Celebrating

IR-4 Annual Report 2012

The IR-4 Project
Pest Management Solutions
for Specialty Crops and
Minor Uses

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Dear Friends,

On behalf of IR-4 Project Management Committee and the 120 women and men who participate in IR-4 data development/data management process throughout the US, I am honored and delighted to provide you this report that documents our significant accomplishments and deliverables in 2012. To put it simply, **IR-4 had another successful year!**

Food Program:

- EPA approved 266 new pesticide tolerances supporting 1085 potential new use registrations. Of these clearances, 633 (60%) have already been registered. Of the 40% remaining many of them were for tolerances that were granted late in 2012 and will likely appear on labels in 2013.
- EPA also codified updates to the stone fruit and tree nut crop groups. Codex Committee of Pesticide Residues approved IR-4's submission to modify the fruit crop groups.
- IR-4 submitted new residue tolerance petitions on 31 active ingredients to EPA that will address 142 IR-4 requests from stakeholders and will likely provide hundreds of new crop registrations for growers in 2013/2014.
- IR-4 started research on 80 new EPA Guideline "Magnitude of the Residue" studies to answer priority grower pest management needs. These studies are made up of 523 field trials. IR-4 also conducted over 71 efficacy and/or crop safety trials on food crops to answer the product performance data requirements for 23 projects.
- In an effort to eliminate pesticide residues as a barrier to export markets, IR-4 prepared six data packages, covering 60 commodities and submitted them to the Joint Meeting of Pesticide Residues/Codex Committee of Pesticide Residues or foreign regulatory authorities to support US export of specialty crops.
- IR-4 co-sponsored the Second Global Minor Use Summit during this period, which was held in Rome Italy (FAO Headquarters) and attended by more than 230 participants from 50 countries.

Ornamental Horticulture Program:

- IR-4 data/submissions were used in 3 registrations and label amendments. This influenced the use of pesticides on 644 species on non-food crops.
- During this period IR-4 implemented activities for future registrations including: initiating 722 field and greenhouse trials on ornamental crops to collect efficacy and/or crop safety data within 487 studies; writing and submitting to registrants 21 data summaries to registrants to expand the use of pesticides on ornamentals; and collaborating with national and international scientists on the development of efficacy data for invasive species.

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.

Biopesticide and Organic Support Program:

- IR-4 solicited proposals and competitively funded 19 grants to develop efficacy data necessary to prove proof of concept or further development of effective biopesticides.
- IR-4 regulatory assistance efforts and data were used by EPA to support 12 new biopesticide registrations including carob moth pheromone on dates, *Reynoutria sachanilensis, Phoma macrostoma, Trichoderma asperellum,* and *Trichoderma virens G41.*

Public Health Pesticide Program:

- IR-4 submitted additional data to EPA to support IR-4's 1st public health pesticide residue study to support registration of etofenprox to control adult mosquitoes near crops.
- IR-4 published an extensive online inventory of 600+ available and potential pesticides that can be used to manage arthropod pests that vector disease in humans. The Public Health Pesticides Inventory included information on specifications, regulatory, use, efficacy, and safety information on 600+ materials.

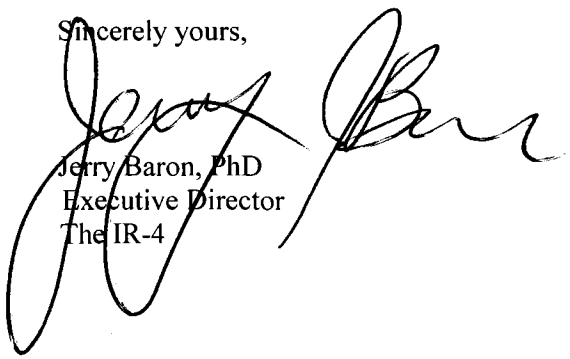
These successes were coupled with new challenges. Federal funding for the IR-4 Project was decreased. At the same time, IR-4 was included in a USDA plan to consolidate their Integrated Pest Management (IPM) programs. Specialty crop growers and other minor use stakeholders had critical concerns about the impact of including IR-4 in this IPM consolidation plan. These stakeholders communicated their concerns about the proposed consolidation plan to USDA and Congress. This effort resulted in IR-4 being withdrawn from the consolidation plan.

Adequate funding remains the most critical challenge for the continued success of the IR-4 Project. Over the past two years there have been modest cuts with and more cuts are predicted. The IR-4 Project has responded to cuts with reduction in study trials and in some cases the reduction of staff. IR-4 is committed to remaining prudent with its resources in order to fulfill its mission of facilitating registration of sustainable pest management technology for specialty crops and minor uses but we can no longer "do more with less".

This year, 2013, marks the 50th Anniversary of the IR-4 Project. Since 1963, the IR-4 Project research has facilitated over 26,000 registrations of conventional pesticides and biopesticides for food and ornamental crops. Today, many of the IR-4 facilitated registrations are core to sustainable and environmentally friendly pest management strategies for specialty crops. A recent update of the economic impact of the IR-4 Project by the Center for Economic Analysis at Michigan State University reported, "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 more than $7.2 billion." It is safe to say that our economy and quality of life has been improved by IR-4's efforts.

In this milestone year, I want to express my heartfelt appreciation to the IR-4 Commodity Liaison Committee, the Minor Crop Farmers Alliance and other stakeholders for their commitment and support of the IR-4 Project; our partners in USDA and the State Agricultural Experiment Stations for providing the necessary resources and cooperation; EPA, for their assistance in proving advice and counsel; the dedicated IR-4 staff throughout the United States for their work in developing high quality data used in submissions, and finally my associates on the IR-4 Project Management Committee for collaboration in leading IR-4 and making decisions that help IR-4 accomplish these successes. All of these people help ensure that the IR-4 Project remains relevant and provides value to society.

Sincerely yours,



Jerry Baron, PhD
Executive Director
The IR-4

ANNUAL REPORT OF THE IR-4 PROJECT (NRSP-4)
January 1, 2012 - December 31, 2012

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

Background

Fifty years ago, the Directors of the State Agricultural Experiment Stations (SAES) and the United States Department of Agriculture (USDA) came together to create a program to assist growers of fruits, vegetables, herbs, ornamentals and other specialty crops with their critical pest management needs. Interregional Research Project Number-4, better known as IR-4 or the IR-4 Project, facilitates the regulatory approval of crop protection products or pesticides by developing the appropriate data required by the United States Environmental Protection Agency (EPA) or other regulatory authorities to support registration in the small markets associated with specialty crops and minor uses. The need for IR-4 exists because companies that develop and sell crop protection products often focus their resources in major markets where there is favorable 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's original objective focused on support of conventional chemical pesticides on small acreage food crops. 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 biopesticide products. For all three objectives (Food, Ornamental Horticulture and Biopesticide and Organic Support Programs) IR-4 provides national coordination, technical guidance and funding to develop the appropriate data. 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.

What began as a two-person operation at Rutgers University in 1963 has grown to a multi-million dollar research organization with over 120 employees and a presence in nearly every state. The research performed by the men and women of the IR-4 Project has facilitated over 26,000 registrations of conventional pesticides and biopesticides for food and ornamental crops. The majority of these registrations have been approved within the last 10 years utilizing lower risk pest management technology.

IR-4 works in close cooperation with many groups and associations to accomplish its mission. 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 regulatory approval of safe and effective plant protection products to assist in the production of food crops continues to be the central objective of the IR-4 Project. IR-4 is committed to provide the support required to give growers the tools they need to be successful and competitive in today's markets. In most cases, IR-4 develops residue data to support new registrations for specialty crops. However, the need for product performance and crop safety data has increased in importance over the past few years due to registrants requesting some efficacy and/or crop safety data prior to marketing a new use. IR-4 efforts to expand crop groups and use of extrapolation based on our residue studies have all contributed to the greater need for efficacy and crop safety data.

Research Activities – Food Residue

Since 1963, IR-4 stakeholders have submitted 11201 requests for assistance to the IR-4 Food Program. Of these, 547 are currently considered researchable projects that remain as documented needs of specialty crop growers. The other requests have been addressed through previous research and regulatory submissions or cannot be registered at this time. In 2012, a total of 171 new project requests were submitted to IR-4 by various stakeholders. As well, IR-4 staff added 78 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 2012 was 249 project requests.

IR-4's research priorities for 2012 were determined by IR-4 stakeholders during the September, 2011 IR-4 Food Use Workshop, in Raleigh, NC. Based on the outcome of that workshop and other priority setting mechanisms, IR-4 scheduled 80 studies consisting of 523 field trials, including 59 trials from our Canadian partners (supporting 21 studies). However, due mostly to weather conditions (late frost etc.), the final number of 2012 studies was 78, supported with 472 field trials. The specific studies, including the test chemical and crop for 2012 are shown in Attachment 2.

The majority of field trials are assigned to IR-4/Canadian Field State/Federal Research Centers and sample analyses to 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 chemical is applied in the field in a manner that simulates proposed grower use of the crop protection product (CPP) 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 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 also known as a maximum residue limit (MRL).

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

In 2012, IR-4 dedicated $147,000 in funding to support E/CS research. This funding supported research to address needs for 23 projects, including 44 state university trials and an additional 27 trials by ARS (see Attachment 3 – "2012 Efficacy/Crop Safety (E/CS) Research Program"). In addition, CN-PMC conducted 1 E/CS trial for IR-4. These trials can be used to support new uses in the U.S. which will benefit specialty crop stakeholders.

Submissions and Success

In 2012, IR-4 submitted data to EPA for 31 chemicals involving 142 IR-4 projects/requests. Additionally, IR-4 submitted 1 petition to add new crops (root and tuber) to an existing crop group. IR-4 also submitted 17 more packages to cooperating registrants, who submitted our data with their submissions of new products or for label amendments, conditional registrations, or to address registration review (re-registration) requirements to maintain the use of a product, for a total number of IR-4 requests being addressed at 159 (see Attachment 4). These numbers are basically on par with the very aggressive number of submissions made in 2011.

The IR-4 Food Use Program continues to work smarter and more efficiently to deliver new CPP for specialty crop growers. In 2012, IR-4 made remarkable progress by shortening study timelines on a project with international scope and is considered to be very safe to beneficial insects, especially bees. IR-4's research on BYI-02960 (flupyradifurone) on blueberry, clover and prickly pear cactus was completed in less than 18 months and the final reports were provided to the registrant for submission with their initial submission on this active ingredient. The blueberry study was also international in scope with 26 field sites located in 9 countries around the world. The review of this new insecticide is part of a Global Joint Review and registration is expected in 2014.

IR-4 also submitted a large number of data packages to the Joint Meeting on Pesticide Residues (JMPR) in 2012 that will be used to establish Codex MRLs. These submissions included 74 data packages on six active ingredients covering over 60 commodities. These submissions can also be viewed in Attachment 4.

After considerably lower numbers posted in 2011, IR-4 had nearly record numbers of new uses in 2012. EPA established a total of 266 permanent tolerances in 2012 based on IR-4 submissions. These tolerances, considering crop grouping and crop definitions, will support up to 1,085 new specialty crop uses that could be added to product labels. A complete list of these new uses and new crop groups can be found in Attachment 5. In total, EPA reviewed 32 chemistries for IR-4 in 2012, which is essentially double the number of chemistries in 2011. These higher values

compared to 2011 are due to the fact that many of these reviews were nearly complete by EPA in 2011, since the cumulative assessment of pyrethroid insecticides had been completed in 2011 and the final rules were realized in 2012. Another factor was the completion of a very large IR-4 submission that was made to EPA in 2011, where IR-4 submitted 5 administrative volumes for 5 active ingredients, 14 final reports, 21 end-use product labels, that resulted in nearly 80 tolerances and more than 350 new uses for growers.

The 1,085 new use registrations in 2012 bring the IR-4 49 year total of clearances to 14,846. The Biopesticide Program added one new product registration and 12 new uses (see Attachment 10). Therefore the combined total number of new food uses by IR-4 in 2012 is 1,097.

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. Through this process, IR-4 confirmed in 2012 that of the 1085 potential new uses, 633 uses were already listed on product labels (approximately 60% of total). Of the 40% remaining, many were for tolerances that were granted late in 2012 and will likely appear on labels in time for the 2013 growing season. It should also be noted that some of the crops not counted were in cases where the new labels were not yet approved for new crop group conversions, therefore some of the crops may be listed on the labels, but not many of the newly added crops added to crop groups. For example, pyriproxyfen does have the fruiting vegetables listed on their current label, but the newly listed crops such as tree tomato, goji berry, and others are not listed on the current label. Therefore the actual number of specialty crop uses listed on these labels is much higher. This information was collected from the CDMS website (http://www.cdms.net/LabelsMsds/) or from information received directly from registrants (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 as well. IR-4 continues to make requests of EPA that many of our submissions be classified as Reduced Risk.

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 Feb. 21-22, 2012 in Davis, CA. At this meeting, the audit plan for 2012 was created. For 2012, regular inspections included 19 facility, 166 field in-life, 112 analytical in-life, 99 analytical summary report/data audits and 426 field data book audits. During the 2012 calendar year, 92 final reports and amended reports were audited.

Members of the IR-4 QAU were also involved in eight EPA GLP compliance inspections in 2012 for GLP compliance and data integrity. A total of 130 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.

The IR-4 QAU began an investigation for identifying an electronic reporting package that would convert the current paper based system to a paperless electronic system. A system was identified and approved for purchase by the IR-4 PMC in March of 2012. The new system, IR-4 eQA is in the development stage and will be rolled out for use in early 2013.

Crop Grouping Initiative

Crop grouping enables the establishment of residue tolerances for a group of crops based on residue data from representative crops from the group or subgroup. The IR-4 Project, with input from the International Crop Grouping Consulting Committee (ICGCC), continues to lead an effort to update the US and Canadian crop group regulation to

incorporate "orphan" crops that are not currently members of a crop group, and to develop new crop groups and subgroups. The ultimate goal is to increase efficiency in data development/data review associated with pesticide tolerances and to pursue a harmonized international crop grouping system to facilitate international MRLs and international trade.

The proposed revised Root and Tuber Crop Group 1 was submitted to the EPA on October 4, 2012. The submission for the Leaves of Root and Tuber Vegetables Crop Group 2 is in progress and the ICGCC is also currently reviewing the proposal for Legume Vegetable Crop Group 6.

The final rule for revisions to the current crop grouping regulations for the Stone Fruit group 12-12 and the Tree Nut crop group 14-12 was published in the *Federal Register* on August 22, 2012.

Efforts to harmonize crop grouping systems between the US, Canada and the Codex Committee on Pesticide Residues (CCPR) continue with cooperative efforts between the US and the Netherlands for revisions to the Bulb Vegetable, Berries and Small Fruits, Edible Fungi, Fruiting Vegetables (except Cucurbits), Oilseed, Citrus Fruits, Pome Fruit, Stone Fruit, Tree Nut, Herb and Spice, Tropical Fruits, Leafy Vegetables, Stalk and Stem and Brassica Vegetable commodity groups. CCPR also made final approval for all of the fruit types in 2012.

International Activities:

IR-4's involvement with efforts to remove pesticide residues as a barrier of exports for US-grown specialty crops has become a common aspect of IR-4's efforts and expanded use of the data generated. IR-4 also regularly participates in global organizations that involve pesticide issues and commodities in trade.

Presence of pesticide residues can be a barrier of trade if appropriate approval in the importing country is not available. IR-4 has been working and providing leadership in the international arena to harmonize pesticide approvals with trading partners to open up the door for increased trade. This includes organizing the Second Global Minor Use Summit, managing the first publically funded international residue study with a specialty crop and further harmonization with Canada through the Regulatory Cooperation Council. It is safe to say that the international sales of specialty crops continues to be a bright spot in the domestic economy and IR-4 has played a role in this success.

In North America, IR-4 cooperates with Canada and its Minor Use Program, the Pest Management Centre (PMC) of Agriculture and AgriFood Canada. Canada cooperated with IR-4 on 21 studies in 2012. Four of the studies were managed and funded by Canada's 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 Canadian 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 Canada PMC representatives participating in various IR-4 meetings and IR-4 participating in PMC meetings.

The minor use joint review process by EPA and Canada's Pest Management Regulatory Agency (PMRA) continues to save resources on both sides of the border, since only one agency is reviewing the residue data; but more importantly, both agencies are establishing maximum residue limits (MRLs) at the same level, at the same time, that prevent trade irritants before they happen. EPA and PMRA completed seven joint reviews in 2012 for the active ingredients Acequinocyl, Azoxystrobin, Difenoconazole, Cyprodinil, Cyazofamid, Fluazinam, and Fludioxonil.

In 2012, IR-4 also made a number of data submissions to JMPR/CCPR that should support additional Codex MRLs in the future. These submissions included Pyrimethanil, Flutolanil, Spirotetramat, Cyprodinil, Fludioxonil, and Propiconazole (see Attachment 4) and included over 70 IR-4 data packages (studies).

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 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 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 Brazil over the past year. The knowledge and expertise of IR-4 is occasionally 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 Canada (the Pest Management Centre of Agriculture and Ag-Food Canada) to further develop harmonized processes and data generation that will allow the US and Canadian regulatory authorities to share resources when reviewing data to essentially eliminate trade barriers and technology gaps between the two countries.

Finally, the keynote event for IR-4 in 2012 was the Second Global Minor Use Summit held at the FAO headquarters in Rome, Italy and co-organized by FAO, USDA, USEPA, and IR-4. The Summit was attended by approximately 230 delegates representing over 50 industrialized and developing countries and resulted in a five year work plan that identifies items into short, medium and long term timeframes to support and address minor use issues. The final report of this meeting can be found at www.gmup.org.

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 2012, IR-4 conducted 772 ornamental horticulture research trials to support registrations in the greenhouse, nursery, landscape, Christmas tree and forestry industries. Of these 572 were efficacy trials designed to compare different products to manage pests, diseases and weeds and 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 2012 field cooperators and Attachment 8 for research activities listed by project.

Table 1. Summary of IR-4's 2012 Ornamental Horticulture Program Research Activities.

Category	**2012**		
	Efficacy	Crop Safety	Total
Number of Studies (PR Numbers) with Planned Trials	196	291	487
Number of Trials	312	460	772

Submissions and Successes

During 2012, 21 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, Bacterial Disease Efficacy, Clethodim Crop Safety, Dimethenamid-p Crop Safety, Dimethenamid-p + Pendimethalin Crop Safety, Fusarium Efficacy, Indaziflam Crop Safety, Liverwort Efficacy, Metconazole Crop Safety, Mite Efficacy & Literature Review, Oxyfluorfen + Prodiamine Crop Safety, PGR Impact on Herbaceous Plant Branching, PGR Impact on Woody Plant Branching, Rust Efficacy, Scale and Mealybug Efficacy, F6875 (Sulfentrazone + Prodiamine) Crop Safety, Spirotetramat Crop Safety, Tolfenpyrad Crop Safety, Trifluralin + Isoxaben Crop Safety, Triticonazole Crop Safety, and Whitefly Efficacy. Data from 3,866 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. 2012 Ornamental Horticulture Program Research Summaries.

Region	**Number of Trials**
North Central	515
North East	364
Southern	1,209
Western	667
USDA-ARS	1,110
Total	3,866

During 2012**,** 3 new products were registered with EPA using label directions based partially on the efficacy or crop safety IR-4 generated: Marengo G (Indaziflam), Orvego (ametoctradin + dimethomorph) and RootShield Plus

(*Trichoderma harzianum* T-22 + *Trichoderma virens* G-41). IR-4 data also contributed to 3 state registrations where efficacy data were reviewed: Barricade 4L (prodiamine), Freehand (pendimethalin + dimethenamid-p), and Micora (mandipropamid). IR-4 data from 385 field trials contributed to these actions. IR-4 data was used to support the registration of Tower EC (dimethenamid-p) in Canada. This impacted 644 ornamental crops. See Table 3 for details.

Table 3. Ornamental Horticulture Program Contributions to 2012 Registrations.

Category	**2012**		
	Efficacy	Crop Safety	Total
New US EPA Product Registrations [a]	2	1	2
US EPA Label Amendments [b]	0	0	0
State Registrations [c]	1	2	3
International	0	1	1
Number of Trials Contributing to Registrations [d]	63	340	403
North Central	11	33	44
North East	6	39	45
Southern	17	65	82
Western	21	59	80
USDA-ARS	8	144	152
Number of Impacted Crops [e]	527	77	644

[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 example, *Phytophthora cinnamomi* is known to infect 204 plant species. By adding *P. cinnamomi* to the Segway label, IR-4 data has impacted 204 crops.

Biopesticide and Organic Support Program

The IR-4 Biopesticide and Organic Support Program has the goal of facilitating the registration of crop protection products 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

The Biopesticide Research Program is in its thirteenth year of competitive grant funding of projects, amounting to over $6.3 million in grants to researchers since its inception in 1983. In 2012, the biopesticide grant program funded 7 Early Stage, 7 Advanced Stage and 5 Demonstration 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.

Submissions and Successes

In 2012, IR-4 submitted to EPA the new active ingredient registration for Carob Moth Pheromone IR-4 submissions for EPA biochemical classification included packages for polyglycol alginate. (see Attachment 10).

From efficacy research funded through the biopesticide grant program, there were 12 additions of crops to biopesticide labels (see Attachment 10). In addition, a total of 26 Emergency Exemptions for 9,10 Anthraquinone

were supported in 2012 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

IR-4's most recent initiative, the Public Health Pesticide (PHP) Program, was established to assist in the development and registration of pesticide minor uses that protect the public from vector-borne diseases such as West Nile virus, Lyme disease, malaria, or dengue fever; as well as the nuisance and economic costs caused by mosquitoes, ticks, and similar public health pests. Funding for the IR-4 PHP Program is from the Department of Defense's Deployed Warfighter Protection Program (DWFP), and the USDA-ARS, which are collaborating on development of improved vector management methods and materials. As the DWFP begins to transition from a product discovery effort to a full product development program, IR-4 serves as the primary regulatory representative for many of the new materials that have been identified as candidate PHP's. In addition, these agencies 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 products, assisting with the development and evaluation of these products, and supporting the continued registration of older useful products.

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, commercial partners, and regulators in the development of new chemical tools for vector control, including toxicants, repellents, and attractant-baited traps. 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 regulatory cost. During 2012, its third full year, the IR-4 Public Health Pesticides Program reached a major milestone with the publication of a unique inventory of over 600 current and potential public health pesticides, with information compiled for the first time on specification and characterization of these materials, their regulatory status in major jurisdictions around the globe, and evidence for their efficacy in a range of potential use patterns. This significantly expanded the IR-4 public access database of chemicals used to combat disease-carrying arthropods (http://ir4.rutgers.edu/PublicHealth/publichealthDB.cfm).

The PHP program also in 2012 completed a number of significant specific regulatory submittals and initiated several others. A first-ever magnitude of the residue study by IR-4 on ultra-low-volume (ULV) spray applied from a moving aircraft (etofenprox vs. mosquitoes) was substantially expanded, with novel models developed and reports submitted on cumulative residues following multiple mosquitocide applications, comparisons of deposition from ground- vs. aerial-applications of mosquitocides, and on the extent of food and feed crops potentially exposed to mosquito control products. IR-4 conducted a risk assessment for retreatment of military uniforms with permethrin once this insect repellent wears out, and is representing the military in discussions with EPA on the label changes that would be required to make this operationally feasible. Finally, a major review of volatile insect repellents and toxicants was initiated, with a primary goal of assisting the military, WHO, CDC, and others in selection and evaluation of potential agents useful for area-wide vector control.

In addition to these activities towards development and registration of new materials, IR-4 has worked to ensure that new data requirements for existing vector control products do not create major gaps in the vector control toolbox. IR-4 collaborated with registrants of the mosquitocides resmethrin, temephos, and malathion to petition for reduced data requirements for these PHP's that were facing unaffordable reregistration data requirements, arguing on the basis of public need, limited exposure patterns, and existing data on similar materials. Recognizing that new data requirements could threaten other PHP's in the near future, and that the market for these materials may be too small to afford extensive data collection, IR-4 expanded in 2012 an exhaustive review of the mosquito pest problem in the U.S., the products available for mosquito control and in the development pipeline, challenges to the availability of these products, and any additional public health pest control needs of vector control professionals and the public in general. This exercise, which will be concluded in 2013, will provide an opportunity to help the user community formally define its priorities for research, regulatory support, training and education, and funding for the coming years.

Impact

The regulatory approval of safe and effective pesticides and biopesticides to assist in the production of food/non-food ornamentals crops and to protect humans from arthropod pests that vector disease is the core objective of the IR-4

Project. IR-4 is committed to provide the support required to give specialty growers and other minor use stakeholders the tools they need to be successful, competitive and safe.

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 adequate pest management tools the cost of production, amount of pest damage price of final product is increased, while supply of quality produce is decreased. 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 specific 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, which are valued at $50 billion at the farm gate.

In an effort to capture a solid assessment of program value, the IR-4 Project commissioned Michigan State University's Center of Economic Analysis to conduct 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 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.

The report went on to break down the specific contributions of the three core research objectives and noted that the Food Program generates economic activity sufficient to support 87,792 US jobs and add $6.1 billion to the annual gross domestic product. The Ornamental Horticulture Program generates a total of 14,501 full and part time jobs and contributes $1.0 billion to the annual gross domestic product. The Biopesticide and Organic Support Program is estimated to generate 2,358 jobs and contribute $155 million to the annual gross domestic product.

Specialty crop growers often share antidotal comments to report on the impact of the IR-4 Project to their business. Some recent quotes include**: *"IR-4 is an invaluable resource for greenhouse and nursery growers – not just in helping make sure they have access to the chemical and biocontrol tools they need to control pests and diseases, but also to support research that helps them use those tools wisely. Specialty crop growers are definitely getting double and triple benefits from the IR-4 program, because the program listens to the industry … you hear our voices!"* - Lin Schmale, Society of American Florists.** Additionally**,** Mike A. Mellano of Mellano & Company stated, "***Over the years I know that IR-4 has been very important and instrumental in helping bring some of the minor use crop materials forward for our operations. Sometimes the work goes unrecognized because it happens behind the scenes without much fanfare. I view the IR-4 program as critically important especially to those of us in the 'super specialty crop' area of agriculture because it is often times difficult or unprofitable for a manufacturer to register materials for our uses. IR-4 gives us the opportunity to broaden our arsenal against the ever increasing range of pests that challenge our farming operations. Without IR-4's efforts our job would be much more difficult if not impossible".***

FY 2012 Appropriations and other funding

The IR-4 Project is funded by USDA in partnership with the SAES. Total direct funding for the IR-4 Project during calendar year 2012 was approximately $19 million.

The majority of USDA funding for the IR-4 Project comes through NIFA. This included the FY 2012 Congressional appropriation through NIFA amounting to $11.913 million. This was a decrease of $243,000 from the FY 2011 appropriation of $12.156 million.

The SAES directly contributes financial resources through Multi-State Research Funds (NRSP-4 grant); with $481,182 being allocated annually. 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 $3.9 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 provided IR-4 with approximately $500,000 to work on international activities to support specialty crop exports and global pesticide regulatory harmonization. This includes funds for reformatting existing data to allow it use to support international maximum residue levels, operations associated with the Global Minor Use Summit-2, and international residue trials.

USDA-APHIS has funded IR-4 approximately $900,000 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 2012 they provided $1.079 million in unrestricted grants. IR-4 used these resources to supplement UDSA funds; $186,764 for additional research activities, $503,333 for multiple year office rent at IR-4 HQ, $327,731 to support additional HQ operations and $61,413 for priority setting workshop and related meetings.

The direct funding of $19 million does not include the substantial in-kind contributions provided by SAES/land grant universities, EPA, the Canadian Pest Management Centre and the crop protection industry. As noted above, 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 fund contributions. The crop protection industry provides characterized test substance and analytical standards to be used in 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 over $6 million in federal fiscal year 2012. 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.

Future Directions

IR-4 continues seek broad input from stakeholders through an open and transparent process to establish priorities on the most critical and damaging pests on specialty crops/minor uses and how IR-4 should allocate its resources to address these identified needs. Priorities for the 2013 food program were established at the 2012 Food Use Workshop September 11 & 12 in St. Louis, MO. The outcome of this workshop and subsequent discussions with stakeholders is a research plan for 2013 which includes 79 magnitude of residue studies consisting of 556 field trials. The Canadian Minor Use Program is cooperating on 16 of those studies and contributing 58 field trials. There will also be an additional 23 field trials in 2013 to complete eight ongoing studies. Additionally, IR-4 will continue to fund efficacy/crop safety research.

The Ornamental Horticulture Program held its last full priority setting workshop October 4-7, 2011 in Sacramento, CA. At this Workshop the participants were asked to identify the most important pest management needs for the various ornamental crops and production systems. First year research was out in in 2012; this will be followed by modifications of the research plan/protocols and additional research to obtain a second year of data. The priorities set at the workshop will lead to 15 research projects on various ornamental species that are part of IR-4 2013 field program.

Within the Biopesticide and Organic Support Program, IR-4 publishes a Request for Applications to solicit proposals for research funding. IR-4 received 37 proposals for 2013 research. Of these, 3 were considered for early stage or pre-development biopesticides and 20 were Advanced Stage labeled with the goal of the proposed work to expand the registration to new crops and/or new pests. The remaining 14 proposals were Demonstration proposals for

biopesticides that were already registered to demonstrate to stakeholders that the biopesticide when used correctly could be part of a successful pest management system. Funding decisions on proposals will be made by March 2013.

As noted earlier, 2013 marks the 50th Anniversary of the IR-4 Project. IR-4 takes pride in these accomplishments and this 50 year milestone. However, there are many issues that remain unresolved. Specialty crop growers/minor use stakeholders still face challenges in managing their critical pests. 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 Marmaladed Stink Bug, Spotted Winged Drosophia, Boxwood Blight, etc., 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.

Adequate funding remains the most critical current and future challenge for IR-4. Over the past two years there have been modest cuts in federal government funding with the potential for more cuts in the future. The IR-4 Project will remain prudent with the use of resources. Additionally, IR-4 continues to search for opportunities to gain efficiencies in all aspects of the 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.

However, 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. Unfortunately, this number of new studies continues to decrease. It is likely that there will be 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.

Finally, in February 2012, USDA released a proposal to consolidate the IR-4 Project with several Integrated Pest Management (IPM) programs. The President's Fiscal Year 2013 funding plan called for the transfer of funds traditionally provided for IR-4 activities and other IPM programs to a new consolidated program called Crop Protection. Many specialty crop growers and others in the minor use community had critical concerns about the impact of including IR-4 in this IPM consolidation plan. Broad grassroots support influenced Congress and USDA of the need to keep IR-4 as a stand-alone program for 2013. We anticipate that there will be continued pressure by the government to look at alternative funding models.

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Kunkel, D. L., J. J. Baron and D. Infante. 2012. US IR-4 Program and Global Minor Use Summit II, February 21-23, 2012. FAO, Rome, Italy.

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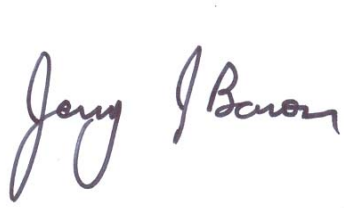
December 31, 2012

Approved by:



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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, California Specialty Crops Council
Dr. Michael Bledsoe, Village Farms, L.P.
Dr. A. Richard Bonanno, Bonanno Farm Trust 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
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, American Nursery and Landscape Assoc.
Mr. Dave Trinka, MBG Marketing
Mr. Tyler Wegmeyer, American Farm Bureau Federation

Cooperating Government Departments and Agencies

Agriculture and Agri Food Canada
American Public and Land Grant Association
Health Canada
State Agricultural Experiment Stations/Land Grant Universities
State of California Department of Pesticide Regulation
U.S. Department of Agriculture, National Institute of Food and Agriculture
U.S. Department of Agriculture, Agricultural Research Service
U.S. Department of Agriculture, Foreign Agriculture Service
U.S. Department of Agriculture, Animal and Plant Health Inspection Service
U.S. Department of Defense, Deployed Warfighter Protection Program
U.S. Environmental Protection Agency

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.
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Valent Bioscience
Valent Professional Products
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ATTACHMENT 1 Continued

IR-4 Project Headquarters (HQ)

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ATTACHMENT 1 Continued

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ATTACHMENT 1 Continued

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ATTACHMENT 1 Continued

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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
C. Farrar	CA
D. Groenendale	WA
J. Kam	HI
G. Koskela	OR
W. Meeks	ID
C. Oman	CO
K. Skiles	CA
D. Stewart	CA
R. Zapien	CA

ARS

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

Canada

T. Abiola	AB
M. Clodius	BC
J. Dubuc	QC
R. Grohs	ON
T. Jobin	QC
S. Leblanc	NB
G. McMillan	BC
D. Nield	BC
H. Peill	NS
G. Riddle	ON
D. Ulrich	SK
M. Weber-Henricks	ON
P. White	ON
R. Wismer	ON

International

C. Caballero	Chile
L. Gaggero	Italy
I. Gallego	Spain
A. Geelen	New Zealand
S. Lange	New Zealand
M. Montagna	Australia
G. Murdoch	Australia
K. Paaske	Denmark
S. Parker	United Kingdom

ATTACHMENT 2
2012 Food Use Research Projects – Residue Trials

CHEMICAL	CROP	PR #
• 6-Benzyladenine	Avocado	10922
• Acetamiprid	Clover (Red) (seed crop)	B9600
• Acetamiprid	Corn (Sweet)	A10216
• Acetamiprid	Cranberry	10943
• Anthraquinone	Rice	9687
• Chlorantraniliprole	Pomegranate	10362
• Chlorothalonil	Cherry (Sour)	10859
• Chlorothalonil	Cranberry	10801
• Clethodim	Hops	A8086
• Clofentezine	Avocado	9321
• Cyantraniliprole (HGW86)	Coffee	10874
• Cyflumetofen	Hops	10954
• Difenoconazole	Guava	10172
• Difenoconazole	Papaya	10802
• Diquat	Banana	10818
• Diquat	Onion (Dry Bulb)	10766
• Diquat	Sugar Apple	10814
• DPX-QGU42	Asparagus	10623, A10623
• DPX-QGU42	Onion	10617
• Emamectin benzoate	Artichoke (Globe)	10863
• Etoxazole	Hops	B8873
• Etofenprox + Piperonyl Butoxide	Mushroom (White Button)	10577
• Famoxadone + Cymoxanil	Ginseng	10812
• Famoxadone + Cymoxanil	Mango	10677
• Fenpyroximate	Caneberry	8097
• Flonicamid	Bean (Edible Podded & Succulent Shelled)	10474
• Flonicamid	Pea (Dry)	10473
• Flonicamid	Pea (Edible Podded & Succulent Shelled)	10472
• Fluazifop-P-Butyl	Grasses (Seed Crop)	9825
• Fluazifop-P-Butyl	Strawberry (Perennial)	A2085
• Fluazinam	Cabbage	7093
• Fluazinam	Cucumber	9238
• Fluazinam	Squash	8916
• Fluensulfone	Carrot	10907
• Fluensulfone	Potato	10904
• Flumioxazin	Orange	10799
• Flumioxazin	Lemon	10763
• Flumioxazin	Grapefruit	10764
• Flumioxazin	Clover (Seed Crop)	A10605
• Fluopicolide	Bean (Snap)	10323
• Fluopicolide	Hops	10916
• Flupyradifurone (BYI 02960)	Cucumber (GH)	10785
• Flupyradifurone (BYI 02960)	Pomegranate	10770
• Flupyradifurone (BYI 02960)	Tomato (GH)	10784
• Flutolanil	Tomato	A10593
• Glyphosate	Onion (Dry Bulb)	8056
• Hexazinone	Blueberry (High Bush)	8325
• Indaziflam	Coffee	10654
• Metaldehyde	Beet (Garden)	10338
• Metaldehyde	Wheat	10335
• Methoxyfenozide	Chives	7240
• Metribuzin	Potato	10671
• Penflufen	Onion	10865
• Penoxsulam + Oxyfluorfen	Pome Fruits	10944
• Penoxsulam + Oxyfluorfen	Stone Fruits	10899
• Potassium Phosphite	Citrus (Post Harvest)	10687
• Propamocarb-HCL	Guava	7171
• Pyrethrins + PBO	Crop Group 04	10846
• Pyrethrins + PBO	Crop Group 05	10847
• Pyrethrins + PBO	Crop Group 10	10850
• Pyrethrins + PBO	Crop Group 12	10852
• Pyrethrins + PBO	Crop Group 19	10855
• Quinoxyfen	Cucumber	7654
• Quinoxyfen	Squash (Summer)	8376
• Rimsulfuron	Grasses (Seed Crop)	10657
• Saflufenacil	Grasses (Seed Crop)	10884
• Saflufenacil	Olive	10787
• Spirotetramat	Carrot	10788
• Spirotetramat	Onion (Green)	A10942
• Spirotetramat	Pomegranate	A10113
• Thiabendazole	Mushroom (White Button)	10880
• Tolfenpyrad	Strawberry	10869
• Trifluralin	Rosemary	10820
• V-10208	Cantaloupe	10652
• V-10208	Cucumber (Field & GH)	10651
• V-10208	Ginseng	10682
• V-10208	Pepper (Bell & Non-Bell)	10650
• V-10208	Squash (Summer)	10649

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

Research to complete E/CS needs for 2009-2011 residue studies:

Chemical	Crop	PR#	Comments	CS trials planned	E trials planned	ARS trials	State trials
clopyralid	radish	10437	2010 residue study	4	none	OH	FL, OR, WI
s-metolachlor	chicory	10480	2011 residue study	1	none	WA	--
quinoxyfen	tomato	09289	2011 residue study, need E/CS data before reg.	from E trials	3	GA, OH, SC	--
acibenzolar	bell pepper	07116	tolerance exists; need E/CS data to add crop to label	from E trials	4	GA, OH, SC	GA
sulfentrazone	apple	07770	Complete final yr of multi-yr CS trials	4	none	--	NY, WV, NC, MI
pendimethalin	caneberry	09840	2011 residue study; multi-year CS trials	5	none	--	AR, MI, NC, OR, WA
quinclorac	caneberry	10436	2010 residue study; multi-year CS trials	5	none	--	AR, MI, NC, OR, WA
pendimethalin	blueberry	10181	2011 residue study; multi-year CS trials	2	none	GA, WA	--
mesotrione	grape	09786	2011 residue study; multi-year CS trials	6	none	WA	CA, CA, MI, NY, NY
flufenacet + metribuzin	timothy hay	10372	covered by grass tolerance; need 1 more CS trial	1	none	WA	--
carfentrazone-ethyl	asparagus	10278	2010-11 residue study	3	none	WA	CA, NJ
cyprodinil + fludioxonil	carambola	07125	tolerance covered by guava; need E/CS data to add crop to label	from E trial	1	--	PR
cyprodinil + fludioxonil	guava	07127	2010-11 residue study	from E trial	1	--	FL
famoxadone + cymoxanil	mango	10677	2011-12 residue study	from E trial	1	--	FL

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

Chemical	Crop	PR#	Comments	CS trials planned	E trials planned	ARS trials	State trials
metrafenone	parsley	10417	need E/CS data before reg.	2	none	CA, OH	--
sulfentrazone	edamame	10750	not a residue study - need E/CS data to add crop to label	3	none	OH, WA, WA	--
quinoxyfen	cucumber	07654	need E/CS data before reg.	3	none	GA, OH, SC	--
quinoxyfen	summer squash	08376	need E/CS data before reg.	3	none	GA, OH, SC	--
penoxsulam + oxyfluorfen	cherry	10899	need E/CS data before reg.	2	none	WA, WA	--
difenoconazole	mango/ papaya	10802	need E/CS data before reg.	from E trial	1	--	FL

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

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

Chemical	Crop	PR#	Comments	CS trials planned	E trials planned	ARS trials	State trials
Herbicides	garden beet	10914	weed control	collect from E trials	8	CA	AR, CA, MI, NC, NY, OR, TX
Fungicides	parsley	10709	leafspot control	collect from E trial	3	--	FL, NJ, VA
Fungicides	tomato	10711	timber rot control (includes a trial in Canada)	collect from E trials	6	--	GA, NJ, NY, PA, PA

Attachment 4 - 2012 Submissions to EPA, Registrants, and State Depts. of Agriculture

Completed Petitions or Final Reports Submitted to EPA

Pest Control Agent / Type*		Commodity or Crop Group	PR#	Date
Glyphosate	H	Vegetable, root and tuber, group 1, except sugar beet	A1243 09063	Jan 13 2012
		Oilseed group 20	10670	
		Teff, forage and hay	10528	
		Vegetable, bulb, group 3-07 (crop group update)	---	
		Vegetable, fruiting, group 8-10 (crop group update)	---	
		Fruit, citrus, group 10-10 (crop group update)	---	
		Fruit, pome, group 11-10 (crop group update)	---	
		Berry and small fruit, group 13-07 (crop group update)	---	
Flumioxazin	H	Prickly pear cactus	08647	Jan 24 2012
		Olive	08670	
		Pomegranate	08671	
		Cabbage	09519	
		Artichoke, globe	09815	
Imidacloprid	I	Fish-shellfish, mollusk	10553	Feb 07 2012
NAA	P	Avocado, Mamey sapote, Mango	09660	Feb 15 2012
		Rambutan	08666	
		Fruit, pome, group 11-10	10955	
Ethephon	I	Tomato (increased tolerance for greenhouse-grown, small-fruited tomato)	00250	Feb 22 2012
Ethalfluralin	H	Rapeseed subgroup 20A Sunflower subgroup 20B	10550	Mar 09 2012
Tebuconazole	F	Barley	A6513	Mar 22 2012
		Cantaloupe (cucurbit group 9)	A5091	
		Fruiting vegetables Group 8-10	---	
Trifluralin	H	Rapeseed subgroup 20A Sunflower subgroup 20B	10749	Mar 28 2012
Clopyralid	H	Teff	10771	Apr 02 2012
Indoxacarb	I	Bean, dry, seed Bean, succulent Bean, forage	09669 08574	Apr 04 2012
		Fruit, small, vine climbing, except fuzzy kiwifruit, subgroup 13-07F (replaces Grape tolerance)	10339	
		Berry, low growing, except strawberry, subgroup 13-07H (replaces Cranberry tolerance)	10340	
Hexythiazox	I	Pepper/Eggplant subgroup 8-10B	09818 09134	Apr 10 2012
		Fruit, pome, group 11-10	10961	
		Caneberry subgroup 13-07A	10962	
		Fruit, small, vine climbing, except fuzzy kiwifruit, subgroup 13-07F	10963	
		Berry, low growing, subgroup 13-07G	10964	
Sulfentrazone	H	Vegetable soybean, succulent	10750	Apr 18 2012
Imazosulfuron	H	Vegetable, tuberous and corm, subgroup 1C	09645	Apr 24 2012
		Melon subgroup 9A	09819	
Fenoxaprop-p-ethyl	H	Grass (grown for seed)	06220	May 23, 2012

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

Attachment 4 - 2012 Submissions to EPA, Registrants, and State Depts. of Agriculture Continued

Pest Control Agent / Type*		Commodity or Crop Group	PR#	Date
Prometryn	H	Snap bean (succulent)	08978	May 24, 2012
		Dill	A3040	
Halosulfuron-methyl	H	Caneberry subgroup 13-07A	09793	Jun 05 2012
		Artichoke, globe	09930	
Fomesafen	H	Cantaloupe	09536	Jun 26 2012
		Watermelon	08945	
		Squash, summer	09538	
		Pumpkin/Winter Squash	09115	
		Cucumber	09537	
Chlorantraniliprole	I	Grain, cereal, group 15, except rice	10204	Jul 11 2012
		Grain, cereal, forage, fodder and straw, group 16		
		Fruit, pome, group 11-10	11037	
		Fruit, citrus, group 10-10	11036	
Pyraclostrobin	F	Artichoke, globe	09689	Jul 27 2012
		Endive, Belgium	A8662	
		Persimmon	09093	
		Vegetable, bulb, group 3-07 (replaces group 3)	10560	
		Vegetable, fruiting, group 8-10 (replaces group 8)	10561	
		Fruit, citrus, group 10-10 (replaces group 10)	10566	
		Fruit, pome, group 11-10 (replaces group 11)	10567	
		Caneberry subgroup 13-07A (replaces subgroup 13A)	10562	
		Bushberry subgroup 13-07B (replaces subgroup 13B)	10563	
		Fruit, small, vine climbing, except fuzzy kiwifruit, subgroup 13-07F (replaces grape tolerance)	10564	
		Berry, low growing, subgroup 13-07G (replaces strawberry tolerance)	10565	
		Oilseed group 20 (replaces canola, sunflower, and cotton tolerances)	10568	
Boscalid	F	Artichoke, globe	09689	Jul 27 2012
		Endive, Belgium	A8662	
		Persimmon	09093	
		Vegetable, bulb, group 3-07 (replaces group 3)	10560	
		Vegetable, fruiting, group 8-10 (replaces group 8)	10561	
		Fruit, citrus, group 10-10 (replaces group 10)	10566	
		Fruit, pome, group 11-10 (replaces group 11)	10567	
		Caneberry subgroup 13-07A (replaces subgroup 13A)	10562	
		Bushberry subgroup 13-07B (replaces subgroup 13B)	10563	
		Fruit, small, vine climbing, except fuzzy kiwifruit, subgroup 13-07F (replaces grape tolerance)	10564	

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

Attachment 4 - 2012 Submissions to EPA, Registrants, and State Depts. of Agriculture Continued

Pest Control Agent / Type*		Commodity or Crop Group	PR#	Date
Boscalid (con't)		Berry, low growing, subgroup 13-07G (replaces strawberry tolerance)	10565	
		Oilseed group 20 (replaces canola, sunflower, and cotton tolerances)	10568	
		Vegetable, root, except sugar beet, subgroup 1B (replaces subgroup 1A)	11047	
		Turnip greens	09423	
Metaldehyde	M	Grass (grown for seed)	06267	Jul 30 2012
		Leaf petioles subgroup 4B	09421	
		Mint	09611	
		Taro (wetland)	07574	
		Corn (field)/Corn (sweet)	09655	
		Soybean (regional registration)	09821	
		Caneberry subgroup 13-07A (replaces group 13)	10778	
		Bushberry subgroup 13-07B (replaces group 13)	10779	
		Berry, low growing, subgroup 13-07G (replaces strawberry tolerance)	10780	
Fenpyroximate	I	Fruit, stone, group 12-12	10438 10468 10469	Aug 07 2012
		Vegetable, tuberous and corm, subgroup 1C	10173	
		Fruit, small, vine climbing, except fuzzy kiwifruit, subgroup 13-07F	11028	
Linuron	H	Coriander	01625	Sep 06 2012
		Dill	01432	
		Horseradish	A3609 B3609	
		Parsley	03035	
		Pea (dry)	09651	
		Celeriac	03557	
		Pea (chickpea)	10098	
Fenpropathrin	I	Barley	07667	Oct 17 2012
		Vegetable, fruit, group 8-10	11030	
		Fruit, citrus, group 10-10	11031	
		Fruit, pome, group 11-10	11032	
		Bushberry subgroup 13-07B	11033	
		Fruit, vine climbing, except fuzzy kiwifruit, subgroup 13-07F	11034	
		Berry, low growing, subgroup 13-07G	11035	
Quinoxyfen	F	Vegetable, fruiting, group 8-10	09289	Oct 29 2012
		Fruit, small, vine climbing, except fuzzy kiwifruit, subgroup 13-07F	11064	
		Berry, low growing, subgroup 13-07G	11065	
Methoxyfenozide	F	Herb subgroup 19A, except chives	07241	Nov 05 2012
		Date	10154	
		Caneberry subgroup 13-07A	10470	
		Sorghum, sweet and grain Aspirated grain fractions	07525	
		Pea and bean, dried shelled, except soybean, subgroup 6C, except pea, blackeyed, seed and pea, southern, seed	11149	

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

Attachment 4 - 2012 Submissions to EPA, Registrants, and State Depts. of Agriculture Continued

Pest Control Agent / Type*		Commodity or Crop Group	PR#	Date
Methoxyfenozide (con't)	F	Fruit, small, vine climbing, except fuzzy kiwifruit, subgroup 13-07F	11150	
		Berry, low growing, subgroup 13-07G, except cranberry	11151	
		Fruit, pome, group 11-10	11152	
		Vegetable, fruiting, group 8-10	11153	
		Sugar apple Cherimoya Atemoya Custard apple Ilama Soursop Biriba	07066 11173 07065 11174 11175 11176 11177	
		Rapeseed subgroup 20A/ inadvertent tolerances	11154	
		Sunflower subgroup 20B/ inadvertent tolerances	11155	
Mandipropamid	F	Basil Bean, snap, and cowpea foliage	10124 10324	Nov 15 2012
		Ginseng	10061	
		Vegetable, fruiting, group 8-10	10485	
		Fruit, small, vine climbing, except fuzzy kiwifruit, subgroup 13-07F	11192	
		Onion, bulb, subgroup 3-07A	11193	
		Onion, green, subgroup 3-07B	11194	
Triflumizole	F	Tomato (greenhouse)	09299	Nov 16 2012
		Cucumber (greenhouse)	09300	
		Fruit, small, vine climbing, except fuzzy kiwifruit, subgroup 13-07F	11048	
		Berry, low growing, subgroup 13-07G	11049	
		Fruit, pome, group 11-10	11050	
Etofenprox	I	All food and feed commodities /supplemental data (in support of mosquitocide use)	10135	Nov 19 2012
Flonicamid	I	Alfalfa and Clover (Pacific Northwest only)	09943	Dec 17 2012
		Mint	09358	
		Vegetable, fruiting, group 8-10	08556 11196	
		Fruit, pome, group 11-10	11197	
		Fruit, stone, group 12-12	11198	
Clomazone	H	Brassica, head and stem, subgroup 5A	A3569	Dec 19 2012
		Rhubarb	08724	
		Pea, southern	08934	

Completed Final Reports Submitted to Registrant for submissions to EPA, Label Expansion or Conditional Registrations

Pest Control Agent / Type*		Commodity	PR#	Date
Tebuconazole	F	Cantaloupe	A5091	Jan 30 2012
Etoxazole	I	Hop	B8873	Jul 09 2012
BYI 02960 (flupyradifurone)	I	Blueberry Clover Prickly Pear Cactus	10637 10747 10722	Jul 17, 2012
Kasugamycin	F	Tomato storage stability	A9797	Aug 22 2012

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

Attachment 4 - 2012 Submissions to EPA, Registrants, and State Depts. of Agriculture Continued

Pest Control Agent / Type*		Commodity	PR#	Date
Kasugamycin	F	Walnut storage stability	A9772	Aug 22 2012
Bifenthrin	I	Grape (grape root borer control)	10074	Aug 30 2012
Cyazofamid	F	Hop	10265	Sep 19 2012
Triflumizole	F	Hop	10798	Oct 04 2012
Chlorantraniliprole	I	Hop	10491	Oct 17 2012
Azoxystrobin	F	Cranberry	10573	Oct 26 2012
Azoxystrobin	F	Caneberry	10574	Oct 26 2012
Flutianil	F	Squash	09177	Nov 20 2012
Flutianil	F	Cucumber	09718	Nov 21 2012
Flutianil	F	Hop	09190	Nov 21 2012
Trifloxysulfuron	H	Tomato	10458	Dec 12 2012
*F=fungicide, H=herbicide, I=insecticide/acaricide, M=molluscide, P=plant growth regulator, R=rodenticide				

Completed Final Reports Submitted to Registrant in Support of Reregistration

Pest Control Agent / Type*		Commodity	PR#	Date
Malathion	I	Flax Processed Commodities	10082	Mar 30 2012
*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*		Commodities	Date
Pyrimethanil	F	Ginseng, Lemon, Berries (low growing)	Dec 05 2012
Flutolanil	F	Brassica (head and stem), Brassica (leafy greens)	Dec 05 2012
Spirotetramat	I	Artichoke (globe), Banana, Plantain, Bushberry, Cranberry, Coffee, Bulb Vegetables, Pomegranate, Pineapple, Watercress	Dec 06 2012
Cyprodinil	F	Carrot, Radish, Spinach, Lettuce, Watercress, Brassica (head and stem), Brassica (leafy greens), Basil, Chives, Parsley, Bean (snap, lima, and dry), Pepper (and other fruiting vegetables), Cucurbits, Lemon, Lime, Avocado, Lychee, Caneberry, Strawberry, Blueberry, Kiwifruit	Dec 10 2012
Fludioxonil	F	Carrot, Radish, Ginseng, Spinach, Lettuce, Brassica (head and stem), Brassica (leafy greens), Basil, Chives, Parsley, Bean (snap, lima, and dry), Pepper (and other fruiting vegetables), Cucurbits, Lemon, Lime, Avocado, Lychee, Raspberry, Strawberry, Blueberry, Kiwifruit, Pineapple	Dec 10 2012
Propiconazole	F	Bean (dry, lima, and snap) Mint, Pineapple, Blueberry, Caneberry	Dec 19 2012

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

ATTACHMENT 5 – IR-4 Project Tolerance Successes in 2012

Pest Control Agent / Type*		Date	Commodity or Crop Group	PR#	No. of Uses	No. of Tolerances
Rimsulfuron	H	Jan 25 2012	Caneberry subgroup 13-07A**	09661	5	1
			Bushberry subgroup 13-07B**	09691	19	1
Acibenzolar-S-methyl	F	Apr 11 2012	Berry, low growing, subgroup 13-07G**	07817	9	1
Quizalofop ethyl	H	Apr 20 2012	Rapeseed subgroup 20A, except flax, seed (replaces tolerances on canola, seed and meal)	07340	13	4
			Sorghum	10092	1	4
Acequinocyl	I	May 02 2012	Bean, succulent shelled** Edamame**	08674 10769 10768	14	4
			Melon subgroup 9A**	08607	3	1
			Cucumber**†	08606 08859	1	1
			Caneberry subgroup 13-07A**†	09273	5	1
			Fruit, small, vine climbing, except fuzzy kiwifruit, subgroup 13-07F (replaces Grape tolerance)**	10585	5	1
			Berry, low growing, subgroup 13-07G (replaces Strawberry tolerance)**	10586	8	1
			Cherry**	09629	1	2
Propiconazole	F	Jun 27 2012	Bean (snap)**	06508 09295	1	1
			Bean (succulent shelled)**	09437	14	1
			Bean (dried seed)**	02008	22	1
			Fruit, citrus, group 10-10 (post-harvest)**	09715 09615 09616 09617	28	1
			Fruit, stone, group 12 (post-harvest), except Plum**	09787 09621 09623	10	1
			Plum**	09622	1	1
			Tomato (post-harvest)**	10182 10493	2	1
			Vegetable, foliage of legume, group 7	---	---	1
Methoxyfenozide	I	Jul 11 2012	Fruit, citrus, group 10-10 (replaces tolerance for group 10)**	09367	14	2
			Vegetable, root, except sugar beet, subgroup 1B** Beet, sugar** (replaces tolerance for subgroup 1A)	09884 09895	---	2
Sulfentrazone	H	Jul 12 2012	Rhubarb	09408	1	1
			Turnip (roots and tops)	07915	3	2
			Sunflower subgroup 20B (to replace tolerance on Sunflower)	---	13	1
			Wheat (Pacific Northwest only)	08722	2	4
			Safflower	06910	1	1
			Cowpea, succulent (Tennessee only)	---	1	1

*F=fungicide, H=herbicide, I=insecticide/acaricide, M=molluscide, P=plant growth regulator, R=rodenticide
**This use (some crops) have been found on an approved market label.
†Joint review project with Canada (EPA/PMRA)

ATTACHMENT 5 – IR-4 Project Tolerance Successes in 2012 – Continued

Pest Control Agent / Type*		Date	Commodity or Crop Group	PR#	No. of Uses	No. of Tolerances
Azoxystrobin	F	Jul 13 2012	Onion, bulb, subgroup 3-07A (replaces tolerance for Onion, bulb)	10345	3	1
			Onion, green, subgroup 3-07B (replaces tolerance for Onion, green)	10346	6	1
			Caneberry subgroup 13-07A (replaces tolerance for subgroup 13A)	10347	1	1
			Bushberry subgroup 13-07B (replaces tolerances for subgroup 13B, juneberry, lingonberry, and salal)	10348	11	1
			Fruit, small, vine climbing, except fuzzy kiwifruit, subgroup 13-07F (replaces tolerance for grape)	10349	5	1
			Berry, low growing, subgroup 13-07G, except cranberry (replaces tolerance for strawberry)**	10350	7	1
			Tomato subgroup 8-10A (replaces tolerance for tomato)**	---	9	1
			Pepper/Eggplant subgroup 8-10B (replaces tolerance for group 8 except tomato)**	---	3	1
			Fruit, citrus, group 10-10 (replaces tolerance for group 10)**	---	14	1
			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
			Cottonseed subgroup 20C (replaces tolerance for cotton, delinted seed)	---	1	2
			Wasabi	10549	1	2
			Dragonfruit	10609	1	1
			Vegetable, tuberous and corm,† subgroup 1C (amended tolerance, also replaces tolerance for potato)	09224 09860	---	---
Difenoconazole	F	Jul 19 2012	Vegetable, fruiting, group 8-10 (replaces tolerance for group 8)**	---	12	1
			Fruit, citrus, group 10-10 (replaces tolerance for group 10)**	---	14	1
			Fruit, pome, group 11-10 (replaces tolerance for group 11)**	---	5	1
			Berry, low growing, subgroup 13-07G, except cranberry (replaces tolerance for strawberry)**	---	7	1
			Vegetable, tuberous and corm,† subgroup 1C (amended tolerance, also replaces tolerance for potato processed waste with potato wet peel)	09860 10131	---	---

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**This use (some crops) have been found on an approved market label.
†Joint review project with Canada (EPA/PMRA)

ATTACHMENT 5 – IR-4 Project Tolerance Successes in 2012 – Continued

Pest Control Agent / Type*		Date	Commodity or Crop Group	PR#	No. of Uses	No. of Tolerances
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
Pyrimethanil	F	Aug 01 2012	Berry, low growing, subgroup 13-07G (replaces tolerance on Strawberry)**	10356	8	1
			Fruit, small, vine climbing, except fuzzy kiwifruit, subgroup 13-07F (replaces tolerance on Grape)**	10355	5	1
			Onion, bulb, subgroup 3-07A (replaces tolerance on Onion, bulb)**	10353	3	1
			Onion, green, subgroup 3-07B (replaces tolerance on Onion, green)**	10354	6	1
			Ginseng**	09707	1	1
Rimsulfuron	H	Aug 03 2012	Chicory	09417	1	2
Paraquat dichloride	H	Aug 09 2012	Pomegranate** Lychee** Mango** Starfruit** Sugar apple** Atemoya** Biriba** Canistel** Cherimoya** Custard apple** Fiejoa** Ilama** Jaboticaba** Longan** Pawpaw** Pulasan** Rambutan** Sapodilla** Black sapote** Mamey sapote** White sapote** Soursop** Spanish lime** Wax jambu**	10127 10096 10097 10093 10140	24	24

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ATTACHMENT 5 – IR-4 Project Tolerance Successes in 2012 – Continued

Pest Control Agent / Type*		Date	Commodity or Crop Group	PR#	No. of Uses	No. of Tolerances
Fludioxonil	F	Aug 15 2012	Acerola**	---	1	1
			Atemoya**	---	1	1
			Biriba**	---	1	1
			Cherimoya**	---	1	1
			Custard apple**	---	1	1
			Feijoa**	---	1	1
			Guava**	10521	1	1
			Ilama**	---	1	1
			Jaboticaba**	---	1	1
			Passionfruit**	---	1	1
			Soursop**	---	1	1
			Starfruit**	---	1	1
			Sugar apple**	10517	1	1
			Wax jambu**	---	1	1
			Avocado (amended tolerance) **	---	---	---
			Black sapote (amended tolerance) **	---	---	---
			Mamey sapote (amended tolerance) **	---	---	---
			Mango (amended tolerance) **	---	---	---
			Papaya (amended tolerance) **	10519	---	---
			Sapodilla (amended tolerance) **	---	---	---
			Star apple (amended tolerance) **	---	---	---
			Longan (amended tolerance) **	---	---	---
			Lychee (amended tolerance) **	10518	---	---
			Pulasan (amended tolerance) **	---	---	---
			Rambutan (amended tolerance) **	---	---	---
			Spanish lime (amended tolerance) **	---	---	---
			Tomato (amended tolerance) (replaces tolerance for tomatillo) **	10182 10493	---	---
			Ginseng**†	09349	1	1
			Onion, bulb, subgroup 3-07A (replaces tolerance for Onion, bulb)**	10522	3	1
			Onion, green, subgroup 3-07B (replaces tolerance for Onion, green) **	10523	6	1
			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
			Vegetable, fruiting, group 8-10, except tomato**†	09140 09567 11006	20	1
			Fruit, citrus, group 10-10 (replaces tolerance for group 10) **	11007	14	1
			Fruit, pome, group 11-10 (replaces tolerance for group 11) **	11008	5	1

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ATTACHMENT 5 – IR-4 Project Tolerance Successes in 2012 – Continued

Pest Control Agent / Type*		Date	Commodity or Crop Group	PR#	No. of Uses	No. of Tolerances
Fludioxonil (con't)			Leafy greens subgroup 4A† (replaces tolerance for subgroup 4A except spinach)	10006	1	1
			Potato†	09860	1	1
			Pineapple**	10203	1	1
			Dragonfruit**	11009	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
			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
			Vegetable, fruiting, group 8-10† (replaces tolerances for tomato and tomatillo) **	09140 09567	19	1
			Citrus, oil (amended tolerance)	---	---	---
			Fruit, pome, group 11-10 (replaces tolerance for group 11) **	---	5	1
			Leafy greens subgroup 4A† (replaces tolerance for subgroup 4A except spinach)	10006	1	1
			Dragonfruit	---	1	1
Pendimethalin	H	Aug 29 2012	Brassica, leafy greens, subgroup 5B	10986 01988 01989	8	1
			Fruit, small, vine climbing, except grape, subgroup 13-07E	06681	6	1
			Lettuce, leaf	09061	1	1
			Melon subgroup 9A	09397	3	1
			Turnip greens	01987	3	1
			Vegetable, soybean, succulent	10286	1	1
Thifensulfuron methyl	F	Aug 29 2012	Chicory	09417	1	2
Dinotefuran	I	Sep 12 2012	Berry, low growing, except strawberry, subgroup 13-07H**	09832	8	1
			Fruit, small, vine climbing, except fuzzy kiwifruit, subgroup 13-07G (replaces tolerance on Grape)**	10728	5	1
			Onion, bulb, subgroup 3-07A**	08645	11	1

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ATTACHMENT 5 – IR-4 Project Tolerance Successes in 2012 – Continued

Pest Control Agent / Type*		Date	Commodity or Crop Group	PR#	No. of Uses	No. of Tolerances
Dinotefuran (con't)			Onion, green, subgroup 3-07B**	09550 08596	15	1
			Peach**	09548	2	1
			Tea	10838	1	1
			Vegetable, tuberous and corm, subgroup 1C (replaces tolerance on Potato)**	10727	16	1
			Watercress**	09514	1	1
Bifenthrin	I	Sep 14 2012	Grass**	09476	3	2
			Tea	10317	1	1
Clopyralid	H	Sep 19 2012	Apple	03623	1	1
			Brassica, leafy greens, subgroup 5B (replaces tolerances on Mustard greens)	10761	7	1
			Rapeseed, subgroup 20A, except gold of pleasure (replaces tolerances on Crambe, Flax, Mustard seed, and Rapeseed)	10762	13	2
			Teff	10771	1	4
Cyazofamid	F	Sep 26 2012	Basil**†	10118	1	2
			Bean, succulent**†	09094	14	1
			Bean, succulent shelled**†	09532	1	1
			Leafy greens subgroup 4A† (replaces tolerance on spinach)**	10037	21	1
			Vegetable, fruiting, group 8-10** (replaces tolerance on crop group 8)	---	12	1
			Vegetable, tuberous and corm, subgroup 1C (replaces tolerance on potato)**	10170	16	1
Glufosinate ammonium	H	Sep 26 2012	Corn, sweet	06515 06953	1	2
			Fruit, citrus, group 10-10 (replaces tolerance on group 10) **	---	14	1
			Fruit, pome, group 11-10 (replaces tolerance on group 11) **	---	5	1
			Fruit, stone, group 12-12**	---	11	1
Sulfentrazone	H	Sep 28 2012	Succulent soybean (edamame)	10750	1	1
Chlorantraniliprole	I	Oct 03 2012	Vegetable, legume, group 6** Vegetable, foliage of legume, group 7	10003 10046	42	3
			Rapeseed subgroup 20B**	10208	14	1

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ATTACHMENT 5 – IR-4 Project Tolerance Successes in 2012 – Continued

Pest Control Agent / Type*		Date	Commodity or Crop Group	PR#	No. of Uses	No. of Tolerances
Buprofezin	I	Oct 17 2012	Brassica, leafy greens, subgroup 5B** Turnip greens**	09005 09006 09007	9	2
			Bean, succulent** (replaces tolerance on Bean, snap, succulent)	---	13	1
			Persimmon**	10541	1	1
			Tea	10646	1	1
			Fruit, pome, group 11-10, except pear and pear, Asian** Pear** Pear, Asian** (replaces tolerance on group 11)	10737	5	3
			Vegetable, fruiting, group 8-10 (replaces tolerance on group 8) **	10735	12	1
Fluazinam	F	Nov 07 2012	Melon subgroup 9A†	07097	3	1
			Pepper/Eggplant subgroup 8-10B†	09556	10	1
Flonicamid	I	Nov 14 2012	Berry, low growing, subgroup 13-07G**	09604	9	1
			Rapeseed subgroup 20A**	09783	17	1
Fenpropathrin	I	Nov 28 2012	Acerola Guava Jaboticaba Lychee Passionfruit Starfruit Sugar apple Wax jambu Atemoya Biriba Cherimoya Custard apple Feijoa Ilama Longan Pulasan Rambutan Soursop Spanish lime	07872 07866 07867 07865 07871 07869 07864 07868	19	19
			Tea	10318	1	1
Zeta-Cypermethrin	I	Dec 07 2012	Artichoke, globe	09365	1	1
			Barley Buckwheat Oat Rye	08812	4	12

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ATTACHMENT 5 – IR-4 Project Tolerance Successes in 2012 – Continued

Pest Control Agent / Type*		Date	Commodity or Crop Group	PR#	No. of Uses	No. of Tolerances
Zeta-Cypermethrin (con't)			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
			Tea	10647	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
			Fruit, pome, group 11-10 (replaces tolerance for group 11)	10782	5	1
Pyriproxyfen	I	Dec 12 2012	Herb subgroup 19A	08908 08909 08913 10745	40	1
			Berry, low growing, except strawberry, subgroup 13-07H (replaces tolerance for cranberry)	10744	7	1
			Bushberry subgroup 13-07B (replaces tolerance for subgroup 13B)	10743	14	1
			Caneberry subgroup 13-07A (replaces tolerance for subgroup 13A)	10742	1	1
			Fruit, pome, group 11-10 (replaces tolerance for group 11)	10741	5	1
			Fruit, citrus, group 10-10 (replaces tolerance for group 10)	10740	14	1
			Vegetable, fruiting, group 8-10 (replaces tolerance for group 8)	10739	12	1
			Vegetable, bulb, group 3-07 (replaces tolerances for group 3 except bulb onion and bulb onion)	10738	15	1
Quinclorac	H	Dec 21 2012	Berry, low growing, except strawberry, subgroup 13-07H	08000	8	1
			Rhubarb	10135	1	1
					Uses	Tolerances
Totals					1085	266

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ATTACHMENT 6 – PENDING FOOD PROGRAM SUBMISSIONS
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PR #	Chemical	Commodity (Full name)
09752	1,3-DICHLOROPROPENE	PINEAPPLE
08992	2,4-DB	LENTIL
10922	6-BENZYLADENINE	AVOCADO
05478	ABAMECTIN	BEAN (SNAP)
07271	ABAMECTIN	BEAN, LIMA (SUCCULENT & DRIED SHELLED)
06475	ABAMECTIN	CANEBERRY (RASPBERRY)
06435	ABAMECTIN	GUAVA
07831	ABAMECTIN	LYCHEE
04068	ABAMECTIN	ONION (GREEN)
04078	ABAMECTIN	PAPAYA
08439	ABAMECTIN	PINEAPPLE
08019	ABAMECTIN	STRAWBERRY
05076	ABAMECTIN	TOMATO (GH)
09026	BETA-CYFLUTHRIN	FLAX
10002	BIFENAZATE	BANANA
09338	BROMOXYNIL	MILLET
07997	CAPTAN	GINSENG
10278	CARFENTRAZONE-ETHYL	ASPARAGUS
09427	CARFENTRAZONE-ETHYL	MINT
10087	CHLORFENAPYR	BASIL & CHIVES (GH)
10367	CHLOROTHALONIL	ALMOND
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
06873	CLETHODIM	APPLE
06877	CLETHODIM	CHERRY
06874	CLETHODIM	PEAR
06948	CLETHODIM	PLUM
10377	CLOTHIANIDIN	CHERRY
10699	CLOTHIANIDIN	CRANBERRY
10376	CLOTHIANIDIN	PLUM
10199	CYANTRANILIPROLE (HGW86)	CRANBERRY
10313	CYANTRANILIPROLE (HGW86)	CUCUMBER (GH)
10122	CYANTRANILIPROLE (HGW86)	PEPPER (BELL & NONBELL) (GH)
10104	CYANTRANILIPROLE (HGW86)	TOMATO (GH)

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10640	CYANTRANILIPROLE (SUNFLOWER)	SUNFLOWER (SEED TRT)
10265	CYAZOFAMID	CHIVES (REP CROP 19A)
07127	CYPRODINIL + FLUDIOXONIL	GUAVA
08332	DCPA	CARROT
10446	DIFENOCONAZOLE	GINSENG
10387	DIFENOCONAZOLE + CYPRODINIL	ARTICHOKE (GLOBE)
10665	DIFENOCONAZOLE + CYPRODINIL	CUCUMBER (GH)
08664	DIFLUBENZURON	PEACH, PLUM
09737	DIQUAT	WATERCRESS
02399	DIURON	CHERRY
03071	DIURON	PLUM
10623	DPX-QGU42	ASPARAGUS
10772	DPX-QGU42	BASIL (FIELD & GH)
10620	DPX-QGU42	CANTALOUPE
10618	DPX-QGU42	CUCUMBER (FIELD & GH)
10616	DPX-QGU42	GINSENG
10653	DPX-QGU42	LETTUCE (HEAD & LEAF)
10617	DPX-QGU42	ONION
10837	DPX-QGU42	PEA (SUCCULENT SHELLED)
10621	DPX-QGU42	PEPPER (BELL & NONBELL)
10619	DPX-QGU42	SQUASH (SUMMER)
10115	ETHEPHON	FIG
08814	ETHEPHON	SWEET POTATO
09918	ETHOFUMESATE	CARROT
09882	ETHOFUMESATE	CEREAL GRAIN
07704	ETHOFUMESATE	CILANTRO
07703	ETHOFUMESATE	DILL
10049	ETHOPROP	MINT
07262	FAMOXADONE + CYMOXANIL	BEAN, LIMA (SUCCULENT & DRIED SHELLED)
08875	FAMOXADONE + CYMOXANIL	CARROT
10812	FAMOXADONE + CYMOXANIL	GINSENG
08759	FAMOXADONE + CYMOXANIL	GREENS (MUSTARD)
10677	FAMOXADONE + CYMOXANIL	MANGO
08895	FENAMIDONE	BEAN (SNAP)
09530	FENAMIDONE	BEAN, LIMA (SUCCULENT & DRIED SHELLED)
09800	FENAMIDONE	GINSENG
09741	FENHEXAMID	KIWIFRUIT (PREHARVEST)
07149	FENHEXAMID	ONION
09266	FENPROPATHRIN	GREENS (MUSTARD)
07946	FENPROPATHRIN	SWEET POTATO
10475	FLONICAMID	BEAN (DRIED SHELLED)

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02083	FLUAZIFOP-P-BUTYL	BLUEBERRY
03947	FLUAZIFOP-P-BUTYL	CANEBERRY
02404	FLUAZIFOP-P-BUTYL	RHUBARB
06890	FLUAZINAM	SPINACH
10249	FLUMIOXAZIN	CANEBERRY (BLACKBERRY)
10121	FLUOPICOLIDE	BASIL
09710	FLUTOLANIL	CARROT
09392	FLUTOLANIL	GINSENG
09711	FLUTOLANIL	RADISH
07768	HALOSULFURON	GRAPE
09722	HALOSULFURON	PEAR
08325	HEXAZINONE	BLUEBERRY (HIGH BUSH)
09494	IMAZALIL	MUSHROOM (WHITE BUTTON)
10230	KASUGAMYCIN	CHERRY
08742	LAMBDA-CYHALOTHRIN	ASPARAGUS (FERN)
09390	LAMBDA-CYHALOTHRIN	CARROT
09926	LAMBDA-CYHALOTHRIN	GREENS (MUSTARD)
09852	LAMBDA-CYHALOTHRIN	OKRA
09381	LAMBDA-CYHALOTHRIN	RADISH
08850	LAMBDA-CYHALOTHRIN	RICE, WILD
10540	LAMBDA-CYHALOTHRIN + THIAMETHOXAM	AVOCADO
08912	MANCOZEB	BLUEBERRY
09497	MANCOZEB	GUAVA
06701	MANCOZEB	LYCHEE
10334	METALDEHYDE	BEAN & PEA (EDIBLE PODDED)
10667	METALDEHYDE	BEAN (SUCCULENT SHELLED)
10333	METALDEHYDE	PEA (SUCCULENT SHELLED)
10388	METCONAZOLE	BEAN (DRIED SHELLED)
10389	METCONAZOLE	PEA (DRY)
10390	METCONAZOLE	SUNFLOWER
07240	METHOXYFENOZIDE	CHIVES (REP CROP 19A)
09367	METHOXYFENOZIDE	CITRUS
10477	METRAFENONE	CANTALOUPE
10370	METRAFENONE	CHERRY
10466	METRAFENONE	HOPS
10369	METRAFENONE	PEACH
10478	METRAFENONE	SQUASH (SUMMER)
10467	METRAFENONE	TOMATO
06388	METRIBUZIN	PEA (EDIBLE PODDED & SUCCULENT SHELLED)
05389	NAA	POMEGRANATE
09246	NOVALURON	AVOCADO

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09780	NOVALURON	BEAN, LIMA (SUCCULENT & DRIED SHELLED)
09522	NOVALURON	CARROT
10237	NOVALURON	CUCUMBER (GH)
10244	PENDIMETHALIN	HOPS
10865	PENFLUFEN	ONION
10944	PENOXSULAM + OXYFLUORFEN	POME FRUITS
10899	PENOXSULAM + OXYFLUORFEN	STONE FRUITS
10694	PENTHIOPYRAD	BLUEBERRY (HIGH BUSH)
10695	PENTHIOPYRAD	CANEBERRY (RASPBERRY)
10687	POTASSIUM PHOSPHITE	CITRUS (POST HARVEST)
07773	PROHEXADIONE CALCIUM	STRAWBERRY
10151	PROHEXADIONE CALCIUM	WATERCRESS
06589	PROPICONAZOLE	DILL
06236	PROPICONAZOLE	GREENS (MUSTARD)
06385	PROPICONAZOLE	RADISH
09937	PROPICONAZOLE	WATERCRESS
08036	PYRIDABEN	CUCUMBER (GH)
10031	QUIZALOFOP	GRAPE
09933	SETHOXYDIM	BLUEBERRY
04873	SETHOXYDIM	GRASSES
09406	S-METOLACHLOR/METOLACHLOR	CANTALOUPE
10218	S-METOLACHLOR/METOLACHLOR	LETTUCE (HEAD)
08982	S-METOLACHLOR/METOLACHLOR	LETTUCE (LEAF)
06656	S-METOLACHLOR/METOLACHLOR	SQUASH (SUMMER)
01676	S-METOLACHLOR/METOLACHLOR	STRAWBERRY
07331	SPINOSAD	COFFEE
09971	SPIROMESIFEN	CANTALOUPE
09970	SPIROMESIFEN	CUCUMBER
09842	SPIROMESIFEN	GRASSES
10551	SPIROMESIFEN	WATERCRESS
10043	STREPTOMYCIN	GRAPEFRUIT
01602	STREPTOMYCIN	TOMATO (FIELD & GH)
07770	SULFENTRAZONE	APPLE
10114	SULFUR DIOXIDE	FIG
10134	TEBUCONAZOLE	TOMATO (GH)
06481	TEBUCONAZOLE	WATERCRESS
09017	TERBACIL	PEACH
08959	TERBACIL	STRAWBERRY (ANNUAL)
07813	THIACLOPRID	BLUEBERRY
10246	THIAMETHOXAM	CANEBERRY
09342	THIFENSULFURON-METHYL	TOMATO
10427	TOLFENPYRAD	AVOCADO

ATTACHMENT 6 – PENDING FOOD PROGRAM SUBMISSIONS
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10380	TOLFENPYRAD	BLUEBERRY
09657	TOLFENPYRAD	ONION
10869	TOLFENPYRAD	STRAWBERRY
10634	TOLFENPYRAD	TOMATO (GH)
09736	ZINC PHOSPHIDE	GRASSES (SEED CROP)

ATTACHMENT 7 – 2012 ORNAMENTAL HORTICULTURE PROGRAM

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Dr. N. Catlin	NY
Dr. D. Gilrein	NY
Dr. T. Mervosh	CT
Dr. A. Senesac	NY
Dr. R Wick	MA

SOUTHERN REGION

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

SOUTHERN REGION (continued)

Dr. K. Heinz	TX
Dr. K. Ivors	NC
Dr. J. Neal	NC
Dr. G. Niu	TX
Dr. D. Norman	FL
Dr. B. Pemberton	TX
Dr. K. Steddom	TX
Dr. J. Williams-Woodward	GA

WESTERN REGION

Dr. G. Chastagner	OR
Dr. J. DeFrancesco	OR
Dr. J. Klett	CO
Dr. J. Pscheidt	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 – 2012 ORNAMENTAL HORTICULTURE PROGRAM

RESEARCH ACTIVITIES

Discipline	Project	Researchers	Crops	Products	Trials
Entomology	Borer & Beetle Efficacy *	2	1	6	14
	NNI-0101 Crop Safety *	4	8	1	13
	Pyridalyl Crop Safety *	3	6	1	7
	Scale Efficacy *	6	5	9	36
	Spirotetramat Crop Safety *	2	2	1	3
	Thrips Efficacy *	4	4	8	24
	Tolfenpyrad Crop Safety *	5	8	2	17
	White Grub & Root Weevil Efficacy	1	1	5	5
	Whitefly Efficacy (Bemisia Q and B, Trialeurodes) *	2	1	7	16
Plant Pathology	Acibenzolar Crop Safety *	3	10	1	15
	Amectotradin + Dimethomorph Crop Safety *	2	7	1	9
	Bacterial Efficacy *	4	4	18	41
	Botrytis Efficacy *	1	1	11	11
	Boxwood Blight	1	1	23	23
	Cyflufenamid Crop Safety *	3	12	1	19
	Fluensulfone Crop Safety *	2	7	1	9
	Fusarium Efficacy *	2	3	17	46
	Metconazole Crop Safety *	4	8	1	10
	Powdery Mildew Efficacy	1	1	9	9
	Pythium Efficacy *	6	5	11	47
	Rust Efficacy	1	1	1	18
	Tebuconazole Crop Safety *	3	12	1	19
	Triticonazole Crop Safety *	6	11	1	19
Weed Science	Acetic Acid Crop Safety *	5	12	1	19
	Ammonium Nonanoate Crop Safety *	6	7	1	12
	Dimethenamid-p Crop Safety *	11	30	1	35
	D-limonene Crop Safety *	6	8	1	13
	F6875 Crop Safety *	15	35	1	71
	Flumioxazin Crop Safety *	2	6	2	6
	Indaziflam Crop Safety *	16	27	3	67
	Isoxaben Crop Safety *	6	21	1	22
	Oregano Oil Crop Safety *	6	8	1	13
	Oxyfluorfen + Prodiamine Crop Safety *	7	11	1	20
	Pelargonic Acid (Scythe) Crop Safety *	3	4	1	6
	Pendimethalin + Dimethenamid-p Crop Safety *	9	13	1	15
	Trifluralin + Isoxaben Crop Safety *	2	5	1	5
Plant Growth Regulators	Herbaceous Branching *	1	1	3	3
	Woody Ornamental Branching *	3	1	1	6

* High Priority Projects

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

ATTACHMENT 9 – SUMMARIES OF 2012 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 2011, the IR-4 Project completed 199 trials on 59 ornamental plant genera or species examining phytotoxicity related to foliar and/or drench applications of acibenzolar. In these trials, 26 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.

Bacterial Disease Efficacy

From 2008 to 2011, 48 products were tested through the IR-4 Program as drench or foliar applications against bacterial pathogens. Species tested included: *Erwinia amylovora, E. chrysanthemi, Pseudomonas. chicorii, P. marginalis, P. syringae, Pseudomonas* sp., *Xanthomonas campestris* and *Xanthomonas* spp. In general, all products, including the standard copper containing bactericides (Camelot, CuPRO, Cuprofix, Cuprofix MZ, Junction, Kocide, Phyton 27 and ReZist) and mancozebs (Dithane, Penncozeb, Protect) and biologicals (Cease, Rhapsody), provided variable efficacy on these bacterial pathogens. Several new products that are included in the 2010 Bacterial efficacy project looked promising based on their efficacy relative to standards. These include Acibenzolar, CG100, Citrex, HM-0736, Kasumin, Regalia, SP2015 and Taegro. Further research is needed to obtain additional efficacy data to recommend actions to register or amend labels for these pests.

Clethodim Crop Safety

Clethodim, a grass herbicide, was first registered in the US as Select Herbicide for ornamental horticulture crops in 1983 with a limited crop list. From 1997 through 2007, the IR-4 Project completed 122 trials on 76 ornamental plant genera or species examining phytotoxicity related to foliar and/or drench applications of clethodim. In these trials, 7 species or genera exhibited minimal or no injury after foliar applications. Based on this information, it is suggested that all of these crops be added to the list of tolerant plants.

Dimethenamid-p Crop Safety

From 2007 to 2012, IR-4 completed 334 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 89 plant genera or species. Of these, 39 plant species exhibited no or minimal transient injury after application at all three rates. Four 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 2011, IR-4 completed 552 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 162 plant genera or species. Of these genera and species, 62 exhibited no or minimal transient injury after application at all three rates. Thirty-one (31) crops exhibited little or no phytotoxicity at 2.64 lb ai per acre, but did have some injury at 4.3 and/or10.6 lb ai per acre, or showed injury after the second application. Of the fifty-three (53) 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.

ATTACHMENT 9 – Continued

F6875 (Sulfentrazone + Prodiamine) Crop Safety

Since 2007 IR-4 has completed 257 trials with products containing sulfentrazone + prodiamine (F6875 0.3G and F6875 4SC) on 107 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 80 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 32 genera or species of which two species exhibited little to no injury at all three rates. Five species (*Buddleia davidii, Echinacea purpurea, Hibiscus sp., Hydrangea sp., and Phlox paniculata)* demonstrated significant injury even at the lowest rate.

Fusarium Efficacy

From 2001 to 2011, numerous products representing 24 active ingredients were evaluated in greenhouse and field trials as soil drench, 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. communi, 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, (*Trichoderma harzianum & T. virens*), CG100 (organic 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

In 2011 IR-4 has completed 21 trials evaluating Indaziflam 0.03% for crop safety on 14 crops. 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 14 plant genera or species. Of these crops, 2 exhibited no or minimal transient injury after application at all three rates including *Rhododendron sp. and Rosa sp*. The remaining crops evaluated exhibited little to no injury in two or less trials. Further testing is required on these species before a conclusion can be made confirming crop safety.

Liverwort Efficacy

Data in this report were generated to evaluate several products for post-emergent control of liverworts (*Marchantia sp*.). Liverworts are among the most serious weeds of container grown ornamentals. Classified as bryophytes these simple plants thrive on water and nitrogen for reproduction but can also survive long dry periods. The Society of American Florists ranked liverwort seventh in a national survey for worst nursery pests while Oregon regards it as No. 1. (Miller, Laura, Ornamental Outlook, *Liver What?,* 2007). During the 2004 and 2009, IR-4 Ornamental Horticulture Workshops, a project was prioritized to screen for efficacious products to manage post-emergent liverwort in container grown ornamentals grown primarily under cover in greenhouses or hoop houses, use sites with very few registered herbicides. This research was conducted across the United States in 1976, 2005, 2006, 2009 to 2011 to evaluate several registered products for liverwort control. Treatments with proven effectiveness in multiple trials include Bryophyter (oregano oil) at 2% v/v, Greenmatch (d-limonene) at 20% v/v , Racer (ammonium nonanoate) at 5% v/v, Scythe (pelargonic acid) at 5-10% v/v, SureGuard (flumioxazin) at 0.375 lb ai/A, Terracyte Pro (sodium carbonate peroxyhydrate) at 10 lb/1000 sq. ft., V-10233 (flumioxazin) at 10 fl oz/A, and WeedPharm (acetic acid) 10- 20% v/v. In limited experiments, Broadstar 0.25G (0.25 lb/A), indaziflam (0.065 lb ai/A), Ronstar 2G (4.0 lb ai/A) and EC (2 lb ai/A) and Showcase 2.5G (2.5 lb ai/A) also demonstrated good control. Contact type treatments such as Scythe and Bryophyter were fast acting but generally required more than one application to remain effective (>80% control) during the trial period. Treatments with unacceptable or inconsistent liverwort control include Champ, FlowerPharm, Freehand, Junction, M-Pedi, Quicksilver, Sporan, Sporatec, and Xeroton. In a

single trial the following products were effective in controlling bittercress and crabgrass, as well as, liverwort: Bryophyter, GreenMatch, Scythe, SureGuard, and WeedPharm. Silwett alone also controlled these weeds but was ineffective in controlling liverwort. The results from this study successfully identify several options for postemergent control of liverwort. Further research should focus on products that can be safely applied as a conventional application or as a dormant treatment to container grown ornamentals which provide residual control of liverwort, as well as, other weeds.

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. During 2010 and 2011, the IR-4 Project completed 94 trials on 26 ornamental plant species examining phytotoxicity related to foliar applications of Tourney. In these trials, 13 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.* and *Liriope sp.* are the four 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.

Mite Efficacy & Literature Review

At the IR-4 Ornamental Horticulture Program Workshop in 2009, Mite Efficacy was selected as a high priority project to obtain data supporting current and future registrations was discussed. There are many different species of mites causing injuries on ornamental horticulture crops, and an extensive project may be required to generate sufficient efficacy data to substantially impact product registrations. This summary contains efficacy on mite species collected through the IR-4 Project and data published in Arthropod Management Tests on fruit and vegetable crops. From 1999 to 2011, 26 active ingredients were tested mainly as foliar applications against several genera and species of mite pests. Mite species tested included: broad mite, *Polyphagotarsonemus latus*, Eriophyid mites including *Aceria* sp., *Aculops lycopersici, Aculus ligustri, Aculus schlechtendali, Epitrimerus pyri,* spider mites including *Tetranychus urticae, Oligonychus ilicis* and *Panonychus citri,* and the red palm mite *Raoeilla indica.* Although there were insufficient data for definitive conclusions, Akari/Fujimite (fenpyroximate), Magus (fenazaquin) and Pylon (chlorfenaphyr) generally performed well on various species. Kontos/Movento/BYI 08330 (spirotetramat) looked promising on the eriophyds *Aceria* sp. and *Aculus ligustri* and on the spider mites *P. citri* and *T. urticae*. Proclaim (emamectin benzoate) was promising on the Eriophyds *Aceria* sp. and *Aculus ligustri* and on *P. latus*. Mesa/Ultiflora (milbemectin) looked promising on the Eriophyds *A. ligustri, Aculus schlechtendali, Epitrimerus pyri* and *Aculops lycopersici.* Shuttle (acequinocyl) looked promising on Southern red mite. On red palm mite, limited data indicated that Forbid/Judo (spiromesifen), Pylon, Sanmite (pyridaben), Shuttle (acequinocyl) and Sulfur/Thiolux (sulfur) performed well while Avid (abamectin), Hexygon (hexythiazox) and Tetrasan (etoxazole) were less effective. Tank-mix combination with oils generally improved mite control.

Oxyfluorfen + Prodiamine Crop Safety

From 2009 through 2011 IR-4 completed 62 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 twenty-eight (28) plant species, representing nineteen (19) genera. Five species and the *Rosa* genera exhibitied no or minimal transient injury in at least 3 trials. Four (4) 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. Eighteen (18) 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* be added to the Biathlon label along with 6 additional varieties of species already listed.

ATTACHMENT 9 – Continued

PGR Impact on Herbaceous Plant Branching

Three plant growth regulators, Augeo (dikegulac sodium), Configure (6-benzladenine) and Florel (ethephon), were tested to determine their potential for improving branching and quality of calibrachoa and verbena. Rates included Augeo at 400 and 800, Configure at 150 and 300 ppm and Florel at 500 and 1000 ppm. Shoot number, quality height and width were found to have a positive impact in several experiments but results were inconsistent. These benefits were offset by crop injury in the form of chlorisis and stunting. Bloom delay was found to be significant among certain varieties and may be unacceptable to growers. Applications of these three plant growth regulators have not been found to reliably replace the current practice of pinching. Further study is required in order to identify which treatments and rates will consistently improve quality for certain varieties of calibrachoa and verbena.

PGR Impact on Woody Plant Branching

Nurserymen have found that a well-branched woody ornamental offers superior plant architecture and produces more blooms, thus is more desirable in the marketplace. Many woody plant species do not branch adequately in a container nursery production system. In order to produce a well branched plant that meets desired size specifications, plants are usually pruned frequently, though some still do not branch as much as desired. Developing plant growth regulators (PGR) that could increase branching is important to provide ornamental nursery growers an additional tool that they can use to produce more desirable plants. Consequently, identifying a plant growth regulator treatment that effectively improves the architecture of woody ornamentals became a research priority for the IR-4 Ornamental Horticulture Program. From 2006 to 2011, eleven products representing seven different active ingredients were tested for enhanced branching on several container grown woody ornamental species. Some products were already registered for use as plant growth regulators on food crops but were not yet registered with the EPA for use on ornamentals. Seven container grown ornamental species were tested including arrowwood, azalea, holly, hydrangea, Indian hawthorn, rose, and sourwood. Sufficient data was generated to recommend registration for use of one or more product(s) on two species. Tiberon 2.8SC (cyclanilide) and MaxCel, (6-benzyladenine) provided significant increase of branching in azalea. Augeo (dikegulac sodium) demonstrated efficacy improving branching on both florist and landscape types of hydrangea. This research shows promise for identifying plant growth regulator treatments to meet the demand for improved branching on species important to the ornamental horticulture industry.

Rust Efficacy & Data Summary

From 2000 to 2011, numerous products representing 30 active ingredients were tested as foliar applications against several genera and species of pathogens causing rust on ornamentals and food crops (Tables 1 and 2). These genera/species tested included: *Cronartium ribicola, Gymnosporangium libocedri, G. clavipes, G. juniperi-virginianae, Phragmidium* sp., *Puccinia hemerocallidis, P. pelargonii-zonalis, P. malvacearum, P. emaculata, P. veronica-longifoliae, P. arachidis* and *Uromyces apendiculatus.* Although there were insufficient data for definitive conclusions, new products like SP2169, Tourney (metconazole), LEM-17 (penthiopyrad) and Topguard (flutriafol) - looked promising. The products registered on ornamentals - Banner (propiconazole), Compass O (trifloxystrobin), Eagle (mycobutanil), Heritage (azoxystrobin), Insignia (pyraclostrobin), Pageant (boscalid+pyraclostrobin), Prostar (flutolanil) and Trinity (triticonazole) - generally performed well. Tank-mix combinations with mancozeb generally improved rust control.

Scale & Mealybug Efficacy

Several neonicotinoids (Celero 16WSG/Aloft SC, Flagship 0.22G/25WP, Safari 2G/20SG/Transtect 70WSP, and TriStar 30SG/70WSP), insect growth regulators (Distance and Talus 40SC/70DF), and other pesticides were tested against scales and mealybugs. All products tested provided excellent control of elongate hemlock scale and cryptomeria scale, generally mediocre to good 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, NNI-0101, Safari, Talus and TriStar; variable control was obtained with A16901B. 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 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 poor 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 Aria, Kontos and Safari in one trial.

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 2011, the IR-4 Project conducted 189 trials on 56 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.

Tolfenpyrad Crop Safety

Hachi-Hachi 15EC (tolfenpyrad) was registered 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. Preliminary results for crop safety screening indicate additional testing is warranted to clarify which crop species may be sensitive. With the limited results so far, impatiens is definitely sensitive to Hachi-Hachi applications. As part of a project to screen new thrips management tools for crop safety, the IR-4 Project completed 71 trials on 16 ornamental plant species during 2010 and 2011 examining phytotoxicity related to foliar applications of Hachi-Hachi 15EC or Tolfenpyrad SC. In these trials, 6 species or genera exhibited minimal or no injury after foliar applications. Based on this information, it is recommended that these crops (*Begonia sp., Viola sp.* and *Zinnia sp.*) be added to the list of tested crops on the Hachi-Hachi label.

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 2011, IR-4 completed 419 trials on Snapshot 2.5TG. One hundred forty seven different species were examined. Of these, 61 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-one species exhibited phytotoxicity at the 5 lb ai per acre rate. For the remaining 60 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. During 2010 and 2011, the IR-4 Project completed 108 trials on 29 ornamental plant species examining phytotoxicity related to foliar applications of Trinity 2SC. In these trials, 20 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, Begonia sp., Camellia sp., Cornus sp., Hemerocallis sp., Hydrangea 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.

Whitefly Efficacy

Whiteflies are significant pests of ornamental horticulture crops. Three whiteflies species and biotypes contribute to crop production losses in the United States: greenhouse whitefly (*Trialeurodes vaporariorum*), silverleaf whitefly B biotype (*Bemisia tabaci* B Biotype), and silverleaf whitefly Q biotype (*Bemisia tabaci* Q Biotype). From 2002 through 2009, 76 products or rotational/tank mix treatments comprised of 39 different active ingredients were tested through this screening program. In addition to research collected through the IR-4 program, this summary includes a review of experiments conducted from 2004 to 2009 on ornamental horticulture crops.The best products for Q biotype eradication, and those that should be reserved for critical situations, were Judo and Safari. However, Avid, Sanmite, and TriStar also demonstrated effective control and should be utilized routinely as part of the overall management program for Bemisia whiteflies. Mycoinsecticides under these testing conditions did not perform as well as anticipated for Q biotype whitefly management.

ATTACHMENT 10- Biopesticide and Organic Support Program

Biopesticide Grant Proposals Funded 2012

Grant Stage—Early

- Efficacy of *in vitro* produced *Pasteuria penetrans* for contol of *Meloidogyne arenaria* on snapdragon (*Antirrhium majus*) in Florida
- Efficacy of *in vitro* produced *Pasteuria penetrans* for contol of *Meloidogyne incognita* on tomato and cucumber in Florida
- Evaluation of a Three-Lure (TML, ME, RK = TMR) Attract and Kill Trap against Medfly, Oriental Fruit Fly and Melon Fly
- Development of Biopesticide Options against Rice Water Weevil Emphasizing *Bacillus thuriengiensis galleriae*
- Toward the development of amicrobial control strategy for Varroa mite
- Development of IRF-135, an Allyl Isothiocyanate, based biopesticide for the management of weeds and soilborne pests and pathogens
- Improving conventional control of mint flea beetle and strawberry root weevil on mint by incorporating early applications of grupGONE! Granular

Grant Stage—Advanced

- Field Evaluation of *Metarhizium anisopliae* F52 for Grasshopper control in natural habitats (rangeland) -2nd Year
- Re-formulation and repurposing of fungal biopesticides for control of bed bugs
- Biological control materials as resistance management options for Kasugamycin
- Efficacy of Serenade Soil and Fungicides for the control of white rot of *alliums*
- Efficacy of Sil-Matrix for broad-spectrum disease control in small fruit crops
- Enhancing performance of Phosphorous Acid Salts for Apple Scab management through trunk injection delivery
- Biologically based alternatives for broadleafweed control in turf and ornamentals

Grant Stage—Demonstration

- Evaluation of biopesticides for the management of whitefly-transmitted Tomato yellow leaf curl virus in Tomato
- Efficacy of biofungicide products at the demonstration stage of development for *Phytophthora* Blight in Squash and Pepper
- Efficacy of biofungicide products at the demonstration stage of development for foliar diseases in organically- produced tomato
- Integration of Regalia into Mummy Berry Management Programs
- Developing a Protocol for Ground Application of SPLAT GM Gypsy Moth Mating Disruptant

ATTACHMENT 10 – Continued

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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
Reynoutria sachanilensis	Blueberry	0864B
	Cucumber	0824B
	Apple	0141B
	Peach	0170B
	Tomato	0310B
Phoma macrostoma	Turf	0858B
Trichoderma asperellum	Strawberry	0861B
	Summer Squash	0820B
	Pepper	0721B
Trichoderma virens G41	Pointsettia	0758B
Polyoxin-D Zinc salt	Ginseng	338B, 0503B
	Pepper	0405B

FIFRA Section 18 -Seed Treatment Labels

- **Avipel 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, Deleware, Virginia
- **AV-1011 for Rice** Louisiana, Florida
- **Avipel liquid for Sunflower**- South Dakota

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