded, and the IR-4 Inventory of Public Health Pesticides, based on the database, was reprinted. In particular, work in 2013 ensured that all data is explicitly connected to citations; added information on key end-use products and product types (e.g. volatile/spatial repellents) as well as primary chemicals; and allowed a wider range of queries. This expanded body of information on the specification, bio-activity, and regulatory status of potentially useful materials will allow publication of a 2nd edition of the Inventory, and release of an expanded online database, in 2014. 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.

Impact

Specialty crop growers and other minor use stakeholders are often at a disadvantage relative to major crops (corn, soybean, cotton and other program crops) in having legal access to effective pesticides and biopesticides. Without an adequate arsenal of pest management tools, the cost of production and the amount of pest damage on the crops are likely to increase, while supply of quality produce is likely to decrease. Because of this, the IR-4 Project is an important entity in providing the US population a plentiful supply of reasonably priced vegetables, fruits, herbs, and ornamental crops throughout the year.

Specific IR-4 Project deliverables to stakeholders are documented in the respective Program sections (Food Use Program, Ornamental Horticulture Program, the Biopesticide and Organic Support Program and the Public Health Program). It is safe to say that without the existence of the IR-4 Project; only a limited number of safe and effective crop protection chemicals and biological alternatives would be available for use on food and ornamental specialty crops and minor uses. IR-4's activities protect these high value crops which are valued at $50 billion at the farm gate.

In an effort to capture a solid assessment of program value, Michigan State University's Center of Economic Analysis conducted a study on the economic impact of IR-4 Project's activities in the Food, Ornamental Horticulture and Biopesticide and Organic Support programs. This report was updated in October 2012. When well-established methods of measuring direct and secondary economic impacts are used to gauge the contributions of the IR-4 Project and its three primary programs, including the Food Crops, Ornamental, and Biological and Organic Support programs in terms of sales, employment and gross domestic product is significant. Each program posits real economic benefits to growers and the economy as a whole. Specifically, growers benefit in higher yields with higher quality output, consumers benefit by more varieties and lower costs of food and ornamental crops, and the industry benefits through better global competitiveness of US output. Including all secondary impacts, the IR-4 Project is

anticipated to support research and industry sales sufficient to support 104,650 U.S. jobs and bumps annual gross domestic product by as much as $7.2 billion. It is safe to assume that the economic impact of IR-4's activity in 2013 is equal or better than the values reported in 2012.

2013 Appropriations and other funding

The IR-4 Project is funded by USDA in partnership with the SAES and others. Total direct funding for the IR-4 Project during calendar year 2013 was $17.919 million.

The majority of USDA funding for the IR-4 Project comes through NIFA. This included the Congressional appropriation through NIFA amounting to $11.006 million. This was a decrease of $910,000 from the FY 2012 appropriation of $11.916 million and was associated with the cuts from the Budget Control Act of 2012 or "Sequestration".

The SAES directly contributes financial resources through Multi-State Research Funds (NRSP-4 grant). This grant was also reduced due to the Sequester, down by over $36 K to $444,536. Additionally, the Directors of the State Agricultural Experiment Stations provide IR-4 a significant amount of in-kind contributions by hosting IR-4 field research centers, analytical laboratories and management offices throughout the United States.

USDA-ARS maintains a companion minor use program. The amount allocated to the USDA-ARS Minor Use Program remains below $3.6 million. Their research activities are fully integrated with activities of IR-4 within the SAES, with ARS contributing necessary data from unique locations. Additionally, USDA-ARS, under a cooperative agreement with DWFP, funds IR-4 Public Health Pesticide activities at $250,000, annually.

USDA-FAS and other global partners (mostly World Bank funds through Standards Trade and Development faculty grant) provided IR-4 with approximately $320,680 to work on international activities to support specialty crop exports and global pesticide regulatory harmonization. This includes funds for reformatting existing IR-4 data to allow its use to support international maximum residue levels and capacity building training programs in Asia, Africa and Latin America. IR-4 is participating in pilot projects to teach developing countries how to develop required data to support Maximum Residue Levels on specially crops.

USDA-APHIS has funded IR-4 approximately $895,000 to do work on selected invasive species both within the US within quarantine facilities as well as internationally where the invasive pest is native. Activities include efficacy testing of pest management products to studies to better understand the biology of the pest.

Finally, the crop protection industry also contributes direct financial resources as well as significant in-kind resources. In 2013 they provided approximately $1.4 million in unrestricted grants. IR-4 used these resources to supplement USDA funds; $169,652 for additional research activities, $398,419 for office rent, $370,721 to support additional HQ operations and $53,533 for priority setting workshop and related meetings.

The direct funding of nearly $18 million does not include the substantial in-kind contributions provided by SAES/land grant universities, EPA, the CN-PMC and the crop protection industry. Most IR-4 research units are housed at state funded research stations. The institutions host the IR-4 units and contribute by not charging indirect costs. Many also contribute by discounts on direct costs or actually provide additional contributions. The crop protection industry provides characterized test substance and analytical standards to be used in pesticide residue studies and they also provide significant technical assistance. IR-4 is exempt from paying the EPA Pesticide Registration Improvement Act review fees associated with IR-4 submissions. This was valued at over $3.89 million in federal fiscal year 2013. Finally, the CN-PMC work on cooperative projects reduces the amount of work IR-4 would have to do if it was a domestic only project.

The IR-4 Project remains prudent with the use of resources while it continues to search for opportunities to gain efficiencies in all aspects of its research and regulatory affairs. Over the last several years, there have been substantial process improvements which allow IR-4 to get the most out of the funding such as our eQA system which was launched for program wide use in 2013.

Future Directions

Annually, IR-4 hosts a Food Use Workshop to prioritize future research projects. These open workshops are designed to gain stakeholder input and feedback to determine what the most important research pest management needs are and where resources should be spent. The 2013 Food Use Workshop was held September 17 & 18 in Albuquerque, NM. One-hundred and fifty seven stakeholders attended the Workshop. The outcome of this workshop and subsequent discussions with stakeholders is a research plan for 2014 which includes 75 new magnitude of the residue studies consisting of 447 field trials. The CN-PMC is cooperating on 22 of those studies and contributing 54 field trials. There will also be 44 additional 2014 field trials to complete 20 ongoing studies. Additionally, IR-4 will continue to fund efficacy/crop safety research.

The Ornamental Horticulture program hosts a biennial workshop to set two year research priorities. In 2013, the Ornamental Horticulture Workshop was held October 16 & 17 near Miami, FL. The projects selected include: thrips efficacy, armored scale efficacy, botrytis efficacy, leaf spot/Anthracnose efficacy and new product crop safety.

Within the Biopesticide and Organic Support Program, IR-4 publishes a Request for Applications to solicit proposals for research funding. IR-4 received 43 proposals for 2014 research. Of these, 5 were considered for Early Stage and 22 were Advanced Stage. The remaining 16 proposals were Demonstration proposals. Funding decisions on proposals will be made by March 2014.

IR-4 takes pride in these accomplishments and its 50 year milestone in 2013. However, there are many issues that remain unresolved. Specialty crop growers/minor use stakeholders still face challenges in managing critical pests that consume their crops and profits. It is often difficult to export certain specialty crops because standards of allowable pesticide residues vary across nations. IR-4's international involvement plays a major role in harmonizing maximum residue levels for allowable pesticide residues in specialty crops. Newly emerging invasive pests, such as Brown Marmorated Stink Bug, Spotted Winged Drosophia, Boxwood Blight, resistant weeds and other pests threaten agriculture and the environment. Recent outbreaks of West Nile Virus and Dengue Fever in the continental US highlight the need for solutions to manage public heath pests.

In 2013, IR-4 started the process of developing its next Strategic Plan: Vision 2020. The first stage of the process involved a stakeholder survey. This survey went out in September and by the closing date in November, over 550 individuals provided feedback. The comments will be reviewed and used to draft the Strategic Plan. It is envisioned that comments will be solicited on the draft plan.

IR-4 involvement in international harmonization of pesticide residues continue to expand. There are great opportunities for partnership and associated efficiencies by working with other publically funded global minor use programs. Working cooperatively, IR-4 can leverage other countries' contributions to reduce specific costs in the United States. For example, IR-4 has been working in cooperation with Canada for 15 years on a small proportion of projects annually and has achieved great savings (estimated at $500,000 per year). More importantly, the cooperative projects usually open up access, allowing US growers to export their produce to the cooperating country.

IR-4 is often used as a template when foreign governments make a financial investment in facilitating registrations for specialty crops and minor uses. In 2013, Costa Rica joined the expanding list of countries that support minor uses and are willing to work in cooperation with IR-4 and/or other countries. IR-4 expects that many more countries will be capable of cooperative research once fully trained after the completion of the Asia/Africa/Latin American capacity building project is complete.

Also in the international area, IR-4 has been asked to participate in President Obama's initiative with Canada's Prime Minister Harper called the Regulatory Cooperation Council (RCC). Here IR-4 has been working with partners in Canada (Pest Management Centre of Agriculture and Ag-Food Canada) to develop additional processes and data that will allow the US and Canadian regulatory authorities to share resources to review data to essentially eliminate trade barriers and the technology gap between the two countries.

Adequate funding remains the most critical current and future challenge for IR-4. Over the past two years there have been significant cuts in federal government funding with the potential for more cuts in the future. IR-4 has reached a

point where it can no longer "**do more with less"**. Escalating costs of research and employee expenses coupled with funding reductions are resulting in less research activity. This will directly translate to less new approvals of critically needed pesticides and biopesticides for specialty crops and minor uses in the coming years unless these additional investments are realized.

PUBLICATIONS/PRESENTATIONS

Arsenovic, M., D.L. Kunkel, J.J. Baron, and D. Carpenter. 2013. The IR-4 Project: Update on Weed Control Projects (Food Uses). Annual Meeting of Weed Science Society of America (poster).

Bonde, M. R., C. A. Murphy, G. R. Bauchan, D. G. Luster, C. L. Palmer, S. E. Nester, D. K. Berner. 2013.Systemic infection in chrysanthemum plants by *Puccinia horiana*, causal agent of chrysanthemum white rust. Abstract. American Phytopathology Society Annual Meeting. Phytopathology 103(Suppl. 2):S2.18.

Bonde, M. R., Palmer, C. L., Luster, D. G., Nester, S. E., Revell, J. M., and Berner, D. K. 2013. Sporulation capacity and longevity of Puccinia horiana teliospores in infected chrysanthemum leaves. Online. Plant Health Progress doi:10.1094/PHP-2013-0823-01-RS.

Braverman, M., D. Kunkel and J. Baron. 2013. The IR-4 Project: A Public Sector Program to Facilitate the Registration of Biopesticides. Abstract. American Chemical Society Meeting.

Braverman, M., D. Kunkel, J. Baron and J. Sandahl. 2013. Challenges of Establishing and Managing Global Pesticide Magnitude of Residue Studies. Abstract. American Chemical Society Meeting.

Braverman, M., D. Kunkel, J. Baron and M. Arsenovic. 2013. Biopesticides and Organic Herbicides for Weed Management. Tropical Weed Science Society, Chiang Mai , Thailand.

Hester, K.A., G. Bi, M.A. Czarnota, A. Fulcher, G.J. Keever, J.H. Liether, J.D. Orsi, B.E. Whipker, K. Sullivan, and C.L. Palmer. 2013. Impact of Augeo, Configure and Florel on Hydrangea Branching. Journal of Environmental Horticulture. 31(1):27-29.

Kunkel, D.L., J. Baron, M. Arsenovic, M. Braverman, and E. Lurvey. 2013. Fifty years of Providing Crop Protection Solutions to Specialty Crop Growers: The IR-4 Program. Weed Science Society of America Abstracts.

Malamud-Roam, K., 2013. Public Health Pesticides: An Inventory of Chemical Tools for Vector Control (updated and reprinted).

McKenzie, C. L., V. Kumar, C. L. Palmer, R. D. Oetting and L. Osborne. 2013. Chemical class rotations for control of *Bemisia tabaci* (Hemiptera: Aleyrodidae) on poinsettia and their effect on cryptic species population composition. Abstract. Entomology Society of America Annual Meeting. November 2013, Austin, TX.

Novack, S. IR-4 Newsletter, Winter Vol. 44 no1

Novack, S. IR-4 Newsletter, Spring Vol. 44 no 2

Novack, S. IR-4 Newsletter, Summer Vol. 44 no3

Novack, S. IR-4 Newsletter, Fall Vol. 44 no 4

Palmer, C. L. 2013. Impatiens Downy Mildew. Presentation for New Jersey Nursery and Landscape Association. February 19, 2013.

Palmer, C.L. 2013. IR-4: 50 Years and Counting. Presentation and Proceedings for SAF Pest & Production Management Conference, February, 2013.

Palmer, C.L., 2013. Three Rogues: Boxwood Blight, Impatiens Downy Mildew & Rose Rosette. Presentation for New Jersey Nursery and Landscape Association. October 28, 2013.

Palmer, C.L., 2013. Spotlight on Ornamentals: Rose Rosette Disease. IR-4 Newsletter. Vol. 44. No. 2. Spring 2013.

Palmer, C.L., 2013. Spotlight on Ornamentals: Time to Think Spring! IR-4 Newsletter. Vol. 44. No. 3. Fall 2013.

Palmer, C.L., 2013. Ornamental Horticulture Workshop & Tour. IR-4 Newsletter. Vol. 44. No. 4. Fall 2013.

Palmer, C.L., and L. Schmale. 2013. Invasives of Concern – Chrysanthemum White Rust. Presentation for SAF Pest & Production Management Conference, February, 2013.

Palmer, C.L., J. Baron, E. Vea and E. Lurvey. 2013. Update on 2012 Weed Science Research in the IR-4 Ornamental Horticulture Program. Proceedings of the 67th Northeastern Weed Science Society. February 2013.

Starner, V.R., J.J. Baron and D.L. Kunkel. 2013. Invited lecture "The IR-4 Project at Rutgers" 3/11/13 in Rutgers Entomology course "Agricultural Entomology and Pest Management" taught by Dr. George Hamilton.

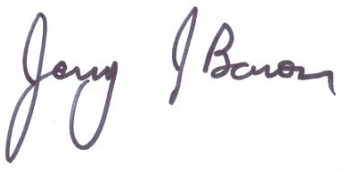
Starner, V.R., J.J. Baron and D.L. Kunkel. 2013. Invited presentation "IR-4 Update from Headquarters" at the IR-4 Western Region SLR Meeting, Santa Cruz, CA, 3/26-27/2013.

Starner, V. and S. Novack, 2013. Beyond the Battlefield II – apples to watercress! IR-4/EPA/USDA Field Tour June 26, 2013 tour book. New Jersey Agricultural Experiment Station Publication No. P-27200-22-13, 16 pp.

Valencia-Botin, A. J., S. N. Jeffers, C. L. Palmer, J. W. Buck. 2013. Fungicides Used Alone, in Combinations, and in Rotations for Managing Gladiolus Rust in Mexico. Plant Disease 97:1491-1496. http://cd.coi.org/10.1094/PDIS-03-13-0272-RE.

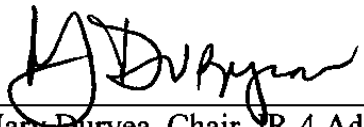
Valencia-Botin, A. J., J. W. Buck, S. N. Jeffers, C. L. Palmer. 2013. Resistance of gladiolus cultivars to *Uromyces transversalis* in field trials in Mexico: Preliminary results. Abstract. American Phytopathology Society Annual Meeting. Phytopathology 103(Suppl. 2):S2.151.

Approved by:



J.J. Baron, Executive Director
IR-4 Project, NJ Agricultural Experiment Station
Rutgers, The State University of New Jersey

D. Soderlund, Chair,
IR-4 Project Management Committee
Cornell University



Mary Duryea, Chair, IR-4 Administrative Advisers
University of Florida

ATTACHMENT 1

Participants in the Process

Stakeholder Representatives

These are the primary customers for IR-4 Project services. A concerted effort is always made to seek input from growers/commodity group representatives for establishing research priority setting policies. The **IR-4 Commodity Liaison Committee (CLC)** provides input to the IR-4 Project Management Committee on overall operations and program direction. They are often effective communicators to Congress on the importance of the IR-4 Project and its deliverables to specialty crop agriculture in the United States. Members include:

Dr. Michael Aerts, Florida Fruit and Vegetable Association
Mr. Mark Arney, Nat'l Watermelon Promotion Board
Mr. Kirk Baumann, Ginseng Board of Wisconsin
Dr. Lori Berger, Ag Business Resources
Dr. Joe Bischoff, AmericanHort
Dr. Michael Bledsoe, Village Farms, L.P.
Dr. A. Richard Bonanno, Pleasant Valley Farms and CLC Chair
Mr. Bruce Buurma, Buurma Farms Inc.
Mr. James R. Cranney, California Citrus Quality Council
Dr. Brian R. Flood, Del Monte USA
Ms. Ann E. George, Washington Hop Commission
Mr. Hank Giclas, Western Growers Association
Mr. Terry Humfeld, Cranberry Institute
Mr. John Keeling, National Potato Council
Mr. Phil Korson, Cherry Marketing Institute
Mr. Rocky Lundy, Mint Industry Research Council
Mr. Eric Maurer, Engage Agro
Mr. Armando Monterraso, Brooks Tropicals
Ms. Laura Phelps, American Mushroom Institute
Mr. Ray Prewett, Texas Vegetable Association
Mr. Ray Ratto, Ratto Brothers
Ms. Lin Schmale, Society of American Florists
Mr. Todd Scholz, USA Dry Pea & Lentil Council
Dr. Alan Schreiber, Agriculture Development Group, Inc.
Dr. Marc Teffeau, AmericaHort.
Mr. Dave Trinka, MBG Marketing
Mr. Tyler Wegmeyer, American Farm Bureau Federation

Cooperating Government Departments and Agencies

Agriculture and Agri Food Canada (CN-PMC)
American Public and Land Grant University Association (APLU)
Health Canada
State Agricultural Experiment Stations/Land Grant Universities (SAES)
State of California Department of Pesticide Regulation (DPR)
U.S. Department of Agriculture, National Institute of Food and Agriculture (NIFA)
U.S. Department of Agriculture, Agricultural Research Service (ARS)
U.S. Department of Agriculture, Foreign Agriculture Service (FAS)
U.S. Department of Agriculture, Animal and Plant Health Inspection Service (APHIS)
U.S. Department of Defense, Deployed Warfighter Protection Program (DWFP)
U.S. Environmental Protection Agency (EPA)

ATTACHMENT 1 Continued

Crop Protection Industry

AgBio Development Inc.
AgraQuest Inc.
Agrimar
AgroSource Inc.
Albaugh, Inc.
Amvac Chemical Corporation
Arkion Life Sciences
Arysta LifeScience North America Corp.
BASF Corporation
Bayer CropScience USA
Bayer Environmental Science
BioBest
Bioworks
Certis USA
Cheminova
Chemtura AgroSolutions
Cleary Chemical
Dow AgroSciences
DuPont Agricultural Products
Engage Agro
FMC Corporation
Gowan Company
Isagro, USA
ISK Biosciences
Janssen Pharmaceutica
K-I Chemical USA Inc.
MGK
Landis International
Lonza Inc.
Makhteshim-Agan N.A. Inc.
Marrone BioInnovations, Inc.
Monsanto Company
Natural Industries
Neudorff
Nichino America, Inc.
Nisso America, Inc.
Novozymes, Inc.
Nufarm Americas, Inc.
OHP
Sankyo Agro Co., Ltd.
SePro Corporation
Sipcam Advan
Summerdale, Inc.
Syngenta Crop Protection Inc.
Syngenta Flowers
TKI Novasource
UPI
Valent Bioscience
Valent Professional Products
Valent USA Corporation
Willowood USA

IR-4 PARTICIPANTS

Project Management Committee (PMC):

Dr. Jerry Baron, IR-4 Project Headquarters – IR-4 Project Executive Director
Dr. A. Richard Bonanno, Bonanno Farm Trust and CLC Chair
Dr. Douglas Buhler, Michigan State University – Administrative Advisor, North Central Region
Dr. Mary Delany, University of California, Davis - Administrative Advisor, Western Region
Dr. Mary Duryea, University of Florida - Administrative Advisor, Southern Region
Dr. Robert Hollingworth, Michigan State University – Regional Director, North Central Region
Dr. Monte Johnson, USDA-NIFA
Dr. Maurice Marshall, University of Florida - Regional Director, Southern Region
Dr. Daniel Rossi, Rutgers University - Administrative Advisor, Northeast Region
Dr. Sally Schneider, USDA-ARS - Administrative Advisor, ARS
Dr. Paul Schwartz, Jr. USDA-ARS – Director Minor Use Program
Dr. David Soderlund, Cornell University - Regional Director, Northeast Region & PMC Chair
Dr. Ronald Tjeerdema, University of California, Davis - Regional Director, Western Region

ATTACHMENT 1 Continued

IR-4 Project Headquarters (HQ)

IR-4 Headquarters is located at the 500 College Road East, Suite 201W, Princeton, NJ 08540; (732) 932-9575

Dr. Marija Arsenovic – Manager, Weed Science Activities/Study Director
Ms. Tammy Barkalow – Assistant Director, Quality Assurance
Mr. Bill Barney – Manager, Crop Grouping/Study Director
Dr. Jerry Baron – Executive Director
Dr. Michael Braverman – Manager, Biopesticides and Organic Support Program
Ms. Uta Burke – Administrative Support
Dr. Debbie Carpenter – Assistant Director, Registrations
Dr. Johannes Corley – Study Director/Research Coordinator
Dr. Keith Dorschner – Manager, Entomology Activities/Study Director
Ms. Cheryl Ferrazoli – Administrative Support
Ms. Jane Forder – Quality Assurance
Ms. Kathryn Hackett-Fields – Quality Assurance (partial year)
Ms. Lori Harrison – Administrative Support (partial year)
Ms. Kathryn Homa – Study Director/Research Coordinator
Ms. Shiayi Huang - Database Developer
Ms. Diane Infante – Data Manager and Administrative Support
Ms. Carolyn Jolly – Study Director/Research Coordinator
Dr. Daniel Kunkel – Associate Director, Food & International Program**s**
Ms. Grace Lennon – Study Director/Research Coordinator
Mr. Raymond Leonard – Study Director/Research Coordinator
Dr. Karl Malamud-Roam – Manager, Public Health Pesticides Program
Ms. Sherri Nagahiro – Business Manager
Ms. Sherri Novack – Manager, Communications and Outreach
Dr. Cristi Palmer – Manager, Ornamental Horticulture Program
Ms. Bharti Patel – Quality Assurance (partial year)
Mr. Kenneth Samoil – Study Director/Research Coordinator
Ms. Karen Sims – Administrative Support
Dr. Van Starner – Assistant Director, Research Planning & Outreach
Ms. Juliet Thompson – Administrative Support
Dr. Ely Vea – Assistant, Ornamental Horticulture Program
Ms. Jennifer Wain – Research Assistant, Public Health Pesticides

Field Coordinators (Regional and ARS)

Ms. Edith Lurvey, Cornell University – Northeast Region
Dr. Satoru Miyazaki, Michigan State University – North Central Region
Dr. Michelle Samuel-Foo, University of Florida – Southern Region
Dr. Paul Schwartz Jr., USDA-ARS – ARS Office of Minor Use Pesticides
Ms. Rebecca Sisco, University of California, Davis – Western Region

Laboratory Coordinators (Regional and ARS)

Dr. Wlodzimierz (Wlodek) Borejsza-Wysocki, University of Florida – Southern Region
Ms. Sue Erhardt, Michigan State University – North Central Region
Mr. Thomas Hendricks, USDA-ARS – Tifton, GA
Dr. Matt Hengel, University of California, Davis – Western Region
Mr. T. Todd Wixson, USDA-ARS – Wapato, WA

ATTACHMENT 1 Continued

Regional Quality Assurance Unit Coordinators

Ms. Barbara Anderson, Cornell University – Northeast Region (partial year)
Dr. Martin Beran, University of California, Davis – Western Region
Dr. Zhongxiao (Michael) Chen, Michigan State University – North Central Region
Ms. Michele Humiston, Cornell University – Northeast Region (partial year)
Ms. Kathleen Knight, University of Florida – Southern Region

Additional Technical Staff

Ms. Robin Adkins – Quality Assurance, Southern Region
Mr. Brian Bowman – Quality Assurance, North Central Region
Ms. Elizabeth Culbert – IR-4 Satellite Laboratory, Washington State University
Mr. Stephan Flanagan – Assistant Regional Field Coordinator, Western Region
Dr. Vince Hebert – Manager, IR-4 Satellite Laboratory, Washington State University
Ms. Regina Hornbuckle – Quality Assurance USDA-ARS
Dr. Bryan Jensen – Quality Assurance Participant, University of Wisconsin
Dr. Kenneth Kanagalingam – Quality Assurance Consultant
Dr. Derek Killilea – Quality Assurance Consultant
Dr. Q. Li - Manager, IR-4 Satellite Laboratory, University of HI
Ms. Mary Lynn – Quality Assurance Consultant
Mr. James McFarland, Quality Assurance, Western Region
Ms. Sherita Normington – Associate Quality Assurance, Western Region
Ms. Mika Pringle Tolson – Field Program Assistant, Western Region
Dr. Yavuz Yagiz – Analytical Quality Assurance, Southern Region

State and Federal IR-4 Liaisons Representatives

Northcentral Region

Dr. S. Clay	SD
Dr. R. Cloyd	KS
Dr. D. Doohan	OH
Dr. D. Egel	IN (Co-Liaison)
Dr. R. Groves	WI
Dr. R. Hartzler	IA
Dr. D. Heider	WI
Dr. T. Jordon	IN (Co-Liaison)
Dr. S. Kamble	NE
Dr. C. Krause	USDA-ARS
Dr. V. Krischik	MN
Dr. S. Miyazaki	MI
Dr. M. Reding	USDA-ARS
Dr. D. Williams	IL
Dr. M. Williams	USDA-ARS
Dr. R. Zollinger	ND
VACANT	MO

Northeast Region

Dr. E. Beste	MD
Dr. N. Brazee	MA
Ms. H. Faubert	RI
Dr. D. Frank	WV
Dr. A. Hazelrigg	VT
Dr. G. Krawczyk	PA
Dr. B. Kunkel	DE
Dr. J. Locke	USDA-ARS

ATTACHMENT 1 Continued

Northeast Region (Continued)

Ms.	E.	Lurvey	NY
Dr.	T.	Mervosh	CT
Dr.	W.	Reissig	NY
Dr.	C.	Rodriguez-Saona	NJ
Ms.	C.	Smith	NH
Dr.	R.	Webb	USDA-ARS
Dr.	D.	Yarborough	ME

Southern Region

Dr.	R.	Bessin	KY
Dr.	N.	Burgos	AR
Dr.	S.	Culpepper	GA
Dr.	R.	Davis	USDA-ARS
Ms.	A.	Fulcher	TN
Dr.	C.	Gilliam	AL
Dr.	A.	Henn	MS
Mr.	C.	Luper	OK
Mr.	M.	Matocha	TX
Dr.	D.	Monks	NC
Dr.	W.	Robles Vasquez	PR
Dr.	M.	Samuel-Foo	FL
Dr.	A.	Simmons	USDA-ARS
Dr.	M.	Weaver	VA
Mr.	T.	Webster	USDA-ARS

Western Region

Dr.	R.	Boydston	USDA-ARS
Dr.	M.	Burrows	MT
Mr.	M.	Craig	NM
Mr.	J.	Davison	NV
Mr.	J.	DeFrancecso	OR
Dr.	M.	Ferrell	WY
Dr.	R.	Hirnyck	ID
Dr.	P.	Kaspari	AK
Dr.	M.	Kawate	HI
Dr.	R.	Miller	GU
Dr.	J.	Munyaneza	USDA-ARS
Dr.	S.	Nissen	CO (Acting)
Dr.	J.	Palumbo	AZ
Dr.	C.	Ransom	UT
Ms.	R.	Sisco	CA
Dr.	D.	Walsh	WA

Regional Field Research Directors

Northcentral Region

S. Chapman	WI
M. Ciernia	ND
S. Clay	SD
M. Hausbeck	MI
D. Heider	WI
B. Jenks	ND
D. Stamm	NE
J. Wise	MI
B. Zandstra	MI

ATTACHMENT 1 Continued

Northeastern Region

R. Bellinder	NY
J. Collins	ME
T. Freiberger	NJ
B. Gugino	PA
B. Majek	NJ
M. McGrath	NY
M. Ross	MD
M. Sylvia	MA
D. Yarborough	ME

Southern Region

R. Batts	NC
N. Burgos	AR
L. Gregg	TX
B. Huffman	FL
R. Olzack	FL
D. Studstill	FL

Western Region

M. Bari	CA
B. Boutwell	CA
J. Coughlin	HI
M. Craig	NM
J. DeFrancesco	OR
D. Ennes	CA
M. Feliciano Riveri	PR
D. Groenendale	WA
J. Kam	HI
G. Koskela	OR
T. Lanini	CA
W. Meeks	ID
D. Morishita	ID
C. Oman	CO
K. Skiles	CA
D. Stewart	CA
P. Sturman	OR
R. Zapien	CA

ARS

S. Benzen	CA
R. Boydston	WA
B. Fraelich	GA
J. Harvey	WA
L. Horst	OH
P. Wade	SC

Canada

T. Abiola	AB
M. Clodius	BC
M. Dombrowsky	ON
J. Dubuc	QC
R. Hadd	QC
T. Jobin	QC
H. Peill	NS
G. Riddle	ON
D. Ulrich	SK
M. Weber-Henricks	ON
R. Wismer	ON

ATTACHMENT 2
2013 Food Use Research Projects – Residue Trials

CHEMICAL	CROP	PR #
• Abamectin	Carrot	10893
• Acequinocyl	Avocado	9218
• Acequinocyl	Bean (Dried Shelled)	8675
• Acequinocyl	Squash (Summer)	8608
• Acetochlor	Bean & Pea (Succulent)	10214
• Benzovindiflupyr	Onion (Dry Bulb)	11130
• Bifenthrin	Apple	11016
• Bifenthrin	Avocado	10578
• Bifenthrin	Grapefruit	11165
• Bifenthrin	Greens (Mustard)	8490
• Bifenthrin	Lemon	11164
• Bifenthrin	Orange	11166
• Bifenthrin	Peach	11017
• Carbaryl	Cranberry	10789
• Carfentrazone-ethyl	Asparagus	10278
• Chlorothalonil	Cherry (Sour)	10859
• Clethodim	Almond	11093
• Clethodim	Pecan	11094
• Clomazone	Asparagus	10279
• Clomazone	Cilantro	11092
• Clomazone	Cucurbit Vegetables	11063
• Cyantraniliprole (HGW86)	Caneberry	11046
• Cyantraniliprole (HGW86)	Coffee	10874
• Cyantraniliprole (HGW86)	Strawberry	10328
• Cyazofamid	Hops	9823
• Cyprodinil + Fludioxonil	Carambola	7125
• Difenoconazole + Azoxystrobin	Cranberry	10828
• Diquat	Guava	10817
• Diquat	Sugar Apple	10814
• DPX-QGU42	Subgroup 05B	11125
• Ethaboxam (V-10208) + Fluopicolide	Potato	11113
• Ethofumesate	Beet (Sugar)	11126
• Etoxazole	Corn (Sweet)	11099
• Famoxadone + Cymoxanil	Ginseng	10812
• Fenpyroximate	Banana	10008
• Fenpyroximate	Celery	11100
• Fenpyroximate	Squash (Summer)	9033
• Fenpyroximate	Watermelon	11182
• Flonicamid	Pea (Eddible Podded & Succulent Shelled)	10472
• Fluazifop-p-butyl	Grasses (Seed Crop)	9825
• Fluenfulfone	Beet (Sugar)	10908
• Fluenfulfone	Potato	10904
• Flumioxazin	Artichoke (Globe)	10864
• Flumioxazin + Pyroxafulfone	Grasses (Seed Crop)	10885
• Flumioxazin + Pyroxafulfone	Sweet Potato	11120
• Fluopicolide	Grapefruit	11022
• Fluopicolide	Lemon	11110
• Fluopicolide	Orange	11021
• Flupyradifurone (BYI 02960)	Pepper (Bell & Non-Bell (GH)	11244
• Flupyradifurone (BYI 02960)	Prickly Pear Cactus	11188
• Fomesafen	Bean (Lima) (Succulent)	6202
• FTH 545	Cantaloupe	11158
• FTH 545	Cucumber	11156
• FTH 545	Squash (Summer)	11157
• Fungicide (TBD)	Fruiting Vegetables	10711
• Halosulfuron	Cucumber	10891
• Indaziflam	Blueberry (High Bush)	10882
• Indaziflam	Caneberry	10909
• Indaziflam	Hops	11071
• Ipconazole	Onion (Seed TRT)	11111
• Isoxaben	Apple	7603
• Lambda-Cyhalothrin + Thiamethoxam	Guava	6684
• Metaldehyde	Hops	11038
• Nitrapyrin	Broccoli	2188
• Nitrapyrin	Cabbage	2022
• Nitrapyrin	Greens (Mustard)	2660
• Nitrapyrin	Lettuce (Head & Leaf)	2659
• Nitrapyrin	Spinach	2658
• Novaluron	Lychee	10956
• Pendimethalin	Caneberry	9840
• Penflufen	Onion	10865
• Penoxsulam + Oxyfluorfen	Pome Fruits	10944
• Penoxsulam + Oxyfluorfen	Stone Fruits	10899
• Prometryn	Sesame	11178
• Propamocarb-Hcl	Guava	7171
• Propiconazole	Avocado	11053
• Propiconazole + Chlorothalonil	Tomato (GH)	11078
• Spirotetramat	Carrot	10788
• Pyrethrins + PBO	Coffee	5923
• Pyrethrins + PBO	Crop Group 12	10852
• Pyroxasulfone	Sunflower	10932
• Pyroxasulfone	Mint	10792
• Quinclorac	Caneberry	10436
• Saflufenacil	Pomegranate	10786
• S-Metolachlor/ Metolachlor	Chicory (Roots & Tops)	10480
• S-Metolachlor/ Metolachlor	Rosemary	10819
• Spinosad	Onion (Dry Bulb)	10988
• Sulfentrazone	Edamame (vegetable Soybean)	10750
• Sulfoxaflor	Sunflower	11095
• Tolfenpyrad	Cucumber (GH)	10842
• Zeta-Cypermethrin	Basil	8397

ATTACHMENT 3 - 2012 Efficacy/Crop Safety (E/CS) Research Program

Research to complete E/CS needs for 2010-2012 residue studies:

Chemical	Crop	PR#	Comments	ARS trials	State trials
s-metolachlor	chicory	10480	2011 residue study	WA	NE
penflufen	dry bulb onion	10865	2012 seed treatment residue study	WA, OH	--
sulfentrazone	edamame	10750	not a residue study - need E/CS data to add crop to label	OH, WA, WA	AR, NY
penoxsulam + oxyfluorfen	cherry	10899	need E/CS data before reg.	WA, WA	--
pendimethalin	caneberry	09840	2011 residue study; multi-year CS trials	--	NC
quinclorac	caneberry	10436	2010 residue study; multi-year CS trials	--	NC
mesotrione	grape	09786	2011 residue study; multi-year CS trials	--	CA, MI
flufenacet + metribuzin	timothy hay	10372	covered by grass tolerance; need 1 more CS trial	WA	--
carfentrazone-ethyl	asparagus	10278	2010-11 residue study	--	NJ
clomazone	asparagus	10279	2012 residue study	--	NJ, NC, MI, CA
cyprodinil + fludioxonil	carambola	07125	tolerance covered by guava; need E/CS data to add crop to label	--	PR
propamocarb	guava	07171	2011-2012 residue study	--	FL

Research to complete E/CS needs for new 2013 residue studies:

Chemical	Crop	PR#	Comments	ARS trials	State trials
DPX-QGU42	leafy Brassica	11125	2013 residue study	SC, GA, OH	--
fomesafen	lima bean	06202	2013 residue study	OH	WI, MD, AR, ID
propiconazole + chlorothalonil	GH tomato	11078	2013 residue study; E/CS focus was crop safety with PPZ	--	CA, MD
indaziflam	high bush blueberry	10882	2013 residue study; multi-year CS trials	GA	OR, NC, MI
clomazone	cilantro	11092	2013 residue study	SC	AR, MD
clomazone	dill	11091	2013 residue study	SC	MD
s-metolachlor	rosemary	10819	2013 residue study	SC	--

Research for 2012 PPWS (Pest Problem Without Solution) study:

Chemical	Crop	PR#	Comments	ARS trials	State trials
Fungicides	tomato	10711	timber rot control	--	NY, PA

ATTACHMENT 4 - 2013 Submissions to EPA, Registrants, and State Depts. of Agriculture

Pest Control Agent / Type*		Commodity or Crop Group	PR#	Date
Pyrifluquinazon	I	Lettuce	11202	Jan 21 2013
Pyrifluquinazon	I	Pepper	10555	Jan 21 2013
Pyrifluquinazon	I	Tomato (greenhouse)	10126	Jan 21 2013
Acetamiprid	I	Corn, sweet	10216	Jan 30 2013
Fenamidone[1]	F	Bean, succulent	09530 08895	Feb 03 2013
		Ginseng	09800	
		Onion, bulb, subgroup 3-07A	10351	
		Onion, green, subgroup 3-07B	10352	
Vegetable, leaves of root and tuber, group 2 revision			41 crops vs 16 currently	Mar 18 2013
Fomesafen	H	Bean, lima	A6202	Mar 19 2013
Chlorantraniliprole	I	Onion, green, subgroup 3-07B	A10204	Apr 02 2013
		Fruit, stone, group 12-12, except Cherry, Chickasaw plum, and Damson plum	11200	
		Papaya Passionfruit	B10204	
		Nut, tree, group 14-12	11201	
		Spice subgroup 19B	A10204	
Abamectin	I	Caneberry	06475	Apr 22 2013
DPX-QGU42	F	Lettuce	10653	Apr 24 2013
		Pepper	10621	Apr 24 2013
		Cucumber	10618	Apr 26 2013
		Cantaloupe	10620	Apr 30 2013
DPX-QGU42	F	Ginseng	10616	May 02 2013
DPX-QGU42	F	Onion	10617	May 09 2013
Metrafenone	F	Tomato	10467	May 10 2013
Pronamide	H	Lettuce (leaf)	09149	May 13 2013
DPX-QGU42	F	Squash	10619	May 20 2013
Tobacco mild green mosaic tobamovirus (TMGMV)	H	Pasture grass	0364B	May 20 2013
Cyantraniliprole	I	Carrot	10364	May 23 2013
1,3-Dichloropropene	F	Pineapple	09752	Jun 05 2013
Prometryn	H	Parsley	A3618	Jun 20 2013
Saflufenacil	H	Grass (seed)	10884	Jun 20 2013
Vegetable, legume, group 6			45 crops vs 37 currently	Jul 09 2013
Vegetable, foliage of legume, group 7				
Cyantraniliprole (HGW86)	I	Radish	10641	Jul 18 2013
Simazine	H	Currant	05465	Aug 14 2013
Dimethomorph	F	Mustard greens	A7247	Aug 22 2013

ATTACHMENT 4 - 2013 Submissions to EPA, Registrants, and State Depts. of Agriculture Continued

Paraquat	H	Vegetable, tuberous and corm, subgroup 1C	10583	Sep 10 2013
Sulfentrazone	H	Apple	07770	Sep 12 2013
Spinosad	I	Coffee	07331	Sep 11 2013
Spinetoram	I	Coffee	11067 10132	Sep 11 2013
		Berry, low growing, subgroup 13-07G, except blueberry, lowbush, and cranberry	11219	
		Bushberry subgroup 13-07B, except Lingonberry	11220	
		Caneberry subgroup 13-07A	11221	
		Fruit, citrus, group 10-10	11222	
		Fruit, pome, group 11-10	11223	
		Fruit, small, vine climbing, except fuzzy kiwifruit, subgroup 13-07F	11224	
		Fruit, stone, group 12-12	11225	
		Nut, tree, group 14-12	11226	
		Onion, bulb, subgroup 3-07A	11227	
		Onion, green, subgroup 3-07B	11228	
		Vegetable, fruiting, group 8-10	11229	
		Cottonseed subgroup 20C	11230	
Saflufenacil	H	Olive	10787	Sep 12 2013
Cyazofamid	F	Tomato (greenhouse)	10656	Sep 30 2013
Metrafenone	F	Peach	10369	Sep 30 2013
		Cherry	10370	
		Hops	10466	
		Cantaloupe	10477	
		Summer Squash	10478	
		Cucumber	10479	
Pendimethalin	H	Hops	10244	Oct 16 2013
		Onion, bulb, subgroup 3-07A	11353	
		Onion, green, subgroup 3-07B	11354	
		Vegetable, fruiting, group 8-10	11355	
		Fruit, citrus, group 10-10	11356	
		Fruit, pome, group 11-10	11357	
		Fruit, stone, group 12-12	11358	
		Berry, low growing, subgroup 13-07G	11359	
		Sunflower subgroup 20B	11360	
Boscalid + Pyraclostrobin	F	Herb subgroup 19A Dill, seed	08792 08793 08691	Oct 30 2013
		Fruit, stone, group 12-12	11384	
		Nut, tree, group 14-12	11385	
Metconazole	F	Bean, dry	10388	Oct 02 2013
Propiconazole	F	Radish	06385	Oct 21 2013
Dimethomorph	F	Bean, lima	A7261	Oct 21, 2013
Fluazifop-p-butyl	H	Coffee (storage stability in processed commodities)	A3432	Nov 04 2013

ATTACHMENT 4 - 2013 Submissions to EPA, Registrants, and State Depts. of Agriculture Continued

Mefenoxam + Copper	F	Caneberry (decline trials)	C1169	Nov 04 2013
Metaldehyde	M	Vegetable, legume, edible podded, subgroup 6A	10334	Dec 18, 2013
		Pea and bean, succulent shelled, subgroup 6B	10333 10667	
		Vegetable, foliage of legume, except soybean, subgroup 7A	10334	
		Clover, forage and hay	10105	
		Ginseng	10704	
		Tomato subgroup 8-10A	11401	
		Fruit, citrus, group 10-10	11402	

*F=fungicide, H=herbicide, I=insecticide/acaricide, M=molluscide, P=plant growth regulator, R=rodenticide
[1]Joint submission with Agriculture and AgriFood Canada.

Reduced Risk Requests for Petitions Submitted to EPA

Pest Control Agent / Type*		**Commodity or Crop Group**	**PR#**	**Date**
Acetamiprid	I	Corn, sweet	10216	Jan 30 2013
Flupyradifurone	I	Bushberry subgroup 13-07B Prickly pear cactus Animal feed, nongrass, group 18	---	May 15 2013
Spinosad	I	Coffee	07331	Sep 11 2013
Spinetoram	I	Coffee	11067 10132	Sep 11 2013

*F=fungicide, H=herbicide, I=insecticide/acaricide, M=molluscide, P=plant growth regulator, R=rodenticide

Commodities Requested in Submission to JMPR for Establishment of Codex MRL values

Pest Control Agent / Type*		**Commodity**	**Date**
Fenamidone	F	Bean, lima Bean, snap Carrot Ginseng Sunflower	Dec 2013
Propamocarb	F	Bean, lima	Dec 2013
Spirodiclofen	I	Guava Bushberry Sugar apple Lychee	Dec 2013
Diclobenil**	H	Cranberry	Dec 2013
Dimethomorph**	F	Bean, lima; mustard greens;	Dec 2013
Imazamox**	H	Beans all types	Dec 2013
Mesotrione**	H	Cranberry	Dec 2013
Metrafenone**	F	Tomato, squash, melon	Dec 2013
Pymetrozine**	I	Asparagus	Dec 2013

*F=fungicide, H=herbicide, I=insecticide/acaricide, M=molluscide, P=plant growth regulator, R=rodenticide
**IR-4 data submitted by manufacture

ATTACHMENT 5 – IR-4 Project Tolerance Successes in 2013

Permanent Tolerances Published in the Federal Register

Pest Control Agent / Type*		Date	Commodity or Crop Group	PR#	No. of Uses	No. of Tolerances
Thiacloprid	I	Feb 06 2013	Peach subgroup 12-12B**	07811	2	1
			Cherry subgroup 12-12A**	07812	5	1
			Plum subgroup 12-12C**	08038	15	1
Fenpyrazamine	F	Mar 06 2013	Bushberry subgroup 13-07B	09445	19	1
			Caneberry subgroup 13-07A	09444	5	1
			Ginseng	09453	1	1
			Pistachio	09452	1	1
Emamectin benzoate	I	Mar 27 2013	Vegetable, cucurbit, group 9	06987 08939 08940 08941	14	1
Clothianidin	I	Mar 29 2013	Tea	10876	1	1
Flumioxazin	H	Apr 05 2013	Artichoke, globe**	09815	1	1
			Cabbage Cabbage, Chinese, Napa (registration for tight-headed varieties only)	09519	3	2
			Olive**	08670	1	1
			Pomegranate**	08671	1	1
			Prickly pear cactus	08647	1	2
Glyphosate	H	May 01 2013	Berry and small fruit, group 13-07[1] (also replaces 7 individual tolerances)	11014	30	1
			Carrot	01243	1	1
			Fruit, citrus, group 10-10[1]	11012	14	1
			Fruit, pome, group 11-10[1]	11013	5	1
			Oilseed group 20, except canola**	06159 07210 08672 10670	31	1
			Teff, forage and hay**	10528	1	2
			Vegetable, bulb, group 3-07[1]	11010	15	1
			Vegetable, fruiting, group 8-10, except okra[1]	11011	11	1
Spirotetramat[7]	I	May 15 2013	Artichoke, globe**	10243	1	1
			Berry, low growing, except strawberry, subgroup 13-07H†	10198	8	1
			Bushberry subgroup 13-07B†	10194	19	1
			Coffee**	10041	1	2
			Fruit, citrus, group 10-10[1†]	10929	14	1
			Fruit, pome, group 11-10[1†]	10930	5	1
			Pineapple**	10635	1	1
			Pomegranate**	10113	1	1
			Taro, leaves**	10581	1	1
			Vegetable, bulb, group 3-07**	09983 10942	26	1
			Vegetable, fruiting, group 8-10[1**]	10928	21	1
			Watercress**	09948	1	1
NAA	P	May 22 2013	Avocado **	09660	1	1
			Mango ** Mamey sapote **	09701	2	2
			Rambutan **	08666	1	1
			Fruit, pome, group 11-10[1 **]	10955	5	1

ATTACHMENT 5 – IR-4 Project Tolerance Successes in 2013 Continued

Permanent Tolerances Published in the Federal Register

Pest control Agent/ Type*		Date	Commodity or Crop Group	PR #	No. of Uses	No. of Tolerances
Propamocarb	F	Jun 05 2013	Bean, lima, succulent	07263	1	1
Imidacloprid	I	Jun 05 2013	Fish Fish-shellfish, mollusk	10553	1	2
Fenpyroximate	I	Jun 17 2013	Vegetable, tuberous and corm, subgroup 1C **	10173	17	1
			Fruit, stone, group 12-12 **	10438 10468 10469	22	1
			Fruit, small, vine climbing, except fuzzy kiwifruit, subgroup 13-07F[2] **	11028	5	1
Acetamiprid	I	Jun 19 2013	Corn, sweet **	10216	1	3
Ethalfluralin	H	Jul 03 2013	Rapeseed subgroup 20A[2] Sunflower subgroup 20B[2]	10550	27	2
Hexythiazox	I	Jul 17 2013	Pepper/Eggplant subgroup 8-10B	09134	10	1
			Fruit, pome, group 11-10[1] **	10961	5	1
			Caneberry subgroup 13-07A[1] **	10962	1	1
			Fruit, small, vine climbing, except fuzzy kiwifruit, subgroup 13-07F[2]	10963	6	1
			Berry, low growing, subgroup 13-07G[2] **	10964	9	1
Imazosulfuron	H	Jul 24 2013	Vegetable, tuberous and corm, subgroup 1C	09645	17	1
			Melon subgroup 9A	09819	3	1
Trifluralin	H	Jul 31 2013	Oilseed group 20[2]	10749	29	1
Halosulfuron-methyl	H	Aug 28 2013	Artichoke, globe **	09930	1	1
			Caneberry subgroup 13-07A **	09793	5	1
Pyraclostrobin	F	Aug 28 2013	Artichoke, globe	09689	1	1
			Endive, Belgium**	A8662	1	1
			Persimmon	09093	1	1
			Vegetable, bulb, group 3-07[1]	10560	15	1
			Vegetable, fruiting, group 8-10[1]	10561	12	1
			Fruit, citrus, group 10-10[1]	10566	14	1
			Fruit, pome, group 11-10[1]	10567	5	1
			Caneberry subgroup 13-07A[1]	10562	1	1
			Bushberry subgroup 13-07B[1]	10563	14	1
			Fruit, small, vine climbing, except fuzzy kiwifruit, subgroup 13-07F[2]	10564	5	1
			Berry, low growing, subgroup 13-07G[2]	10565	8	1
			Oilseed group 20[2]	10568	2	1
Prometryn	H	Sep 11 2013	Bean, snap, succulent	08978	1	1
			Dill (replaces tolerance with regional restrictions)	A3040	1	3
Quinoxyfen	F	Sep 18 2013	Berry, low growing, subgroup 13-07G[2]	11065	8	1
			Fruit, small, vine climbing, except fuzzy kiwifruit, subgroup 13-07F[2]	11064	5	1
			Vegetable, fruiting, group 8-10[3]	09289	19	1
Chloran-traniliprole	I	Sep 18 2013	Fruit, citrus, group 10-10[1] **	11036	14	1
			Fruit, pome, group 11-10[1] **	11037	4	1
			Grain, cereal, except rice and corn, group 15 and group 16 **	10204	12	2

ATTACHMENT 5 – IR-4 Project Tolerance Successes in 2013 Continued

Permanent Tolerances Published in the Federal Register

Pest control Agent/ Type*		Date	Commodity or Crop Group	PR #	No. of Uses	No. of Tolerances
Methoxyfenozide	I	Oct 02 2013	Herb subgroup 19A, except chives	07241	39	1
			Date	10154	1	1
			Caneberry subgroup 13-07A	10470	5	1
			Sorghum, sweet and grain Grain, aspirated fractions	07525	2	8
			Pea and bean, dried shelled, except soybean, subgroup 6C, except Pea, blackeyed, seed and Pea, southern, seed[4]	11149	0	1
			Fruit, small, vine climbing, except fuzzy kiwifruit, subgroup 13-07F[2]	11150	5	1
			Berry, low growing, subgroup 13-07G[2]	11151	8	1
			Fruit, pome, group 11-10[1]	11152	5	1
			Vegetable, fruiting, group 8-10[3]	11153	10	1
			Rapeseed subgroup 20A[6]	11154	0	1
			Sunflower subgroup 20B[6]	11155	0	1
			Atemoya[5]	07065	1	1
			Sugar apple[5]	07066	1	1
			Cherimoya[5]	11173	1	1
			Custard apple[5]	11174	1	1
			Ilama[5]	11175	1	1
			Soursop[5]	11176	1	1
			Biriba[5]	11177	1	1
Fomesafen[7]	H	Nov 01 2013	Bean, lima, succulent	06202	1	1
			Cantaloupe	09536	1	1
			Cucumber	09537	1	1
			Pea, succulent	08083	7	1
			Pumpkin	09115	1	1
			Soybean, vegetable, succulent	10287	1	1
			Squash, summer Squash, winter	09538	11	1
			Watermelon	08945	1	1
Boscalid	F	Nov 08 2013	Artichoke, globe	09689	1	1
			Berry, low growing, subgroup 13-07G, except cranberry[2]	10565	7	1
			Bushberry subgroup 13-07B[1]	10563	14	1
			Caneberry subgroup 13-07A[1]	10562	1	1
			Endive, Belgian**	A8662	1	1
			Vegetable, bulb, group 3-07[1]	10560	15	1
			Fruit, citrus, group 10-10[1]	10566	14	1
			Fruit, pome, group 11-10[1]	10567	5	1
			Fruit, small, vine climbing, except fuzzy kiwifruit, subgroup 13-07F[2]	10564	5	1
			Vegetable, fruiting, group 8-10[1]	10561	12	1
			Oilseed group 20[2]	10568	29	1
			Persimmon	09093	1	1
			Turnip, greens	09423	3	1
Tebuconazole	F	Nov 15 2013	Barley, grain**	A6513	1	1
			Vegetable, cucurbit, group 9**	A5091	14	1
			Vegetable, fruiting, group 8-10[1]	10960	12	1

ATTACHMENT 5 – IR-4 Project Tolerance Successes in 2013 Continued

Permanent Tolerances Published in the Federal Register

Pest control Agent/ Type*		Date	Commodity or Crop Group	PR #	No. of Uses	No. of Tolerances
Fenpropathrin	I	Nov 20 2013	Barley	07667	1	3
			Berry, low growing, subgroup 13-07G[2]	11035	8	1
			Bushberry subgroup 13-07B[1]	11033	11	1
			Fruit, citrus, group 10-10[1]	11031	14	1
			Fruit, pome, group 11-10[1]	11032	5	1
			Fruit, small, vine climbing, except fuzzy kiwifruit, subgroup 13-07F[2]	11034	5	1
			Vegetable, fruiting, group 8-10[1]	11030	12	1
Etofenprox	I	Nov 27 2013	All food commodities[6]	---	0	1
Metaldehyde[7]	M	Nov 27 2013	Grass (grown for seed) **	06267	3	2
			Leaf petioles subgroup 4B **	09421	7	1
			Mint **	09611	2	4
			Taro (wetland) **	07574	1	2
			Corn (field and sweet) **	09655	1	6
			Soybean (regional registration only)**	A9821	1	1
			Caneberry subgroup 13-07A[1 **]	10778	1	1
			Bushberry subgroup 13-07B[1 **]	10779	14	1
			Berry, low growing, subgroup 13-07G[2 **]	10780	8	1
Flonicamid	I	Dec 11 2013	Alfalfa	09943	3	3
			Vegetable, fruiting, group 8-10[1]	11196	11	1
			Fruit, pome, group 11-10[1]	11197	5	1
			Fruit, stone, group 12-12[1]	11198	11	1
			Mint	09358	2	2
Mandipropamid	F	Dec 20 2013	Basil	10124	1	2
			Bean, snap	10324	1	1
			Ginseng	10061	1	1
			Fruit, small, vine climbing, except fuzzy kiwifruit, subgroup 13-07F[2]	11192	5	1
			Onion, bulb, subgroup 3-07A[2]	11193	3	1
			Onion, green, subgroup 3-07B[2]	11194	6	1
			Vegetable, fruiting, group 8-10[1]	10485	11	1
Indoxacarb	I	Dec 27 2013	Bean, dry, seed (includes Cowpea forage and hay)	09669	22	3
			Bean, succulent	08574	14	1
			Berry, low growing, except strawberry, subgroup 13-07H[2]	10340	7	1
			Fruit, small, vine climbing, except fuzzy kiwifruit, subgroup 13-07F[2]	10339	5	1
				Totals	1032	187
*F=fungicide, H=herbicide, I=insecticide/acaricide, M=molluscide, P=plant growth regulator, R=rodenticide						

[1] Update of established tolerance on old crop group or subgroup
[2] Conversion of established tolerance(s) on representative commodities to a crop group or subgroup tolerance
[3] Conversion of established tolerance(s) on representative commodities *and* submission of new data to complete the requirements for a crop group or subgroup
[4] Response to EPA request for Codex harmonization
[5] Establishment of tropical fruit commodity tolerance based on data or established tolerance on a representative commodity
[6] Tolerance for indirect or inadvertent residues
[7] Joint submission with Agriculture and AgriFood Canada.

** These uses have been found on an approved market labels per www.cdms.net or on company website.

[†] Labelling for noted crops is being delayed for pollinator data.

ATTACHMENT 5 – IR-4 Project Tolerance Successes in 2013 Continued

IR-4 Project Tolerance Successes from 2012, where uses are now listed on product labels
(** These uses have been found on an approved market labels per www.cdms.net or on company website.**)**

Pest Control Agent / Type*		Date	Commodity or Crop Group	PR#	No. of Uses	No. of Tolerances
Sulfentrazone	H	Jul 12 2012	Cowpea, succulent (Tennessee only)**	---	1	1
Sulfentrazone	H	Sep 28 2012	Succulent soybean (edamame)**	10750	1	1
Azoxystrobin	F		Rapeseed subgroup 20A (replaces tolerances for canola, crambe, flax, field mustard, Indian mustard, mustard, Indian rapeseed, and rapeseed)**	---	8	1
			Sunflower subgroup 20B (replaces tolerances for safflower and sunflower)**	---	12	1
			Wasabi**	10549	1	2
			Dragonfruit**	10609	1	1
			Potato – Post Harvest**	09860	---	---
Difenoconazole	F	Jul 19 2012	Potato – Post Harvest**	09860	---	---
Acetamiprid	I	Jul 25 2012	Brassica, head and stem, subgroup 5A (replaces tolerance for group 5)**	---	---	1
			Brassica, leafy greens, subgroup 5B (revised use pattern)** Turnip greens**	09271	---	2
			Asparagus**	09905 09939	1	1
			Fruit, citrus, group 10-10 (replaces tolerance for group 10)**	10774	14	1
			Fruit, pome, group 11-10 (replaces tolerance for group 11)**	10775	5	1
			Vegetable, fruiting, group 8-10 (replaces tolerance for group 8)**	10776	12	1
Rimsulfuron	H	Aug 03 2012	Chicory**	09417	1	2
Fludioxonil			Caneberry subgroup 13-07A (replaces tolerance for subgroup 13A)**	10524	1	1
			Bushberry subgroup 13-07B (replaces tolerances for subgroup 13B, juneberry, lingonberry, and salal)**	10079 10525	11	1
			Fruit, small, vine climbing, except fuzzy kiwifruit, subgroup 13-07F**	10526	6	1
			Berry, low growing, subgroup 13-07G, except cranberry (replaces tolerance for strawberry)**	10527	7	1
			Leafy greens subgroup 4A (replaces tolerance for subgroup 4A except spinach)**	10006	1	1
			Potato**	09860	1	1
S-Metolachlor	H	Aug 15 2012	Cilantro Coriander	09595	1	2
			Garden beet leaves	07486	1	1
Cyprodinil	F	Aug 17 2012	Onion, bulb, subgroup 3-07A (replaces tolerance for Onion, bulb)**	10511	3	1
			Onion, green, subgroup 3-07B (replaces tolerance for Onion, green)**	10512	6	1

ATTACHMENT 5 – IR-4 Project Tolerance Successes in 2013 Continued

IR-4 Project Tolerance Successes from 2012, where uses are now listed on product labels
(** These uses have been found on an approved market labels per www.cdms.net or on company website.**)**

			Caneberry subgroup 13-07A (replaces tolerance for subgroup 13A)**	10513	1	1
			Bushberry subgroup 13-07B (replaces tolerances for subgroup 13B, juneberry, lingonberry, and salal)**	10514	11	1
			Fruit, small, vine climbing, except fuzzy kiwifruit, subgroup 13-07F**	10515	6	1
			Berry, low growing, subgroup 13-07G, except cranberry (replaces tolerance for strawberry)**	10516	7	1
			Leafy greens subgroup 4A† (replaces tolerance for subgroup 4A except spinach)**	10006	1	1
			Dragonfruit**	---	1	1
Pendimethalin	H		Melon subgroup 9A**	09397	3	1
Thifensulfuron methyl	F	Aug 29 2012	Chicory**	09417	1	2
Clopyralid	H	Sep 19 2012	Apple**	03623	1	1
			Brassica, leafy greens, subgroup 5B (replaces tolerances on Mustard greens)**	10761	7	1
Glufosinate ammonium	H	Sep 26 2012	Corn, sweet**	06515 06953	1	2
Zeta-Cypermethrin	I	Dec 07 2012	Artichoke, globe**	09365	1	1
			Barley** Buckwheat** Oat** Rye**	08812	4	12
			Avocado** Mango** Papaya** Canistel** Sapodilla** Black sapote** Mamey sapote** Star apple**	09396 08538	8	8
			Pistachio**	10579	1	1
Fenpyroximate	I	Dec 12 2012	Avocado** Mango** Papaya** Canistel** Sapodilla** Black sapote** Mamey sapote** Star apple**	10007	8	8
			Cucumber**	09032	1	1
			Bean, snap, succulent**	09942	1	1
			Vegetable, fruiting, group 8-10 (replaces tolerance for group 8)**	10783	12	1
			Fruit, citrus, group 10-10 (replaces tolerance for group 10)**	10781	14	1
Quinclorac	H	Dec 21 2012	Berry, low growing, except strawberry, subgroup 13-07H**	08000	8	1
			Rhubarb**	10135	1	1

ATTACHMENT 6 – PENDING FOOD PROGRAM SUBMISSIONS
Final Report in Progress (All Data Received at HQ)

PR #	Chemical	Commodity (Full name)
07732	2,4-D	STRAWBERRY (ANNUAL)
00275	2,4-DB	GUAR
08992	2,4-DB	LENTIL
07271	ABAMECTIN	BEAN, LIMA (SUCCULENT & DRIED SHELLED)
05478	ABAMECTIN	BEAN (SNAP)
11057	ABAMECTIN	CITRUS FRUIT GROUP
11058	ABAMECTIN	FRUITING VEGETABLES GROUP
06435	ABAMECTIN	GUAVA
11186	ABAMECTIN	LOW GROWING BERRY SUBGROUP
07831	ABAMECTIN	LYCHEE
04068	ABAMECTIN	ONION (GREEN)
04078	ABAMECTIN	PAPAYA
08439	ABAMECTIN	PINEAPPLE
11242	ABAMECTIN	POME FRUIT GROUP
11184	ABAMECTIN	STONE FRUIT GROUP
11059	ABAMECTIN	SMALL FRUIT VINE CLIMBING SUBGROUP, EXCEPT FUZZY KIWIFRUIT
05076	ABAMECTIN	TOMATO (GH)
11185	ABAMECTIN	TREE NUTS
09600	ACETAMIPRID	CLOVER (RED) (SEED CROP)
11394	ALL PESTICIDES	CUCURBIT VEGETABLES GROUP
11052	ALL PESTICIDES	LEAVES OF ROOT/TUBER GROUP
03735	ATRAZINE	SORGHUM (SWEET)
08052	AVG	CHERRY
08053	AVG	PEACH
08054	AVG	PLUM
11055	AZOXYSTROBIN	BLUEBERRY
10994	AZOXYSTROBIN	TI PALM
09026	BETA-CYFLUTHRIN	FLAX
10002	BIFENAZATE	BANANA
11061	BIFENAZATE	FRUITING VEGETABLES GROUP
11060	BIFENAZATE	POME FRUIT GROUP
10624	BIFENTHRIN + ZETA-CYPERMETHRIN	DRAGON FRUIT (PITAYA)
09338	BROMOXYNIL	MILLET
07997	CAPTAN	GINSENG
10721	CARFENTRAZONE-ETHYL	ARTICHOKE (GLOBE)
10278	CARFENTRAZONE-ETHYL	ASPARAGUS
09427	CARFENTRAZONE-ETHYL	MINT
11145	CARFENTRAZONE-ETHYL	SESAME
10196	CARFENTRAZONE-ETHYL	TEFF

ATTACHMENT 6 – PENDING FOOD PROGRAM SUBMISSIONS
Final Report in Progress (All Data Received at HQ) - Continued

10087	CHLORFENAPYR	BASIL & CHIVES (GH)
10367	CHLOROTHALONIL	ALMOND
10801	CHLOROTHALONIL	CRANBERRY
10164	CHLOROTHALONIL	GRAPEFRUIT
05423	CHLOROTHALONIL	GREENS (MUSTARD)
10100	CHLOROTHALONIL	GUAVA
10165	CHLOROTHALONIL	LEMON
00147	CHLOROTHALONIL	LETTUCE (HEAD & LEAF)
06420	CHLOROTHALONIL	LYCHEE
10163	CHLOROTHALONIL	ORANGE
00148	CHLOROTHALONIL	RADISH
00397	CHLOROTHALONIL	SPINACH
06873	CLETHODIM	APPLE
06876	CLETHODIM	APRICOT
09127	CLETHODIM	BLUEBERRY (LOWBUSH)
10545	CLETHODIM	BULB VEGETABLES SUBGROUP
10210	CLETHODIM	CAMELINA (GOLD-OF-PLEASURE)
06877	CLETHODIM	CHERRY
09748	CLETHODIM	CUPHEA
10543	CLETHODIM	FRUITING VEGETABLES
10373	CLETHODIM	GOJI BERRY
08086	CLETHODIM	HOPS
10546	CLETHODIM	LOW GROWING BERRY SUBGROUP
06878	CLETHODIM	NECTARINE
10544	CLETHODIM	OILSEED CROP GROUP
06874	CLETHODIM	PEAR
06948	CLETHODIM	PLUM
11205	CLETHODIM	STEVIA
09321	CLOFENTEZINE	AVOCADO
10377	CLOTHIANIDIN	CHERRY
11392	CLOTHIANIDIN	FRUITING VEGETABLES GROUP
11391	CLOTHIANIDIN	PEACH SUBGROUP
10376	CLOTHIANIDIN	PLUM
11389	CLOTHIANIDIN	POME FRUIT GROUP
11390	CLOTHIANIDIN	SMALL FRUIT VINE CLIMBING SUBGROUP, EXCEPT FUZZY KIWIFRUIT
11388	CLOTHIANIDIN	TREE NUT GROUP
10199	CYANTRANILIPROLE (HGW86)	CRANBERRY
10313	CYANTRANILIPROLE (HGW86)	CUCUMBER (GH)
10327	CYANTRANILIPROLE (HGW86)	LETTUCE (GH)
10122	CYANTRANILIPROLE (HGW86)	PEPPER (BELL & NONBELL)
10104	CYANTRANILIPROLE (HGW86)	TOMATO (GH)
10640	CYANTRANILIPROLE (SUNFLOWER)	SUNFLOWER (SEED TRT)

ATTACHMENT 6 – PENDING FOOD PROGRAM SUBMISSIONS
Final Report in Progress (All Data Received at HQ) - Continued

10265	CYAZOFAMID	CHIVES
07127	CYPRODINIL + FLUDIOXONIL	GUAVA
10613	CYPRODINIL + FLUDIOXONIL	POMEGRANATE (POST HARVEST)
01548	DCPA	ASPARAGUS
08332	DCPA	CARROT
10245	DCPA	PRICKLY PEAR CACTUS
10446	DIFENOCONAZOLE	GINSENG
11271	DIFENOCONAZOLE + AZOXYSTROBIN	DRAGON FRUIT (PITAYA)
10387	DIFENOCONAZOLE + CYPRODINIL	ARTICHOKE (GLOBE)
10665	DIFENOCONAZOLE + CYPRODINIL	CUCUMBER (GH)
08678	DIFLUBENZURON	ALFALFA
08643	DIFLUBENZURON	CARROT
05526	DIFLUBENZURON	EGGPLANT
08910	DIFLUBENZURON	OKRA
08664	DIFLUBENZURON	PEACH, PLUM
09891	DIFLUBENZURON	PEANUT
10818	DIQUAT	BANANA
10766	DIQUAT	ONION (DRY BULB)
10669	DIQUAT	PEPPER (BELL & NONBELL)
10668	DIQUAT	TOMATO
09737	DIQUAT	WATERCRESS
02399	DIURON	CHERRY
03071	DIURON	PLUM
10837	DPX-QGU42	PEA (SUCCULENT SHELLED)
07137	EMAMECTIN BENZOATE	BASIL
10685	EMAMECTIN BENZOATE	CHERRY
10115	ETHEPHON	FIG
08814	ETHEPHON	SWEET POTATO
09918	ETHOFUMESATE	CARROT
09882	ETHOSUMESATE	CEREAL GRAIN
04124	ETHYLENE	PINEAPPLE
07262	FAMOXADONE + CYMOXANIL	BEAN, LIMA (SUCCULENT & DRIED SHELLED)
08875	FAMOXADONE + CYMOXANIL	CARROT
08759	FAMOXADONE + CYMOXANIL	GREENS (MUSTARD)
10677	FAMOXADONE + CYMOXANIL	MANGO
10507	FENHEXAMID	BUSHBERRY SUBGROUP
10506	FENHEXAMID	CANEBERRY SUBGROUP
09741	FENHEXAMID	KIWIFRUIT (PREHARVEST)
10510	FENHEXAMID	LOW GROWING BERRY SUBGROUP
07149	FENHEXAMID	ONION
08243	FENHEXAMID	ONION (GH TRANSPLANT)
10508	FENHEXAMID	SMALL FRUIT VINE CLIMBING SUBGROUP, EXCEPT GRAPE

ATTACHMENT 6 – PENDING FOOD PROGRAM SUBMISSIONS
Final Report in Progress (All Data Received at HQ) - Continued

10509	FENHEXAMID	SMALL FRUIT VINE CLIMBING SUBGROUP, EXCEPT FUZZY KIWIFRUIT
11333	FENPROPATHRIN	CHERRY SUBGROUP
10715	FENPROPATHRIN	DRAGON FRUIT (PITAYA)
11393	FENPROPATHRIN	DRAGON FRUIT (PITAYA)
09266	FENPROPATHRIN	GREENS (MUSTARD)
11334	FENPROPATHRIN	PEACH SUBGROUP
11335	FENPROPATHRIN	PLUM SUBGROUP
07946	FENPROPATHRIN	SWEET POTATO
11332	FENPROPATHRIN	TREE NUT GROUP
09517	FENPROPATHRIN	TURNIP (ROOTS)
11029	FENPYROXIMATE	BEAN (SUCCULENT)
11246	FENPYROXIMATE	TREE NUTS
10475	FLONICAMID	BEAN (DRIED SHELLED)
10999	FLONICAMID	PEPPER (GH)
06385	FLUAZIFOP-P-BUTYL	BLUEBERRY
03947	FLUAZIFOP-P-BUTYL	CANEBERRY
02402	FLUAZIFOP-P-BUTYL	CASSAVA
11363	FLUAZIFOP-P-BUTYL	CITRUS FRUIT GROUP
09825	FLUAZIFOP-P-BUTYL	GRASSES (SEED CROP)
02702	FLUAZIFOP-P-BUTYL	LETTUCE (HEAD & LEAF)
11362	FLUAZIFOP-P-BUTYL	ONION BULB SUBGROUP
03405	FLUAZIFOP-P-BUTYL	ONION (GREEN)
02404	FLUAZIFOP-P-BUTYL	RHUBARB
11365	FLUAZIFOP-P-BUTYL	SMALL FRUIT VINE CLIMBING SUBGROUP (EXCEPT FUZZY KIWIFRUIT)
11364	FLUAZIFOP-P-BUTYL	STONE FRUIT GROUP
02085	FLUAZIFOP-P-BUTYL	STRAWBERRY (PERENNIAL)
02403	FLUAZIFOP-P-BUTYL	TANIER
03029	FLUAZIFOP-P-BUTYL	TARO
11362	FLUAZIFOP-P-BUTYL	TUBEROUS AND CORM VEGETABLES (EXCEPT POTATO SUBGROUP)
06796	FLUAZINAM	MAYHAW
09000	FLUCARBAZONE-SODIUM	GRASSES (SEED CROP)
11181	FLUDIOXONIL	CARROT (POST HARVEST)
10374	FLUDIOXONIL	CELERY (GH)
10224	FLUMIOXAZIN	BROCCOLI
10134	FLUMIOXAZIN	CANEBERRY (BLACKBERRY)
09700	FLUMIOXAZIN	CANEBERRY (BLACKBERY)
10249	FLUMIOXAZIN	CANEBERRY (BLACKBERRY)
10229	FLUMIOXAZIN	CANEERRY (RASPBERRY)
10605	FLUMIOXAZIN	CLOVER (SEED CROP)
11371	FLUMIOXAZIN	FRUITING VEGETABLES GROUP

ATTACHMENT 6 – PENDING FOOD PROGRAM SUBMISSIONS
Final Report in Progress (All Data Received at HQ) - Continued

10686	FLUMIOXAZIN	GUAYULE
11370	FLUMIOXAZIN	LOW GROWING BERRY SUBGROUP
11369	FLUMIOXAZIN	ONION BULB SUBGROUP
11366	FLUMIOXAZIN	POME FRUIT SUBGROUP
11368	FLUMIOXAZIN	SMALL FRUIT VINE CLIMBIN SUBGROUP, EXCEPT FUZZY KIWIFRUIT
11367	FLUMIOXAZIN	STONE FRUIT GROUP
10121	FLUOPICOLIDE	BASIL
10323	FLUOPICOLIDE	BEAN (SNAP)
11191	FLUOPICOLIDE	FRUITING VEGEGTABLES GROUP
10916	FLUOPICOLIDE	HOPS
11190	FLUOPICOLIDE	SMALL FRUIT VINE CLIMGING SUBGROUP EXCEPT FUZZY KIWIFRUIT
10807	FLUROXYPRY + FLORASULAM	TEFF
09710	FLUTOLANIL	CARROTT
10393	FLUTOLANIL	GREENS (MUSTARD) (SEED TRT)
09392	FLUTOLANIL	GINSENG
09711	FLUTOLANIL	RADISH
10476	FOMESAFEN	PEA (DRY)
10282	FOMESAFEN	STRAWBERRY
10439	FOMESAFEN	STRAWBERRY (PERENNIAL)
10285	GLYPHOSATE	PEPPER (CHILI)
06312	GLYPHOSATE	STRAWBERRY
07768	HALOSULFURON	GRAPE
08722	HALOSULFURON	PEAR
09494	IMAZALIL	MUSHROOM (WHITE BUTTON)
07669	IMIDACLOPRID	BLUEBERRY (HIGH BUSH)
10654	INDAZIFLAM	COFFEE
09521	INDOXACARB	GRASSES (SEED CROP)
10230	KASUGAMYCIN	CHERRY
08742	LAMBDA-CYHALOTHRIN	ASPARAGUS (FERN)
10255	LAMBDA-CYHALOTHRIN	BROCCOLI RAAB
10343	LAMBDA-CYHALOTHRIN	BULB VEGETABLES SUBGROUP
09390	LAMBDA-CYHALOTHRIN	CARROT
10810	LAMBDA-CYHALOTHRIN	DRAGON FRUIT (PITAYA)
09926	LAMBDA-CYHALOTHRIN	GREENS (MUSTARD)
09430	LAMBDA-CYHALOTHRIN	MILLET, PEARL
09852	LAMBDA-CYHALOTHRIN	OKRA
09381	LAMBDA-CYHALOTHRIN	RADISH
08850	LAMBDA-CYHALOTHRIN	RICE (WILD)
09380	LAMBDA-CYHALOTHRIN	RUTABAGA
10344	LAMBDA-CYHALOTHRIN	TEA

ATTACHMENT 6 – PENDING FOOD PROGRAM SUBMISSIONS
Final Report in Progress (All Data Received at HQ) - Continued

09379	LAMBDA-CYHALOTHRIN	TURNIP (ROOTS)
10540	LAMBDA-CYHALOTHRIN + THIAMETHOXAM	AVOCADO
10627	LAMBDA-CYHALOTHRIN + THIAMETHOXAM	DRAGON FRUIT (PITAYA)
08912	MANCOZEB	BLUEBERRY
11376	MESOTRIONE	BERRY & SMALL FRUIT GROUP
09786	MESOTRIONE	GRAPE
10334	METALDEHYDE	BEAN & PEA (EDIBLE PODDED)
10667	METALDEHYDE	BEAN (SUCCULENT SHELLED)
10338	METALDEHYDE	BEET (GARDEN)
11402	METALDEHYDE	CITRUS FRUIT GROUP
10105	METALDEHYDE	CLOVER (SEED CROP)
10704	METALDEHYDE	GINSENG
10333	METALDEHYDE	PEA (SUCCULENT SHELLED)
11401	METALDEHYDE	TOMATO SUBGROUP
11373	METCONAZOLE	RAPESEED SUBGROUP
11374	METCONAZOLE	STONE FRUIT GROUP
11375	METCONAZOLE	TREE NUT GROUP
07240	METHOXYFENOZIDE	CHIVES
06388	METRIBUZIN	PEA (EDIBLE PODDED)
03524	NAA	ALMOND
03523	NAA	PLUM
05389	NAA	POMEGRANATE
03525	NAA	WALNUT
09246	NOVALURON	AVOCADO
09780	NOVALURON	BEAN, LIMA (SUCCULENT & DRIED SHELLED)
09522	NOVALURON	CARROT
10237	NOVALURON	CUCUMBER (GH)
11025	NOVALURON	FRUIT VEGETABLE GROUP
11026	NOVALURON	POME FRUIT GROUP
03616	OXYFLUORFEN	CANEBERRY (RASPBERRY)
09822	OXYFLUORFEN	COFFEE
06318	OXYFLUORFEN	KENAF
03574	OXYFLUORFEN	ONION (GREEN)
03573	OXYFLUORFEN	SHALLOT
09352	OXYFLUORFEN	STRAWBERRY (TRANSPLANTS)
07377	OXYFLUORFEN	TI PALM
04132	OXYFLUORFEN	TOMATO
10181	PENDIMETHALIN	BLUEBERRY (HIGH BUSH)
09840	PENDIMETHALIN	CANEBERRY
11255	PENDIMETHALIN	SAFFLOWER
10022	PENTHIOPYRAD	CILANTRO

ATTACHMENT 6 – PENDING FOOD PROGRAM SUBMISSIONS
Final Report in Progress (All Data Received at HQ) - Continued

10630	PERMETHRIN	DRAGON FRUIT (PITAYA)
10840	PERMETHRIN	TEA
10687	POTASSIUM PHOSPHITE	CITRUS
07733	PROHEXADIONE CALCIUM	SRAWBERRY
10151	PROHEXADIONE CALCIUM	WATERCRESS
05109	PRONAMIDE	GRASSES (ORCHARD, SEED CROP)
06589	PROPICONAZOLE	DILL
06326	PROPICONAZOLE	GREENS (MUSARD)
10995	PROPICONAZOLE	TI PALM
09937	PROPICONAZOLE	WATERCRESS
10847	PYRETHRINS + PBO	BRASSICA (COLE) LEAFY VEGETABLES GROUP
10720	PYRETHRINS + PBO	CANEBERRY
10724	PYRETHRINS + PBO	CITRUS
10850	PYRETHRINS + PBO	FRUITING VEGETABLES GROUP
10846	PYRETHRINS + PBO	LEAFY EXCEPT BRASSICA GROUP
10719	PYRETHRINS + PBO	STRAWBERRY
08036	PYRIDABEN	CUCUMBER (GH)
10793	PYRIFLUQUINAZON	CUCUMBER (GH)
10435	QUINCLORAC	BLUEBERRY
10031	QUIZALOFOP	GRAPE
11379	RIMSULFURON	CITRUS FRUIT GROUP
07888	RIMSULFURON	CRANBERRY
11380	RIMSULFURON	POME FRUIT GROUP
11378	RIMSULFURON	SMALL FRUIT VINE CLIMBING SUBGROUP, EXCEPT FUZZY KIWIFRUIT
11381	RIMSULFURON	STONE FRUIT GROUP
11382	RIMSULFURON	TREE NUT GROUP
11377	RIMSULFURON	TUBEROUS/CORM VEGETABLES
03659	S-METOLACHLOR/METOLACHLOR	CALABAZA
09406	S-METOLACHLOR/METOLACHLOR	CANTALOUPE
11280	S-METOLACHLOR/METOLACHLOR	FRUITING VEGETABLES GROUP
10218	S-METOLACHLOR/METOLACHLOR	LETTUCE (HEAD)
08982	S-METOLACHLOR/METOLACHLOR	LETTUCE (LEAF)
10099	S-METOLACHLOR/METOLACHLOR	LETTUCE (LEAF)
06656	S-METOLACHLOR/METOLACHLOR	SQUASH (SUMMER)
01676	S-METOLACHLOR/METOLACHLOR	STRAWBERRY
11281	S-METOLACHLOR/METOLACHLOR	SUNFLOWER SUBGROUP
09933	SETHOXYDIM	BLUEBERRY
10940	SETHOXYDIM	BULB VEGETABLE GROUP
10933	SETHOXYDIM	CANEBERRY SUBGROUP
10936	SETHOXYDIM	CITRUS FRUIT GROUP
10941	SETHOXYDIM	FRUITING VEGETABLES GROUP

ATTACHMENT 6 – PENDING FOOD PROGRAM SUBMISSIONS
Final Report in Progress (All Data Received at HQ) - Continued

04873	SETHOXYDIM	GRASSES
10934	SETHOXYDIM	LOW GROWING BERRY SUBGROUP
10935	SETHOXYDIM	LOW GROWING BERRY SUBGROUP, EXCEPT STRAWBERRY
10939	SETHOXYDIM	OILSEED GROUP
10937	SETHOXYDIM	POME FRUIT GROUP
10938	SETHOXYDIM	SMALL FRUIT VINE CLIMBING SUBGROUP, EXCEPT FUZZY KIWIFRUIT
08345	SETHOXYDIM	VERNONIA (IRON WEED)
11230	SPINETORAM	COTTONSEED
10675	SPINOSAD	PLUM
09971	SPIROMESIFEN	CANTALOUPE
09970	SPIROMESIFEN	CUCUMBER
10800	SPIROMESIFEN	FRUITING VEGETABLES GROUP
09842	SPIROMESIFEN	GRASSES
09290	SPIROMESIFEN	OKRA
09972	SPIROMESIFEN	SQUASH (SUMMER)
10551	SPIROMESIFEN	WATERCRESS
10788	SPIROTETRAMAT	CARROT
10043	STREPTOMYCIN	GRAPEFRUIT
11189	STREPTOMYCIN	POME FRUIT GROUP
01602	STREPTOMYCIN	TOMATO (FIELD & GH)
10114	SULFUR DIOXIDE	FIG
10134	TEBUCONAZOLE	TOMATO (GH)
06481	TEBUCONAZOLE	WATERCRESS
09017	TERBACIL	PEACH
08959	TERBACIL	STRAWBERRY (ANNUAL)
10246	THIAMETHOXAM	CANEBERRY
10632	THIAMETHOXAM	DRAGON FRUIT (PITAYA)
09709	THIOPHANATE METHYL	BEAN (SNAP)
08614	THIOPHANATE METHYL	PEPPER (FIELD AND GH)
10427	TOLFENPYRAD	AVOCADO
10380	TOLFENPYRAD	BLUEBERRY
09657	TOLFENPYRAD	ONION
10869	TOLFENPYRAD	STRAWBERRY
10634	TOLFENPYRAD	TOMATO (GH)
09736	ZINC PHOSPHIDE	GRASSES (SEED CROP)
09708	ZOXAMIDE	GINSENG

ATTACHMENT 7 – 2013 ORNAMENTAL HORTICULTURE PROGRAM

FIELD COOPERATORS

NORTHCENTRAL REGION

Dr. Raymond Cloyd	IL
Mr. T. Davis	MI
Dr. M. Hausbeck	MI
Dr. G. Jones	OH
Dr. W. Kirk	MI
Dr. R. Lopez	IL
Dr. H. Mathers	OH
Dr. C. Sadof	IL
Dr. D. Williams	IL

NORTHEAST REGION

Dr. C. Becker	NY
Dr. E. Beste	MD
Dr. N. Brasee	MA
Dr. N. Catlin	NY
Dr. R. Frank	MD
Dr. D. Gilrein	NY
Dr. B. Kunkel	DE
Ms. C. Mansue	NJ
Dr. A. Senesac	NY
Dr. R Wick	MA

SOUTHERN REGION

Dr. D. Benson	NC
Dr. K. Braman	GA
Dr. Y. Chen	LA
Dr. J. Chong	SC
Dr. M. Czarnota	GA
Dr. G. Denny	MS
Dr. J. Derr	VA
Dr. S. Frank	NC
Dr. A. Fulcher	KY

SOUTHERN REGION (continued)

Dr. C. Gilliam	AL
Dr. M. Gu	MS
Dr. K. Heinz	TX
Dr. J. Neal	NC
Dr. D. Potter	KY
Dr. J. Williams-Woodward	GA

WESTERN REGION

Dr. G. Chastagner	OR
Dr. J. DeFrancesco	OR
Dr. B. Hanson	CA
Dr. C.-Z. Jiang	CA
Dr. J. Klett	CO
Dr. E. Peachey	OR
Dr. J. Pscheidt	OR
Dr. L. Santamaria	OR
Dr. B. Uber	CA
Dr. L. Villavicencio	CA
Dr. C. Wilen	CA

USDA-ARS

Dr. E. Beste	MD
Dr. R. Boydston	WA
Mr. B. Fraelich	GA
Mr. R. Frank	MD
Mr. T. Freiberger	NJ
Dr. N. Grunwald	OR
Dr. J. Harvey	WA
Dr. M. Reding	OH
Mr. P. Wade	SC

ATTACHMENT 8 – 2013 ORNAMENTAL HORTICULTURE PROGRAM

RESEARCH ACTIVITIES

Discipline	Project	Researchers	Crops	Products	Trials
Entomology	Borer & Beetle Efficacy *	3	3	7	18
	Pyrfluquinazon Crop Safety*	8	16	1	24
	Pyridalyl Crop Safety*	1	2	1	2
	Sawfly Efficacy	1	1	5	6
	Scale Efficacy*	4	5	5	9
	Spirotetramat Crop Safety*	8	10	1	15
	Thrips Efficacy*	3	2	8	15
	Tolfenpyrad Crop Safety*	9	13	2	36
	Whitefly Efficacy (Bemisia Q and B, Trialeurodes)*	2	2	9	14
Pathology	Acibenzolar Crop Safety*	2	3	1	7
	Amectotradin + Dimethomorph Crop Safety*	6	6	1	13
	Azoxystrobin Crop Safety*	1	1	1	3
	Benzovindiflupyr + Azoxystrobin (A18126B) Crop Safety*	11	16	1	25
	Botrytis Efficacy	3	4	19	37
	Chlorthalonil + Propiconazole Crop Safety*	1	1	1	3
	Cyflufenamid Crop Safety*	9	14	1	24
	Difenconazaole + Azoxystrobin (A13703G) Crop Safety*	1	2	1	3
	Fludioxonil Crop Safety*	1	1	1	3
	Fluensulfone Crop Safety*	1	3	1	3
	Fusarium Efficacy*	3	3	10	21
	Metconazole Crop Safety*	10	10	1	24
	Pythium Efficacy*	4	2	13	32
	Tebuconazole Crop Safety*	8	11	1	22
	Triticonazole Crop Safety*	11	15	1	29
Weed Science	Acetic Acid Crop Safety*	2	11	1	13
	Ammonium Nonanoate Crop Safety*	3	5	2	6
	Dimethenamid-p Crop Safety*	17	39	1	62
	Dithiopyr Crop Safety*	1	3	1	4
	D-limonene Crop Safety*	3	5	1	6
	F6875 Crop Safety*	15	31	1	45
	Flumioxazin + Pyroxasulfone Crop Safety*	3	16	1	18
	Flumioxazin Crop Safety*	2	12	1	15
	Indaziflam Crop Safety*	5	9	1	10
	Isoxaben Crop Safety*	7	10	1	14
	Liverwort Efficacy*	1	1	3	3
	Oregano Oil Crop Safety*	2	5	1	5
	Oxyfluorfen + Prodiamine Crop Safety*	10	17	1	21
	Pelargonic Acid (Scythe) Crop Safety*	1	2	1	2
	Pendimethalin + Dimethenamid-p Crop Safety*	12	18	1	26
	Prodiamine Crop Safety*	1	3	1	4
Plant Growth Regulators	Herbaceous Branching	1	1	3	3

* High Priority Projects

For a detailed list of research activities visit ir4.rutgers.edu.

ATTACHMENT 9 – SUMMARIES OF 2013 ORNAMENTAL HORTICULTURE RESEARCH

Acibenzolar Crop Safety

Acibenzolar is an active ingredient that stimulates plant defense systems. In 2002, IR-4 started testing acibenzolar for safety on several ornamental horticulture crops. In 2008, IR-4 continued crop safety screening after a renewed interest in bringing this active ingredient to ornamental horticulture growers. From 2002 through 2012, the IR-4 Project completed 235 trials on 63 ornamental plant genera or species examining phytotoxicity related to foliar and/or drench applications of acibenzolar. In these trials, 29 species or genera exhibited minimal or no injury after foliar applications. Based on this information, it is recommended that all but 2 of these crops be added to a list of tolerant plants when this active ingredient gains registration. While there was sufficient evidence of minimal or no injury for *Dianthus sp.* and *Pelargonium x hortorum*, a single trial for each crop did elicit moderate to severe injury. Further investigation on cultivar or species differences may be warranted.

Cyflufenamid Crop Safety

Cyflufenamid is an active ingredient for managing foliar diseases including powdery mildew and botrytis. It is not yet registered by EPA for the ornamental horticulture industry. During 2012, the IR-4 Project completed 20 trials on 12 ornamental plant genera or species. In these trials, 1 species or genera exhibited minimal or no injury after foliar applications. For the remaining 11 crops, not sufficient information has been generated. However, to date the tested crops are not sensitive to foliar applications up to 4X the proposed high label rate.

Dimethenamid-p Crop Safety

From 2007 to 2013, IR-4 completed 373 trials on Tower EC (dimethenamid-p). The data contained in this report was generated to register uses of dimethenamid on and around ornamental horticulture plants with over-the-top applications. The dimethenamid rates in the testing program were 0.97, 1.94 and 3.88 pounds active ingredient per acre (lb ai per A) as the 1X, 2X and 4X rates. Tower EC had been applied to 123 plant genera or species. Of these, 52 plant species exhibited no or minimal transient injury after application at all three rates. Fifteen crops exhibited no phytotoxicity at 0.97 and 1.94 lb ai per acre but did have some injury at 3.88 lb ai per acre. Three crops – *Cladrastis*, *Epilobium canum* and *Viburnum opulus* – exhibited significant phytotoxicity at even the lowest rate.

Pendimethalin + Dimethenamid-p Crop Safety

From 2007 to 2013, IR-4 completed 578 trials on Freehand G (BAS 649 G; dimethenamid-p + pendimethalin). The data contained in this report was generated to register uses of dimethenamid-p + pendimethalin on and around ornamental horticulture plants with broadcast applications, including over the top of established plants. The Freehand rates in this testing program were 2.64, 4.3 and 10.6 pounds active ingredient per acre (lb ai per A) as the 1X, 2X and 2X rates. Freehand G had been applied to 165 plant genera or species. Of these genera and species, 65 exhibited no or minimal transient injury after application at all three rates. Thirty (30) crops exhibited little or no phytotoxicity at 2.64 lb ai per acre, but did have some injury at 4.3 and/or 10.6 lb ai per acre, or showed injury after the second application. Of the fifty-three (54) crops that still need additional information, there are twelve (12) genera or species in which three or more trials do not show significant injury, but one or more additional trials shows some sort of notable injury, necessitating additional research. Additional trials are also indicated to establish species or cultivar sensitivities.

Fusarium Efficacy

From 2001 to 2012, numerous products representing 27 active ingredients were evaluated in greenhouse and field trials as soil drench, soil incorporation, foliar, in-furrow, drip irrigation or tuber soak applications against several *Fusarium* species causing rots (crown, stem and tuber rots) and wilt on ornamentals, and wilt and root rot on vegetables. *Fusarium* species tested included: *F. avenaceum, F. commune, F. oxysporum* and *F. solani*. Most trials were conducted on *F. oxysporum* on larkspur, lisianthus and watermelon. Although there were insufficient data for definitive conclusions, several relatively new products showed promising, though inconsistent, efficacy comparable to the standards. These include acibenzolar, Heritage (azoxystrobin), Compass (trifloxystrobin), Hurricane (fludioxonil + mefenoxam), Insignia (pyraclostrobin), SP2169, Tourney (metconazole) and Trinity (triticonazole). BW240/RootShield Plus (*Trichoderma harzianum & T. virens*), CG100 (caprylic acid), Pageant (boscalid + pyraclostrobin) and Palladium (cyprodinil + fludioxonil) provided no to mediocre efficacy. Proline (prothioconazole)

provided consistently good control of *F. oxysporum* in watermelon trials. The established standards 3336 and Medallion generally provided inconsistent efficacy while Terraguard was effective in one trial.

Indaziflam Crop Safety

From 2011 through 2013 IR-4 has completed 84 trials evaluating indaziflam granular formulations for crop safety. The data contained in this report was generated to register the use of indaziflam on and around ornamental horticulture plants with over-the-top applications. The rates tested were 0.045, 0.089 and 0.178 pounds active ingredient per acre (lb ai per A) as the 1X, 2X and 4X rates. The indaziflam 0.03%G formulation was applied to 17 plant genera or species, the Marengo G formulation was applied to 25 crops. Of these crops, 5 exhibited no or minimal transient injury after application at all three rates including Liriope sp., *Rhododendron sp., Rosa sp*., *Taxus media* and certain *Viburnum* species. The remaining crops evaluated have only been screened in 1 or two trials or exhibited minimal to significant injury. Further testing is required on many species before a conclusion can be made confirming crop safety.

Isoxaben Crop Safety

Gallery 75DF (isoxaben) was initially registered in 1992 for ornamental horticulture uses. This initial label contained an extensive list of ornamental horticulture crops where Gallery could be used without causing phytotoxicity. It also included a short list of crops where Gallery applications were not recommended. Between 1992 and 2013, IR-4 examined 93 crops to expand this label to other crops, including several different fern species grown in field containers. Of these, 24 crop species exhibited no or minimal transient injury with 20 already placed on the Gallery label. Eight crops exhibited injury in this research: *Astilbe sp., Athyrium filix-femina, Buddleia davidii, Dendranthema x morifolium, Digitalis purpurea, Echinacea purpurea, Stachys byzantine,* and *Thymus sp.*

Metconazole Crop Safety

Metconazole was registered as Tourney 50WDG in the United States in 2007 as a turf fungicide. In 2010, uses for ornamental horticulture plants in greenhouse, nurseries, and landscapes were added. The commercial label contains a list of 49 woody ornamental plants exhibiting no or minimal injury. However, because metconazole is in the triazole class it could cause symptoms similar to plant growth regulators and additional testing is warranted on additional herbaceous and woody ornamental species. Between 2010 and 2012, the IR-4 Project completed 108 trials on 33 ornamental plant species examining phytotoxicity related to foliar applications of Tourney. In these trials, 14 species or genera exhibited minimal or no injury after foliar applications. Of these, 9 are already on the Tourney label; *Antirrhinum majus, Hemerocallis sp., Hydrangea sp. Lantana* and *Liriope sp.* are the five crops not yet listed. Based on this information, it is recommended that these be added to the list of tolerant plants on the Tourney 50WDG label. Four crops exhibited stunting: Begonia, Impatiens, Pansy and Zinnia.

Oxyfluorfen + Prodiamine Crop Safety

From 2009 through 2013 IR-4 completed 98 trials evaluating Biathlon (oxyfluorfen + prodiamine) crop safety. The data contained in this report were generated to register uses of oxyfluorfen + prodiamine as over-the-top applications on and around ornamental horticulture plants. The rates tested were 2.75 (1X), 5.5 (2X) and 11.0 (4X) pounds active ingredient per acre (lb ai per acre). Biathlon was applied to thirty-four plant species or genera. Thirteen (13) genera exhibited no or minimal transient injury in at least 3 trials. One species exhibited phytotoxicity or growth reduction in at least one trial at the 2X and/or 4X rate, but it may not affect the marketability of the crop. No species tested consistently exhibited significant phytotoxicity or growth reduction in more than one trial. Twenty-one (21) species require further testing. Results are summarized at the species level, as there is some evidence that crop safety can differ at the varietal level. On the Biathlon label, *Potentilla fruticosa* appears twice: it may be used on the variety 'Abbotwood' but is not recommended on 'Goldfinger'. More data is needed to establish the actual varietal sensitivities within *Potentilla fruticosa*, and identify other species with the same difficulty. We recommend *Lantana camara Rudbeckia spp*., and *Sedum spp.* be added to the Biathlon label along with 6 additional varieties of species already listed.

Pyridalyl Crop Safety

Pyridalyl was registered as Overture for use on ornamental horticulture plants in greenhouses with foliar applications in the United States in 2008. The label recommends use on ornamental horticulture plants with testing by the grower.

From 2010 to 2011, the IR-4 Project conducted 34 trials on 10 ornamental plant species examining phytotoxicity related to Overture applications. In these trials, no injury was noted.

Pyrifluquinazon Crop Safety

Pyrifluquinazon was registered for use on ornamentals applied foliar or drench in the United States in 2013. The label recommends use on ornamental horticulture plants except a few species or genera specified in the label. From 2010 to 2012, the IR-4 Project conducted 50 trials on 16 ornamental plant species examining phytotoxicity related to pyrifluquinazon applications. No tested crops exhibited significant injury or growth reduction during these experiments.

Pythium Efficacy

At the IR-4 Ornamental Horticulture Program Workshop in 2009, Pythium Efficacy was selected as a high priority project to expand the knowledge and list of fungicides available to growers for these diseases. In addition to research collected through the IR-4 program, this summary includes a review of experiments conducted from 1999 to 2013 on ornamental horticulture and vegetable crops. During this time period, numerous products representing 38 active ingredients were tested as drench, foliar or soil applications against several *Pythium* species causing root rot and damping-off on ornamentals, and root rot, cottony leak, damping-off and cavity spot on vegetables. *Pythium* species tested included: *P. aphanidermatum, P. irregulare, P. mamillatum, P. dissotocum, P. myriotylum, P. ultimum* and *P. vipa.* Most trials were conducted on *P. aphanidermatum* and *P. ultimum.* Although there were insufficient data for definitive conclusions, several relatively new products that are included in the Pythium efficacy project looked promising. These were Adorn, Disarm, Fenstop, Heritage and Pageant. V-10208 also looked promising. The phosphorus acids/phosphorus acid generators (Agri-Fos, Alude, K-Phite, Magellan, Phostrol or Vital) provided mix results. Acibenzolar, BW240 and CG100 were generally ineffective. The established standards Subdue Maxx and Terrazole/Truban generally performed well. Conversely, the registered biological products Companion/QRD 713, PlantShield/RootShield and SoilGard generally looked ineffective. The data from these trials suggest that the effectiveness of some fungicides in controlling Pythium root rot may vary, depending on the species of *Pythium* or crop.

Scale & Mealybug Efficacy

Managing scale and mealybug insects presents unique challenges. Products with contact modes of action have to be applied at specific timings in order to reach the most susceptible crawler stages. Products with systemic modes of action may work well for certain species and not others based on application timing and whether the insect feeds within phloem or xylem. In 2003, IR-4 initiated a high priority project to determine efficacy of several insecticides on several scale and mealybug species so data can be obtained to add appropriate species to existing registrations.

Several neonicotinoids (Aloft SC/Celero 16WSG, Flagship 0.22G/25WP, Safari 2G/20SG/Transtect 70WSP, and TriStar 30SG/70WSP), insect growth regulators (Distance and Talus 40SC/70DF), and other products were tested against scales and mealybugs. All products tested generally provided excellent control of elongate hemlock scale, cryptomeria scale and gloomy scale, generally mediocre to excellent control of false oleander scale and Fletcher scale, and poor control of armored scale. Control of Florida wax scale was excellent with Flagship, Safari and TriStar, and good with Talus. Talus was the only foliar product providing excellent control of oystershell scale; Safari applied as drench also provided excellent control. Cottony maple scale control was mediocre to good with Flagship, none to mediocre with Safari and TriStar, and poor with Talus. Control of cottony cushion scale was good to excellent with Distance, Flagship, Kontos and NNI-0101, Talus and TriStar, variable with A16901B and Safari, and poor with GF-2626 and GF 2860. Euonymus scale control was good to excellent with Aloft, Distance and Talus, mediocre to good with Flagship, Safari and TriStar, and variable with A16901B. Calico scale control was mediocre with Safari/Transtect. Control of false Florida red scale was good with Flagship and Safari, mediocre with Distance, and poor with Talus and TriStar. Tea scale control was good to excellent with Safari and Kontos, but variable with Talus. Aloft was the only product providing good holly pit scale control; Distance, Flagship, Safari, Talus and TriStar provided mediocre control. Pine needle scale control was excellent with Aloft, Distance, Kontos, NNI-0101, Safari, Talus and Tristar; A16901B, GF-2626 and GF 2860 and Kontos were less effective. In a camellia scale trial, all products tested provided poor control most likely because of unfavorable environmental conditions.

All products tested on citrus mealybug and Mexican mealybug, including Aria, Flagship, Safari, Talus, and TriStar, generally provided good to excellent efficacy on these species. A trial on Madeira mealybug showed excellent control when TriStar was mixed with Capsil surfactant and poor control without Capsil. NNI-0101, Safari and Talus provided good to excellent control of this species, while A16901B provided mediocre efficacy when applied as drench but good when applied as foliar treatment. Phormium mealybug control was good to excellent with all neonicotinoids tested – Flagship, Safari and TriStar. Good to excellent efficacy on Rhizoecus root mealybug was obtained with A16901B, Aria, Kontos, MBI-203, MBI-205 and Safari in single trials.

Spirotetramat Crop Safety

Spirotetramat was registered as Kontos for use on ornamentals applied foliar or drench in the United States in 2008. The label recommends use on ornamental horticulture plants except a few species or genera specified in the label. From 2007 to 2012, the IR-4 Project conducted 198 trials on 41 ornamental plant species examining phytotoxicity related to Kontos applications. In these trials, only 6 crops (*Begonia* sp, *Coleus x hybridus, Petunia* sp., *Pelargonium* sp., *Vinca* sp., and *Viola* sp.) exhibited noticeable, significant injury and that was a slight height reduction, leaf curling, bleaching of flowers or plant death at the 2X and 4X rates applied as drench. One species (*Verbena hybrida)* exhibited significant flower discoloration at all rates applied as drench in one trial. Based on this information, it is recommended that the label prohibits drench application on *Begonia* sp., *Coleus x hybridus, Petunia* sp., *Pelargonium* sp., *Verbena hybrida, Vinca* sp., and *Viola* sp. The current label does not recommend use of Kontos on *Pelargonium* spp. Foliar application on these species may be recommended with the precautionary statements in the CROP TOLERANCE section of the current Kontos label.

F6875 (Sulfentrazone + Prodiamine) Crop Safety

Since 2007 IR-4 has completed 308 trials with products containing sulfentrazone + prodiamine (F6875 0.3G and F6875 4SC) on 103 crops. The data contained in this report was generated to register uses of sulfentrazone + prodiamine formulation on and around ornamental horticulture plants with over-the-top applications. The rates tested were 0.375, 0.75 and 1.5 pounds active ingredient per acre (lb ai per A) as the 1X, 2X and 4X rates. The F6875 0.3G formulation was applied to 75 plant genera or species. Of these crops, 22 exhibited no or minimal transient injury after application at all three rates. Nine crops (*Buddleia davidii, Echinacea sp., Hemerocallis sp., Hosta sp., Iris sp., Lobularia maritima, Ophiopogon sp., Phlox paniculata, Phlox subulata*) exhibited phytotoxicity at even the lowest rate. F6875 4SC was tested on 44 genera or species of which two species exhibited little to no injury at all three rates. Nine species (*Buddleia davidii, Echinacea purpurea, Hemerocallis, Heuchera sanguinea, Hibiscus sp., Hosta sp., Hydrangea sp., Phlox paniculata, and Rudbeckia sp.)* demonstrated significant injury even at the lowest rate.

Tebuconazole Crop Safety

Tebuconazole was first registered in 1994 for peanut diseases. Since then its food use label has expanded to several other food crops. The first noncrop registration of Torque 3.6SC (tebuconazole) occurred in 2010 for ornamental horticulture growers, professional landscape managers and for golf course turf. Tebuconazole manages foliar ornamental horticulture diseases including powdery mildew and rusts. However, given that triazoles have a tendency to also exhibit impacts similar to growth regulators, the crop safety profile for Torque 3.6SC is not well known. During 2012, the IR-4 Project completed 20 trials on 12 ornamental plant genera or species. In these trials, 1 species or genera exhibited minimal or no injury after foliar applications. Torque caused stunting in Pansy and Zinnia at the higher application rates. In one trial, Narcissus exhibited moderate injury after the third application; additional trials are warranted to determine whether number of applications or the crop cultivar might be the contributing factor for injury. For the remaining 8 crops, not sufficient information has been generated.

Tolfenpyrad Crop Safety

Tolfenpyrad was registered as Hachi-Hachi 15 EC in the United States on July 28, 2010 for the control of aphids, leafhoppers, scales, thrips, whiteflies, and early instar lepidopteran larvae on ornamental horticulture crops grown in greenhouses. An expansion of this label for outdoor uses is planned. In this report, six species or genera exhibited minimal or no injury after foliar treatments of Hachi-Hachi 15EC (tolfenpyrad) at 21, 48 and 84 fl oz per 100 gal. All can be added to the label as crops tested for tolerance: (*Begonia sp., Petunia sp,. Tagetes sp., Verbena sp., Viola sp.* and *Zinnia sp.*).

ATTACHMENT 9 – Continued

Trifluralin + Isoxaben Crop Safety

In an effort to provide weed management tools to growers of a wide variety of nursery ornamental crops this research was undertaken to expand the three pre-emergent herbicide labels: Pendulum 2G (pendimethalin), Pennant Magnum (s-metolachlor), and Snapshot 2.5TG (trifluralin + isoxaben). This report covers only Snapshot 2.5TG. The rates chosen for this research were 2.5, 5, and 10 pounds active ingredient per acre (lb ai per acre) as a 1/2X, 1X and 2X rates. From 2004 to 2013, IR-4 completed 418 trials on Snapshot 2.5TG. One hundred forty one crops were examined. Of these, 62 species exhibited no or minimal transient injury after application at all three rates. Eight crops exhibited no phytotoxicity at 2.5 or 5.0 lb ai per acre, but did have some injury at the higher rate of 10 lb ai per acre. Twenty-two species exhibited phytotoxicity at the 5 lb ai per acre rate. For the remaining 59 crops, IR-4 would recommend generating additional data because either fewer than 3 trials were conducted or different locations exhibited different responses.

Triticonazole Crop Safety

Triticonazole was registered as Trinity 2SC in the United States in 2007 as a turf fungicide. Since that time it has been under development to expand to ornamental horticulture diseases. Because triticonazole is in the triazole class, it could cause symptoms similar to plant growth regulators and testing is warranted on additional herbaceous and woody ornamental species. Between 2010 and 2012, the IR-4 Project completed 128 trials on 33 ornamental plant species examining phytotoxicity related to foliar applications of Trinity 2SC. In these trials, 21 species or genera exhibited minimal or no injury after foliar applications. Based on this information, it is recommended that these crops (*Acer sp., Antirrhinum majus, Camellia sp., Chrysanthemum/Dendranthemum sp., Cornus sp., Hemerocallis sp., Hydrangea sp., Lantana sp., Liriope sp., Malus sp., Pelargonium sp., Petunia sp., Photinia sp., Pyrus calleryana, Quercus sp., Rhododendron sp* (azalea), *Rhododendron sp.* (rhododendron), *Rosa sp., Tagetes sp., Viola sp. and Zinnia sp.*) be added to a list of tolerant plants on the Trinity 2SC label.

ATTACHMENT 10- Biopesticide and Organic Support Program

Biopesticide Grant Proposals Funded 2013

Grant Stage—Early

- Pheromon-mediated management of California prionus, *Prinus californicus* (Coleoptera: Cerambycidae), in hops and cherry via mating disruption

Grant Stage—Advanced

- Developing a reduced risk early season management program for BMSB in Peach
- Biological control materials as resistance management options for kasugamycin
- Evaluation of Fe-HEDTA as an over-the-top herbicide for ornamental nursery production
- Efficacy of biofungicide product at the advanced stage of development for foliar diseases in organically-produced tomato
- Evaluations of biologically based alternatives for broadleaf weed control in turf and ornamentals
- Reduction of aflatoxin contamination in almond orchards using the atoxigenic *Aspergillus flavus* strain AF36 and preparation for registration
- Evaluation of a fungal biopesticide for the control of phorid flies in mushroom houses
- Enhancing performance of azadirachtin and pyrethrin biopesticides intree fruit pest management with trunk injection delivery
- Evaluation of commercial formulations of entomopathogenic fungi to manage the redbay ambrosia beetle, vector of laurel wilt, a lethal disease affecting avocados in Florida
- Evaluation of products and technology to enhance shelf life and quality of greenhouse tomatoes
- Spotted Wing Drosophila control in organic berries
- Improving conventional control of mint flea beetle and strawberry root weevil on mint by incorporating early applications of grupGONE! Granular
- Evalluation of a three-lure (TNL, ME, RK = TMR) attract and kill trap against Medfly, oriental Fruit Fly and Melon Fly
- Managing seed-borne late blight, *Fusarium* and *Rhizoctonia* in potato with biofungicides in combinations with conventional fungicides

Grant Stage—Demonstration

- Efficacy of an essential oil-based pesticide for bed bug management

- Efficacy of biofungicide products at the demonstration stage of development for *Phytophthora* Blight in Squash and Pepper

- Integrating biopesticides into water mold control in specialty crops

- Integrating biopesticides into conventional vineyard IPM programs for vine mealybug as a resistance management strategy
- Incorporation of biofungicides into hop powdery mildew IPM programs
- Efficacy of biofungicide products at the demonstration stage of foliar diseases in organically-produced tomato
- Mitigation of fungicide resistance risk using biopesticides and leaf removal in Washington wine grapes
- Investigating the role of entomopathogens in whitefly IPM programs

ATTACHMENT 10 – Continued

Research Cooperators

NORTHCENTRAL REGION

Dr. Sally A. Miller	OH
Dr. William Kirk	MI
Dr. George Sundin	MI
Dr. John Wise	MI
Dr. Mary Hausbeck	MI

NORTHEAST REGION

Dr. Anne L. Nielsen	NJ
Dr. Margaret Tuttle McGrath	NY
Dr. John Pecchia	PA
Dr. Changlu Wang	NJ

WESTERN REGION

Dr. James D. Barbour	ID
Dr. Cheryl Wilen	CA
Dr. Themis J. Michailides	CA
Dr. Alan Schreiber	WA
Dr. Larry D. Godfrey	CA
Dr. Kent M. Daane	CA
Dr. Gary Grove	WA

SOUTHERN REGION

Dr. Joseph C. Neal	NC
Dr. J.E. Pena	FL
Dr. A.D. Ali	FL

USDA and other Federal Agencies

Dr. Roger Vargas	USDA-ARS (HI)

ATTACHMENT 10 – Continued

Biopesticide Registration Packages Submitted in 2012

Product	Crop	PR Number	TYPE	Registration Type
Carob Moth Pheromone	Date	0757B	Insecticide	New Active Ingredient

New Uses Supported by the Biopesticide Efficacy Grant Program

Active Ingredient	Crop	PR Number
Callus subtilis QST-713	Radish	401B
	Ginseng	137B
	Horseradish	354B
	Turnip Greens	390B
	Lettuce	209B
	Collard Greens	168B
	Cucumber	558B
	Cantaloupe	217B
	Pumpkin	358B
	Pepper	460B
	Tomato	558B
	Citrus	356B
(Z-E)-7,9,11-Dodecatrienyl formate	Dates	757B

FIFRA Section 18 -Seed Treatment Labels

- **Avipel 9,10-Anthraquinone) Liquid for Corn** Louisiana, Michigan, Minnesota, Mississippi, South Dakota, Texas, Wisconsin, Florida, Vermont, Virginia
- **Avipel Dry for Corn** Louisiana, Michigan, Minnesota, Mississippi, North Dakota, South Dakota, Texas, Wisconsin, Maine, Utah, Delaware, Virginia
- **AV-1011 for Rice** Louisiana, Florida
- **Avipel liquid for Sunflower-** South Dakota
- **HopGuard (Potassium salts of Hop Beta Acids) Beehives –** 37 states

Contacts

IR-4 Headquarters

Dr. Jerry Baron - IR-4 Executive Director, 732.932.9575 x 4605 , jbaron@aesop.rutgers.edu

Dr. Dan Kunkel - IR-4 Associate Director, Food and International Programs, 732.932.9575 x 4616, kunkel@aesop.rutgers.edu

Dr. Michael Braverman - Manager, Biopesticide & Organic Support, 732.932.9575 x 4610, braverman@aesop.rutgers.edu

Dr. Cristi Palmer - Manager, Ornamental Horticulture, 732.932.9575 x 4629, palmer@aesop.rutgers.edu

Dr. Karl Malamud-Roam - Manager, Public Health Pesticides, 732.932.9575 x 4628, kmr@aesop.rutgers.edu

Regional Field Coordinators & ARS

Dr. Satoru Miyazaki - North Central, Michigan State University, 517-336-4611, ncrir4@msu.edu

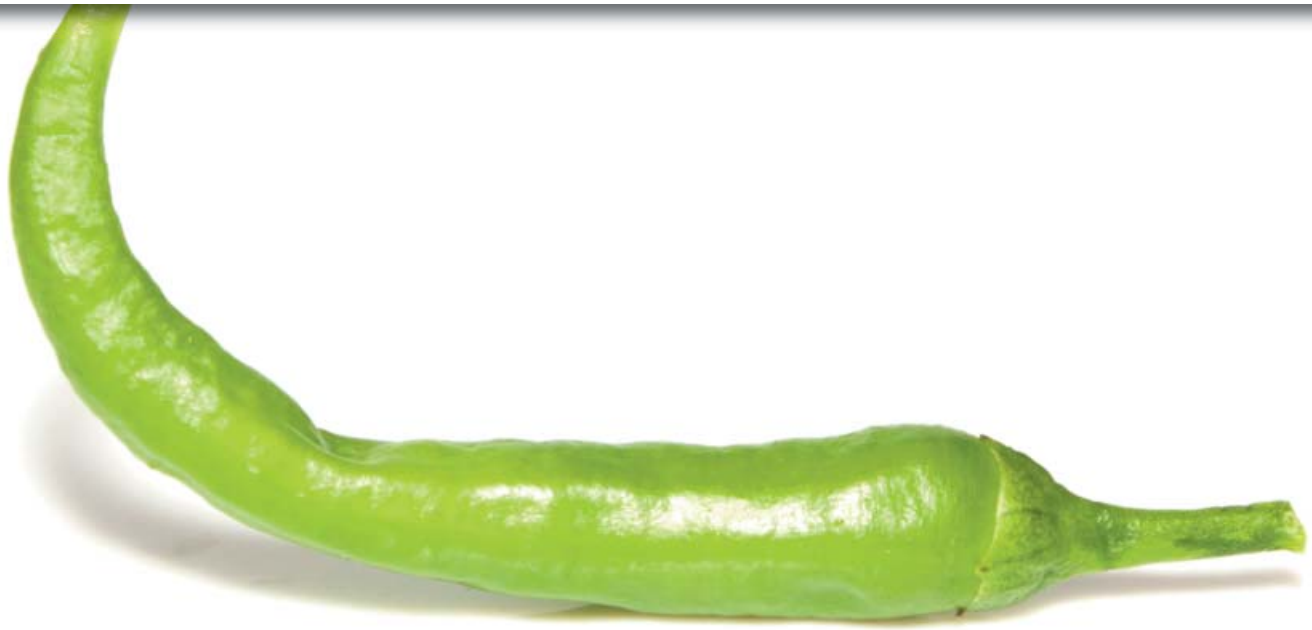
Ms. Edith Lurvey - Northeast, Cornell University-NYSAES, 315-787-2308, ell10@cornell.edu

Dr. Michelle Samuel-Foo - Southern, University of Florida, 352.392.1978 x 406, mfoo@ufl.edu

Ms. Rebecca Sisco - Western, University of California, 530.752.7634, rsisco@ucdavis.edu

Dr. Paul Schwartz - USDA-ARS, 301.504.8256, Paul.Schwartz@ars.usda.gov

www.ir4.rutgers.edu



Major funding provided by Special Research Grants and Hatch Act Funds from USDA-NIFA, in cooperation with the State Agricultural Experiment Stations, and USDA-ARS. State Agricultural Experiment Stations provide in-kind support valued at over $10 million annually.