Eliminating Pesticides as a Trade Barrier

Enhancing our Safe Food Supply

Managing Pesticide Resistance

Combating Vector Borne Diseases

MAKING A DIFFERENCE

Researching Bee Safe Products

Leading Global Collaboration

Facilitating Capacity Building

Combating Invasive Species

Protecting Pollinators

Expanding Crop Groups

The IR-4 Project

Annual Report 2015

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

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Dear Friends,

I am pleased to present the 2015 IR-4 Annual Report documenting IR-4's accomplishments in calendar year 2015. The details of IR-4's research efforts, accomplishments, challenges and future plans are found on the following pages.

Calendar year 2015 was a record breaking year for the Food Program and with significant and notable accomplishments in the other program areas as well. Specifically:

- **Food Program**-EPA approved IR-4 data submissions supporting 1175 registrations or clearances on fruits, vegetables, herbs, other specialty food crops and specialty uses on major food crops. This is the highest number of registrations achieved in a single calendar year and breaks the previous record of 1085 achieved in 2012.
- **Ornamental Horticulture Program**-This Program continues to provide significant deliverables to its stakeholders. In 2015, IR-4 data was used to amend two herbicides (Freehand, Tower) with additional crops. The registration of two new fungicides (Mural, Segovis) improved disease management options.
- **Biopesticide and Organic Support Program** - The biggest highlight and most impactful registration under this Program was EPA approval of the registration of HopGuard II (Potassium salts of hops beta acids) to manage Varroa mites in bee hives. Varroa mites are known to be a critical pest causing significant damage to pollinators. IR-4 staff wrote the registration package and developed science literature reviews utilized in the EPA risk assessment process which directly lead to the registration action.
- **Public Health Pesticide Program**- IR-4's efforts in this area remains relevant and absolutely necessary to protect the public from diseases (such as Zika virus, Dengue fever, malaria, Lyme disease) that are transmitted by mosquitos and ticks. The Program achieved some milestones in 2015, including supporting pre-registration activities, efficacy testing and obtaining Experimental Use Permits for new insecticide-treated fabrics, mosquito traps and molecular biocontrol agents.

In addition to the above, in September 2015 IR-4 successfully managed the first Global Minor Use Priority Setting Workshop. Over 170 participants from 30 countries attended, and through consensus agreement, the participants chose three primary and six secondary research priorities. Research efforts will begin in 2016 on these priorities with multiple international partners.

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

The Directors of the State Agricultural Experiment Stations, recognizing the importance of IR-4 to specialty crop agriculture, approved the 5-year reauthorization of IR-4 Project, through the approval of the NRSP-4 Project Statement. This allows funding of IR-4 through Hatch Act/Multistate Research Funds.

IR-4's deliverables are realized through the collective efforts of many; beginning with farmers, producers and growers who need safe and effective technology to manage destructive pests and ending with industry registering this technology with regulatory authorities thereby allowing legal use. Along the way, many individuals and groups are engaged in **"The IR-4 Process"**, including the large network of university researcher's/extension personnel and USDA employees who do the day to day work. Industry contributes through allowing access to their pest management technology, technical support and additional resources. Significant appreciation to our friends at USDA's National Institute of Food and Agriculture, Agriculture Research Service and Foreign Agriculture Service who help provide resources and the dedicated team at US Environmental Protection Agency who review IR-4 data submissions. Also participating are government personnel from Canada and other international partners who are actively involved in joint data development projects.

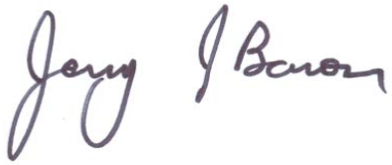
IR-4 continues to face the challenge of securing adequate financial resources to sustain productive research. The impact of multiple years of flat funding and escalating costs is affecting IR-4's ability to establish new research to answer grower needs. Specifically, IR-4 conducted 62 new studies in 2015 which was 23 less than the 85 new studies conducted in 2011. A similar decline was observed in the Ornamental Horticulture program which field trial numbers were reduced from 1316 to 673 during the same time period.

Many of IR-4's partners are facing similar fiscal challenges. Inadequate funding has had a negative impact. For example, Cornell University was forced to cease involvement with most IR-4 activities in 2015/2016 because they could no longer afford to cover overhead costs associated with IR-4 activities in New York State. Fortunately, Rutgers University and the University of Maryland were able to take over Cornell's role. The challenge of allowable overhead and IR-4 funds is becoming a larger issue with other universities that support IR-4 research.

IR-4 continues to rely on the generous contribution of time and effort by the members the IR-4 Commodity Liaison Committee (CLC), Minor Crop Farmers Alliance (MCFA) and other specialty use stakeholders to articulate the value of IR-4 to American agriculture, food safety and economic growth. We sincerely appreciate the support and guidance provided by these individuals and groups to ensure that IR-4 and the need for specialty crop/specialty use pest management technology remains on the front burner.

In closing, it is safe to say, IR-4's accomplishments and how we help farmers and producers grow their healthy food and ornamental crops with limited pest damage and/or reduced food waste makes a difference. Commodity Liaison Committee member Bob Simerly said it best ***"Everyone who eats has an interest in the IR-4 Project whether they know it or not. The IR-4 Project is a vital part of the country's food security system and should be considered a national strategic imperative".***

All the best,



ANNUAL REPORT OF THE IR-4 PROJECT (NRSP-4)
January 1, 2015 - December 31, 2015

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

Background

In 1963, the Directors of the State Agricultural Experiment Stations (SAES) and the United States Department of Agriculture (USDA) established the IR-4 Project (IR-4). IR-4 was needed because the registrants of pesticides focus their product development efforts on large acreage crops (major crops such as corn, soybeans, wheat, etc.) where the potential sales are significant. Fruits, vegetables, nuts herbs, and other small acreage crops (collectively called specialty crops) are considered minor markets and the development of pest management technology for pest control and reducing food waste in the production specialty crops are not usually the objective of the private sector. As a result, there are often many pest management voids in specialty crops. This is called the "Minor Use Problem". The Minor Use Problem also applies to small or specialty uses on major acreage crops.

IR-4 fills the void by developing the magnitude of the residue and/or product performance data needed by the US Environmental Protection Agency (EPA), the crop protection industry and/or other regulatory authorities to allow registrations on the specialty crops. The principal objective of IR-4 is to provide farmers legal access to essential pest management products that protect specialty crops from destructive pests while reducing food waste. Without safe and effective pest management products, which have been approved by regulatory authorities, crops would suffer significant yield and quality losses.

The minor use problem is not unique to low acreage specialty 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 microbial and biochemical pesticide products. In 2009, regulatory support for minor use pesticides that manage arthropod pests which transmit disease to humans was added as a fourth IR-4 Project objective. In all four IR-4 Project areas, national coordination, technical guidance and funding are provided to develop the appropriate data and/or support registrations. The Minor Use Problem is broad, affecting every state, every US territory and essentially every country.

IR-4 has been successful; the research performed by the IR-4 Project over its history has facilitated over 47,000 registrations of conventional pesticides and biopesticides on specialty food crops and ornamental horticulture crops. Since the mid-1990's, IR-4 has given priority to facilitate registration of EPA defined as "Reduced-Risk" chemicals and biopesticides to fill pest management voids. IR-4 also focuses its efforts on products that are compatible with Integrated Pest Management Systems (IPM). All states/territories benefit from the efforts of the IR-4 Project because registrations of pest management products are often national in scope. The general public also benefits because of the broad availability of healthy foods at reasonable prices.

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

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

Food Program

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

Research Activities – Food Residue

Since 1963, IR-4 stakeholders have submitted 11,857 requests for assistance to the IR-4 Food Program. Of these, 390 are currently considered researchable projects that remain as documented needs of specialty crop growers. The others have been addressed through previous research and regulatory submissions or cannot be registered at this time. In 2015, a total of 173 new project requests were submitted to IR-4. IR-4 staff added 66 requests to the IR-4 database to track the new crop group updates that will be bundled into future submissions to EPA. The total number of new requests added to the IR-4 tracking system during 2015 was 239 project requests.

IR-4's research priorities for 2015 were determined by IR-4 stakeholders during the September, 2014 IR-4 Food Use Workshop, in Atlanta, GA. Based on the outcome of that workshop and other priority setting mechanisms such as upgrading to answer regional needs, IR-4 scheduled 62 new studies in 2015. An additional 26 studies were carried over from the previous year for a total of 88 research projects.

In most studies, the test chemical is applied in the field in a manner that simulates proposed grower use of the pesticide on the target crop. When the crop is at the appropriate stage, samples of the crop are collected and shipped to the analytical laboratory where the amount of test chemical remaining in or on the crop is determined. Field and laboratory data from this research are compiled in a regulatory package and utilized to request a pesticide tolerance or to set a maximum residue limit (MRL).

The 2015 food residue research program consisted of 379 IR-4 State, 69 USDA-ARS field trials and 36 trials from our Canadian (CN-PMC) partners for a grand total of 484 field trials. Canada also served as Sponsor and Study Director for 3 of these studies. The specific studies for 2015, including test chemical and crop, are shown in Attachment 2.

The majority of field trials are assigned to IR-4 or CN-PMC/Field Research Centers and sample analyses to the IR-4 Analytical Laboratories. When necessary, other cooperating facilities or contractors are utilized to ensure projects are completed in a timely manner.

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

The need for IR-4 to develop product performance and crop safety data to support labeling of new uses for specialty crop pest management has become a more important priority in the IR-4 research plan in recent years, and in many cases the data are required by registrants prior to actively marketing the new uses. For 2015 IR-4 planned trials, requiring $191,000 in funding, to support E/CS trials in four research areas: for projects where these data are needed to support past residue research, but more E/CS data are needed before registration; supporting on-going residue research; for highest priority regional E/CS needs; and supporting projects to identify possible products to control pests where tools currently are not available [Pest Problem Without Solution, or "PPWS"]. This funding supported research to address needs for 29 projects, including 68 state university trials and an additional 5 trials by ARS. In addition, Canada-PMC planned to conduct 6 E/CS trials, impacting 4 IR-4 projects. All of these E/CS trials will be used to support new uses in the U.S. which will benefit specialty crop stakeholders (see Attachment 3 – "2015 Efficacy/Crop Safety (E/CS) Research Program" for full details).

Submissions and Success

Submissions. In 2015, IR-4 submitted data to EPA or to the cooperating registrant for 22 chemicals, addressing 97 specific IR-4 requests for assistance that were submitted by IR-4 stakeholders. Additionally, IR-4 submitted one petition to EPA that proposed to add new crops to the existing crop groups for the Cereal Grains Crop Group 15; Forage, Fodder and Straw of Cereal Grains Crop Group 16 and the Grass Forage, Fodder, and Hay Crop Group 17.

Included in these pesticide submissions are packages that were submitted to cooperating registrants, where they submit IR-4 data with their submissions for new uses, label amendments, to address conditional registrations (data call-in), or to address registration review (re-registration) requirements to maintain the use of a product. This was another productive year for IR-4 submissions. See Attachment 4 for a comprehensive listing of data submitted in 2015. While this number is lower than the record numbers from 2014, it reflects the fluctuation of study completions and submission that are often dependent on several factors, such as receiving documents from the cooperating registrant, etc. There are another 111 reports signed and ready for submission but are awaiting final documents or are being bundled with other studies before making the submission to EPA.

The IR-4 Food Use Program continuously strives to work smarter and more efficiently to deliver new plant protection products for specialty crop growers. In 2015, EPA provided IR-4 with specific training for making submissions through their portal and IR-4 followed by immediately utilizing this advanced process. This change will enable EPA to process and review IR-4 submissions more efficiently as well as enabling them to work smarter with their review partners, such as the PMRA in Canada. Other efficiencies IR-4 takes advantage of is that nearly every submission made by IR-4 includes an update to at least one of the new crop groups, which add even more new uses to product labels and supports new crop markets for growers. For example, there were a number of tree nut crop group updates made in 2015, and each one of those new tolerances now includes pistachio as well as a number of other new tree crops.

Successes. New uses resulting from IR-4 submissions returned to a record high in 2015, with 1175 new uses from 187 tolerances that EPA established based on IR-4 data. As noted in our 2014 report, there are normal ebb and flow of IR-4 submissions and reviews by EPA and as show here by the high numbers in 2015, EPA continues to support IR-4 in reviewing IR-4 data as it is submitted. IR-4 continues to average 700 new uses each year. The 1173 new uses in 2015 bring the IR-4 52-year total of clearances to 17,362. A complete list of these new uses along with the new crop groups can be found in Attachment 5. In total, EPA reviewed 28 chemistries for IR-4 in 2015, which further demonstrates EPA's support for IR-4 and their commitment to address grower needs.

It is important to note that the successes IR-4 achieved in 2015 were realized in a climate where EPA has placed crop protection products under increased scrutiny to protect consumers, farm workers and the environment, with particular attention being paid to protecting children, pollinators, endangered species, etc. EPA's increased scrutiny of pesticide hazard/risk has required IR-4 to withdraw a number of petitions from EPA, such as clothianidin, and delaying submissions of other products, until further assessments can be made. These types of actions often contribute to the ebb and flow of reviews at EPA.

IR-4 continues to evaluate labels to determine if the new uses approved by EPA are indeed available to growers through labels registered in each state. In 2015, of the 1173 possible new uses it has been determined that 266 uses now appear on product labels, nearly 25% of the total possible uses. IR-4 has contacted each of the registrants to encourage them to continue adding all possible uses to their marketing labels. It should be noted that some of the crops not counted were for new crop group conversions; therefore, some of the crops may be listed on product labels, just not the newly listed crops that were recently added to crop groups. It is expected that many of those uses will be added at a later date. IR-4 will continue to track these new uses with the registrants. IR-4 also re-reviewed the labeling success of 2014 approvals and it is reported that over 70% of those uses now appear on product labels.

A listing of IR-4 projects in the queue for future submission to EPA that include data from 152 studies that will address over 243 IR-4 project requests, are provided on 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, which includes IR-4 submissions pending at EPA, at: http://www.epa.gov/pesticide-registration/multi-year-workplan-conventional-pesticide-registration. 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. Where possible, IR-4 continues to make requests of EPA for many of our submissions to 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 U.S. Audits of facilities and ongoing field and laboratory procedures provide assurance that IR-4's data are of the highest quality and will be accepted by the crop protection industry and EPA.

The Annual QA Planning Meeting was held in Gainesville, FL on March 12-13, 2015. At this meeting, the audit plan for 2015 was created. For calendar year 2015, regular inspections included 25 facilities, 182 in-life audits of field trials, 74 in-life of residue analytical laboratory activities, 57 analytical summary report/data audits and 275 field data book audits. During the 2015 calendar year, 68 final reports and amended reports were audited.

In 2015 the US EPA notified IR-4 of 8 inspections for GLP compliance and data integrity. A total of 151 EPA GLP facility inspections have occurred at IR-4 related sites since April 27, 1997. IR-4 facilities continue to maintain high standards and fully meet the GLP requirements.

IR-4 continues to use the novel eQA reporting system to improve efficiencies and enhanced communications. Over 800 inspection and audit reports have been processed using the web-based system. The system is due for a major upgrade. Training webinars will be offed in early 2016 to familiarize users to the system changes.

Crop Grouping Initiative

IR-4 continues to expand and enhance crop groups and sub-groups. The revised Cereal Grains Crop Group 15; Forage, Fodder and Straw of Cereal Grains Crop Group 16 and Grass Forage, Fodder, and Hay Crop Group 17 were submitted to the EPA over the past year. The revised Nongrass Animal Feeds (Forage, Fodder, Straw and Hay) Crop Group 18 will be submitted in 2016. The final rule for Leafy Vegetables (except Brassica) and Brassica Vegetables and the new crop groups for Stalk, Stem, and Leaf Petiole; Tropical and Sub-tropical fruit, edible peel and Tropical and Sub-tropical fruit inedible peel is expected to be published in 2016. The effort to update crop groups continues with the Codex Committee of Pesticide Residues as well and the Vegetable types are expected to be completed during the 2016 Codex Committee of Pesticide Residues meeting.

International Activities:

IR-4 remains committed to assisting US specialty crop growers with their desire to export fruits and vegetables to international markets through harmonizing pesticide residues standards in specialty crops, thus reducing the use of MRLs as a technical phytosanitary trade barrier.

In North America, IR-4's cooperation with CN-PMC continues to be fruitful considering that they contributed 36 field trials to our joint program in 2015. Of the 88 studies conducted by IR-4 in 2015, three were managed by CN-PMC, with them serving as Study Director and Sponsor, and they utilized a number of IR-4 field research centers to complete the NAFTA data requirements. In addition, the CN-PMC program continues to provide significant contributions to IR-4 efficacy and crop safety research and shares ornamental efficacy and crop safety with IR-4. There also continues to be a good exchange of personnel, with CN-PMC participating in various IR-4 meetings and vice versa. In total the research benefit of working with CN-PMC saves IR-4 an estimated $500,000 per year.

The joint review process by EPA and Canada's Pest Management Regulatory Agency also benefits IR-4 stakeholders by saving resources on both sides of the border; only one agency is responsible for reviewing the residue data. More importantly, both agencies are establishing MRLs at the same level, at the same time. This prevents trade irritants before they happen. EPA and PMRA completed two joint reviews on IR-4/CN-PMC submissions in 2015 for the active ingredient novaluron and pyrimethanil.

IR-4 sponsored the first Global Minor Use Workshop, which took place on September 20-22, 2015 in Chicago, Illinois, and over 170 people from more than 30 countries attended. The workshop was held in association with IR-4's annual research priority setting workshops for specialty food crops with pesticides and biopesticides. The goal of the Global Minor Use Workshop was to prioritize common critical pest management voids on fruits, vegetables and other specialty crops and to identify solutions to problems and then to develop plans for cooperative research targeting one study each of three areas: tropical, temperate growing climates and in greenhouse situations. The primary priorities are greenhouse/protected crops-aphids on lettuce; temperate crops-downy mildew on leafy vegetables; and tropical crops-fruit flies on inedible peal crops.

Activities at the Global Minor Use Workshop concentrated on reviewing a newly developed database of priority global minor use pest management needs. This database was created through a worldwide survey conducted months before the workshop. Forty countries shared information about their specialty crop pest management voids and needs for solutions. Information from the database was used as the first filter to determine what the most important pest needs were and to seek possible solutions for joint research. As needs were discussed, many countries responded by offering existing data to assist in solving pest management problems. The IR-4 Project agreed to be the "lead country," for the tropical project and will provide the oversight and direction for the project. The newly established European Union Minor Use Coordinator Facility is expected to be lead the project on temperate crops. A "lead country" is still being identified for the greenhouse crop projects.

During the Global Minor Use Workshop, USDA-Foreign Agriculture Service (USDA-FAS) announced that they funded $500,000 to IR-4 to start a Global Minor Use Fund. The Fund is intended to serve as seed money in a larger fundraising effort to support future cooperative global work with pesticide registration harmonization.

IR-4's Global Capacity Development, Residue Data Generation Project made good progress in 2015. Coordinated by USDA-FAS, this project's objective is to enhance capacity of participating nations in Asia, Africa and Latin America to meet pesticide-related requirements based on international (Codex) standards. This goal is being achieved by collaborative residue data generation projects on low risk products, such as pyriproxyfen and spinetram on tropical fruits, that incorporate all technical aspects of these studies and is expected to provide broader national residue monitoring as well. The focus of IR-4's contributions has been on developing the expertise to conduct field and laboratory pesticide residue studies under Good Laboratory Practices and to eventually provide data to local authorities and Codex for product registration. All three of the regions participating in this project have received Standards Trade Development Facility (STDF) and USDA-FAS funding, which also provides support for IR-4's contributions to the project. Work in the three regions is progressing and is in various stages, with a commitment to start making submissions to a Joint Meeting on Pesticide Residues (JMPR) in 2016. The Asia region has made the most progress with several reports being completed in time for the 2016 submission date. In Latin America several projects are under way and sample analysis is taking place as well. In the Africa region, training is concluding and projects should initiate in 2016. Please see IR-4 newsletter article on the subject at: http://issuu.com/snovack/docs/vol45no1qxp. It is IR-4's vision that at the end of this work, there will be a global network of capable minor use programs that can partner, when appropriate, with IR-4 to addressing domestic and international grower needs as noted from the Global Minor Use Workshop.

At the request of EPA, IR-4 personnel continue to be included as part of the US delegations to both the CCPR and Organization for Economic Co-operation and Development (*OECD*) as well as the Working Group on Pesticides and the NAFTA Technical Working Group on Pesticides. IR-4 plays a key role on the OECD Expert Group on Minor Uses, where a number of guidance documents have been prepared and released over the past few years with regard to minor use issues. IR-4 also assists other countries, both developed and developing, as they begin to establish minor use programs, especially with New Zealand, Brazil, Costa Rica and Colombia. The knowledge and expertise of IR-4 is often sought and is highly valuable to these countries as their minor use programs evolve.

IR-4 continued to support submissions to the JMPR, where IR-4 supported a number of submissions by registrants. While IR-4 has nominated a number of chemicals for JMPR review in the future, there were no chemistries that IR-4 could dovetail to the 2016 JMPR work plan, since the registrants included IR-4 in their submissions.

Ornamental Horticulture Program

The Ornamental Horticulture Program continues to support an industry valued at nearly $12 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 2015, IR-4 conducted 672 ornamental horticulture research trials to support registrations in the greenhouse, nursery, landscape, Christmas tree and forestry industries. Of these 147 were efficacy trials designed to compare different products to manage damaging insects, plant 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 2015 field cooperators and Attachment 8 for research activities listed by project.

Table 1. Summary of IR-4's 2015 and Revised 2014 Ornamental Horticulture Program Research Activities.

Category	**2015**			**Revised 2014**		
	Efficacy	Crop Safety	Total	Efficacy	Crop Safety	Total
Number of Studies (PR Numbers) with Planned Trials	147	330	477	163	286	449
Number of Trials	234	439	673	231	553	784

Submissions and Successes

During 2015, 22 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, Ametoctradin + Dimethomorph Crop Safety, Aphid Efficacy Literature Review & Summary, Bacterial Disease Efficacy Summary, Benzovindiflupyr + Azoxystrobin Crop Safety - 2015, Cyflufenamid Crop Safety, Cyflumetofen Crop Safety, Dimethenamid-p Crop Safety, Dithiopyr Crop Safety, Gladiolus Rust APHIS Project Summary, Indaziflam Crop Safety, Isoxaben Crop Safety, Mesotrione Crop Safety, Metconazole Crop Safety, Pendimethalin + Dimethenamid-p Crop Safety, Pyrifluquinazon Crop Safety, Pythium Efficacy, Spirotetramat Crop Safety, Tebuconazole Crop Safety Summary, Thrips Efficacy Summary, Tolfenpyrad Crop Safety Summary, and Triticonazole Crop Safety. Data from 4,044 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. 2015 Ornamental Horticulture Program Research Summaries.

Region	**Number of Trials**
North Central	480
North East	458
Southern	1057
Western	771
USDA-ARS	1278
Total	4,044

During 2015, US EPA approved 2 new labels based partially on the efficacy or crop safety IR-4 generated: Mural WDG (benzovindiflupyr + azoxystrobin), Segovis SC (oxathiapiprolin). US EPA approved 2 label amendments: Freehand G (pendimethalin + dimethenamid-p) and Tower (dimethenamid-p). Empress intrinsic Brand Fungicide (indaziflam) was registered in CA. Two numbered formulations were dropped from further development. After the 2014 annual report was finalized, it was discovered that the EPA registrations of Anderson's Golf Products Kansel Plus Fertilizer (oxadiazon + pendimethalin), F6875 4SC (sulfentrazone + prodiamine) occurred. See Table 3 for 2015 and revised 2014 information.

Table 3. Ornamental Horticulture Program Contributions to 2015 and Revised 2014 Registrations.

Category	2015			Revised 2014		
	Efficacy	Crop Safety	Total	Efficacy	Crop Safety	Total
New US EPA Product Registrations [a]	2	0 [f]	2	6	2	8
US EPA Label Amendments [b]	0	2	2	0	0	0
State Registrations [c]	0	1	1	0	1	1
International	0	0	0	1	0	1
Not to be Registered	2	0	2	2	0	2
Number of Trials Contributing to Registrations [d]	101	729	830	72	211	283
North Central	13	56	69	17	28	45
North East	22	53	75	2	17	19
Southern	30	108	138	28	43	71
Western	31	133	164	24	16	40
USDA-ARS	5	379	384	1	107	108
Number of Impacted Crops [e]	4	212	216	5,148	96	5,244

[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.

[f] For some registrations, IR-4 contributed both efficacy and crop safety data.

Priority Setting

The Ornamental Horticulture Workshop was held outside Chicago in Schaumburg, IL in October 2015 to establish priorities for the 2016 to 2017 biennial research cycle. During the first morning of the workshop, registrant representatives presented new active ingredients and highlighted opportunities for existing products. Then the results of the Grower & Extension Survey were presented, and participants discussed the pro and cons for conducting efficacy or crop safety research on 34 current and potential new projects. To have these discussions flow smoothly, IR-4 staff updated Project Sheets which summarized the need, research and registrations to date, and 15 Product Lists outlining the key features of tools currently available for certain diseases and pests. After the relative merits of each project were captured and a Sticker Caucus was held so that workshop attendees could vote for the research projects. During the second morning of the workshop, the outcomes for each discipline were projected, and the research priorities were finalized after further conversations.

Priorities from the 2015 Workshop include:
Entomology Projects: Thrips Efficacy, Foliar Feeding Beetle Efficacy, New Product Crop Safety.
Pathology Projects: Botrytis Efficacy, Bacterial Disease Efficacy, New Product Crop Safety.
Weed Science: Pre-Emergent Herbicide Crop Safety will be focused on Tower EC and Dimension 2EW, while the Ornamental Grass Herbicide Crop Safety will screen Dimension 2EW, Gallery, and Pendulum 2G.

Invasive Species Research Activities

During 2015, the IR-4 Ornamental Horticulture Program continued to facilitate research activities for several invasive species impacting the Ornamental Horticulture Industry: Management of Invasive Arthropods during Shipping, Gladiolus Rust Biology and Management, Chrysanthemum White Rust Biology and Management, Boxwood Blight Biology and Management, and Impatiens Downy Mildew Biology and Management. Each project was funded under USDA-APHIS Farm Bill Section 10201 and encompassed key objectives to manage exotic invasive species by studying aspects of pathogen or pest biology and management tools (conventional or biopesticide

as appropriate to the target organism) on plants to enable growers to better implement mitigation strategies. The Gladiolus Rust Project finished and a final summary report of research results was posted to the IR-4 website. Key elements of each project are listed in Table 4 below.

Table 4. Invasive Species Projects during 2015

Project Topic	**Collaborating Researchers**	**Research Objectives**	**Duration**
Management of Invasive Arthropods	Lance Osborne, University of Florida Cindy McKenzie, USDA-ARS, Fort Pierce Jim Bethke, University of California Arnold Hara, University of Hawai'i	*Duponchelia fovealis* biology and management tools (conventional, biopesticide, predators) Prevention of arthropod development during shipping with applications of biopesticides and biorational materials immediately before shipping	2010 - 2015
Gladiolus Rust	James Buck, University of Georgia Alberto Valencia-Botin, University of Guadalajara Doug Luster, USDA-ARS Fort Detrick Mo Bonde, USDA-ARS Fort Detrick Steve Jeffers, Clemson University	Fungicide screening and rotational programs Screening for gladiolus cultivar resistance Overwintering/oversummering of *Uromyces transversalis* Development of serological and genetic assays	2009 - 2015
Chrysanthemum White Rust	Doug Luster, USDA-ARS Fort Detrick Mo Bonde, USDA-ARS Fort Detrick Oney Smith, Hood College, Kurt Heungens, ILVO, Belgium Bas Brandwagt, Royal van Zanten, The Netherlands JoAnne Crouch, USDA-ARS, Beltsville	Overwintering of *Puccinia horiana* Fungicide impact on sporulation Fungicide screening on whole plants Development of serological and genetic diagnostic tools Biology and development of *P. horiana* in chrysanthemum including systemic movement	2010 - 2016
Boxwood Blight	Sharon Douglas, Connecticut Agriculture Experiment Station (CAES) Robert Marra, CAES Jim LaMondia, CAES Margery Daughtrey, Cornell University Nina Shishkoff, USDA-ARS- Fort Detrick JoAnne Crouch, USDA-ARS, Beltsville Mike Benson, NC State University Marc Cubeta, NC State University Kelly Ivors, NC State University Chuan Hong, Virgina Tech Anton Baudoin, Virginia Tech Norm Dart, Virgina Department of Ag. & Consumer Services Len Coop, Oregon State University Anne Gould, Rutgers University Brad Hillman, Rutgers University	Fungicide screening and mitigation strategies Cultural control potentials including use of heat treatments Effect of sanitizers on conidia and mycelia Impact of fungicides on microsclerotium development Screening of potential biopesticides for microslerotium inactivation Development of isothermic LAMP detection assay Boxwood species and cultivar screen for resistance *Calonectria pseudonaviculata* host range (*Pachysandra* and *Sarcoccoca*) Development of infections under field conditions *Calonectria pseudonaviculata* population genetics Development of epidemiology model based on U.S. temperature and moisture conditions	2011 – 2016
Impatiens Downy Mildew	Margery Daughtrey, Cornell University Mary Hasubeck, Michigan State University Aaron Palmateer, University of Florida JoAnne Crouch, USDA-ARS, Beltsville Nina Shishkoff, USDA-ARS, Fort Detrick Lena Quesada, NC State University Ann Gould, Rutgers University	Overwintering of *Plasmopora obducens* oospores Fungicide screening and rotational strategies Sporangia and oospore development and epidemiology *Plasmopora obducens* population genetics Development of genetic tools for downy mildews including Impatiens Downy Mildew, Cucurbit Downy Mildew, Hops Downy Mildew, Basil Downy Mildew	2012 - 2016

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 also has 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

Since its inception in 1982, the IR-4 biopesticide research program has provided competitive grant funding of projects, amounting to over $7.6 million in grants to researchers. In 2014, IR-4 decided to transition its biopesticide from a "Request For Application", program that supports Early, Advanced and Demonstration stage research to a priority setting workshop with actively engage stakeholders who chose the most critical needs for biopesticides and IR-4 responds by directing research to these priorities.

IR-4 held its first Biopesticide Workshop in September 2014 in association with the Food Use Workshop in Atlanta, GA. Based on the priorities established at the workshop, IR-4 funded 12 studies with 29 different researchers. These studies were conducted by different universities on fruits and vegetables, tropical crops, honeybees, and ornamentals. Among the high profile invasive pests, the biopesticide program has supported projects involving spotted wing drosophila, and fireblight management in organic apples. See Attachment 10 for the specific research projects and research cooperators.

IR-4 held the second Biopesticide Workshop in September 2015 in association with the Food Use Workshop in Chicago, IL. The priority setting workshop was held to actively engage stakeholders and encourage submission of known pest management voids that can potentially be answered by biopesticide technology.

Submissions and Successes

In 2015, IR-4 submitted amended registration packages for *Aspergillus flavus* AF36, and a new registration for *Psuedomonas fluorescens* ACK55.

EPA approved three registration of an IR-4 submission in response to IR-4 submissions. These include a new formulation and manufacturing process for *Aspergillus flavus* AF36, potassium salts of Hop Beta Acids, an extract of hop cones has been registered for use in managing Varroa mites in honeybees and the bird repellent AV-1011 in rice.

The Public Health Pesticides Program

The IR-4 Public Health Pesticide (PHP) Program focuses on expansion and maintenance of the tool box of pesticide products that protect the public from vector-borne diseases (e.g. Dengue fever, Zika virus, Lyme disease, malaria, etc.) and from the nuisance and economic costs caused by mosquitoes, ticks, and other arthropod pests. Vector control uses of pesticides are statutorily recognized as "minor uses", and it is widely recognized that public support for their development and registration is in the public interest.

Primary funding for the IR-4 PHP Program is provided by the Deployed Warfighter Protection Program (DWFP) of the U.S. Department of Defense (DoD), and by USDA-ARS. IR-4 serves as a regulatory consultant and representative for many of the new materials and methods developed by DWFP-funded researchers, as well as other military and USDA medical and veterinary entomology programs. In addition, the DoD and ARS have engaged IR-4 to help maintain and expand the vector control toolbox by identifying new or underutilized vector control tools, supporting the continued registration of existing useful vector control products, and providing regulatory support generally for military pest management.

IR-4 remains a key player linking researchers, the vector control user community, commercial partners, and regulators in the development of a wide range of new chemical tools for vector control, including toxicants, repellents, attract-and-kill products, pesticide-treated fabrics, and novel biocontrol agents if they are regulated as pesticides. This collaborative approach has also been fruitful in efforts to retain existing tools facing new data requirements, and in the search for underutilized chemicals from other realms which might be repurposed for vector control or introduced into the U.S. market from abroad.

During 2015, the IR-4 completed a research program on the drift and incidental deposition of mosquitocides on crops with completion of the final reports covering ground applications of the mosquito adulticide etofenprox on multiple crops. As the EPA submittal was bundled with a crop study and jointly submitted in January 2016. This study complements IR-4's earlier work with aerial applications, which resulted in an all-crop tolerance for this new vector

control product and clarifies the range of residues seen with different application methods, as well as the cumulative load that can result after multiple applications in the same area over the course of a season. In 2015 we worked with pesticide users and regulators to evaluate the extent to which IR-4 models, methods, and data may help estimate incidental drift and deposition onto water, as well as onto crops, and we anticipate extensive use of this information in endangered species and other risk assessments during registration reviews.

IR-4 was active in 2015 in support for other new uses for existing pesticide materials, including assistance in efficacy studies for two types of lethal ovitraps that target container-breeding mosquitoes. One product, originally developed by the U.S. Army and now commercially licensed, has recently received EPA registration with IR-4 but the label recommends a high density of traps, and operational success will likely require more evidence of effectiveness at low trap densities.

Another product in development with support from IR-4 relies on dissemination of a reduced risk insect growth regulator insecticide by ovipositing female mosquitoes. Efficacy trials for these devices are ongoing, and IR-4 is expecting to assist with regulatory submittals in 2016; we also began protocol development in 2015 for large-scale comparative efficacy tests with these and other products potentially useful vs. the serious disease vectors *Aedes aegypti* and *Ae. albopictus.* A different approach to control of day-biting mosquitoes such as these would use volatile materials which reduce biting pressure without needing skin-applied repellents; a major 2015 success was the announcement by Bayer that they are submitting Transfluthrin and a transfluthrin-based "spatial repellent" to EPA for registration after five years of discussions with IR-4, the military, and other proponents of its need in the U.S..

Finally, clothing treated with permethrin helps protect from insect bites but faces limitations, including resistance and durability, and in 2015 we are made significant progress in this realm, defining EPA-acceptable protocols for dose-response and efficacy trials, as well as skin irritancy and sensitization, for non-permethrin chemicals; and demonstrating the technical feasibility of non-destructive measurement of pyrethroids on clothing and nets using IR scanners and possibly other methods.

IR-4 also provided substantial support to new materials and products for vector control this year, including three truly novel approaches. We are the primary regulatory consultants for Attractive Toxic/Targeted Sugar Baits (ATSB) for control of mosquitoes, sand flies, and possibly other vector species. With IR-4 assistance, a commercial EPA 25(b) ATSB product was introduced to the U.S. PCO market in 2014 and a household version was introduced and had great commercial success in 2015, resulting in the company's purchase and a major capital infusion, suggesting strong long-term market viability; we also helped secure major development and efficacy testing funding from the Gates Foundation and the Innovative Vector Control Consortium, and field trials are underway in several countries. We expect to assist with an EPA submittal for non-25(b) products in the next two years. IR-4 also continued to represent the ARS NPURU lab in EPA pre-registration negotiations for an entire new class of repellents and toxicants – the Chromenes; and we hope that commercial viability will allow regulatory submittals in the future. We continued to evaluate a class of natural molecules which repel bees and possibly other pollinators, and which may be a valuable tool to minimize vector control and other pesticide impacts on these beneficial insects. Finally, we helped obtain Experimental Use Permits (EUP's) and funded work on the rearing and release of *Aedes aegypti* mosquitoes infected with the endosymbiotic bacteria *Wolbachia* as a new approach to the sterile male method; a previous EUP we supported for this work vs. *Aedes albopictus* led to an effective product and the EPA registration packet was submitted in January 2016, and will be shown in next year's list.

Given the great diversity of actual and potential vector control tools, a major focus of the IR-4 PHP program has been the development and maintenance of a database of public health pesticides, and we particularly emphasize the identification of underutilized chemicals with significant potential utility for organized vector control programs. During 2015 the IR-4 PHP database (http://ir4.rutgers.edu/PublicHealth/publichealthDB.cfm) was substantially revised and expanded, with the addition of 340 chemicals (AI's), 5601 chemical identifiers, 5234 chemical data records, 1057 products, and over 4000 product identifiers and data records, in addition to updates on thousands of additional records. We added new data on military use pesticides for purposes other than vector control, as a general service to a key stakeholder, and we introduced a Project Management module to assist military and other federal vector control researchers and funders. Finally, we developed several dozen queries to help track regulatory requirements for existing vector control materials, and to help ensure timely response to EPA usage data requests.

Impact

The successes, accomplishments and deliverables of the IR-4 Project and it four main program areas are documented in the Program sections. The accomplishments are many. 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. The IR-4 Project is a critically important organization in providing the US population a safe and plentiful supply of reasonably priced vegetables, fruits, herbs, and ornamental crops throughout the year.

Specialty crop producers have provided antidotal evidence of importance. Here are some of their comments:

"Everyone who eats has an interest in the IR-4 Project whether they know it or not. The IR-4 Project is a vital part of the country's food safety security system and should be considered a national strategic imperative" Bob Simerly, McCain Food USA, Inc. and representing the National Onion Association.

"Del Monte vegetables have been able to secure registrations for all of our primary herbicides, insecticides and fungicides either directly working with IR-4 or in cooperative collaborative efforts with IR-4 and the agrichemical industry". Brian Flood, Research Fellow, Del Monte Foods

"The US greenhouse hydroponic vegetable industry has developed in the last 25 years. We would not exist today without the IR-4 Program" Mike Bledsoe Ph. D, Senior Vice President Food Safety and Regulatory Affairs, Village Farms.

"I do not know how we would survive raising vegetables without IR-4. IR-4 has been able to get us new chemicals labeled, along with better use rates and lower PHIs that we need to keep our vegetables weed free, insect free while keeping our bees safe and our diseases under control." Bruce Buurma, Buurma Farms, Willard Ohio.

"IR-4 has been and continues to be integral in helping to provide guidance in pest management options to the greenhouse, nursery and landscape industries. Through IR-4's focus on product registrations, our industry has greater options for pest management tools that are safe for plants and pesticide resistance management." Jill Calabro, PhD. Science & Research Program Director, American Hort/Horticulture Research Institute.

Michigan State University's Center of Economic Analysis conducted a study on the economic impact of IR-4 Project's activities in the Food, Ornamental Horticulture and Biopesticide and Organic Support programs. This report was updated in October 2012. According to the report, "***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."*** Though the data is over three years old, it is highly likely that the economic impact of IR-4's activity in 2015 is equal or better than the values reported in 2012.

The powerful impact IR-4 has on these economic drivers is only half the story. The other half involves food safety, food security and public wellbeing. IR-4 assists in the registration of the latest generation of reduced risk and biopesticide pest management products. These products are compatible with Integrated Pest Management systems, and have little hazard or degrade rapidly after use. They allow farmers to maximize yields of quality fruits, vegetables and nuts; making products available to the public at an affordable price. With IR-4's assistance, specialty crop growers provide the public a consistent supply of nutritious foods, essential to good health, as well as aid in the production of ornamentals that enhance the environment. Additionally, IR-4 helps provide tools to manage

pests like mosquitoes, ticks and fleas that transmit diseases to humans. The bottom line, what IR-4 delivers to society is extremely important and necessary.

2015 Appropriations and other funding

The IR-4 Project is funded by various groups within USDA in partnership with the SAES as well as others. Total direct funding for the IR-4 Project during calendar year 2015 was $18.1 million and was from the following sources: 2015 Direct Funding for IR-4 including sources and comments:

Amount	Source	Comment
$11.913,000	Congress via a Special Research Grant	Administrated through NIFA. The Congressional appropriated funds managed through USDA-NIFA provide resources for IR-4 Project core operations within the Food, Ornamental Horticulture and Biopesticide and Organic Support programs. In 2015, approximately $7.541 million was distributed to the four IR-4 Regional offices and Headquarters for personnel, supplies, equipment, laboratory analysis and other core expenses. Over $2.5 million was allocated for field trials that produce the necessary residue samples and product performance data; $518,000 for ornamental trials; $400,000 for biopesticide/organic support grants and the remaining $811,075 was mandatory NIFA holdback
$481,182	State Agriculture Experimental Station Directors	Multi-State Research Funds/NRSP-4 grant. NRSP-4 funds directly pay salaries for IR-4 HQ management who provide overall leadership and coordination of the IR-4 Project's on-going research efforts.
$3,170,000	USDA-Agriculture Research Service	USDA-ARS provides funds supporting their personnel who work on cooperative projects that align with priorities and studies managed by IR-4. Participating ARS scientists are given specific research assignments that fully complement and do not duplicate the on-going research at the SAES
$225,000	Department of Defense/USDA-Agricultural Research Service	Cooperative agreement between IR-4 and USDA-ARS based on allocation through Deployed Warfighter Protection Program Funding is provided exclusively for the Public Health Pesticide Registration Support Program and pays for personnel costs, travel and subcontracts to research groups who conduct priority research projects.
$600,000	USDA-Foreign Agriculture Service and other global partners	International activities to support specialty crop exports and global pesticide regulatory harmonization. This includes funds for capacity building training programs in Asia, Africa and Latin America and seed funds to be used for the establishment of the Global Minor Use fund.
$195,000	USDA-Animal and Plant Health Inspection Service	Management of 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.
$1,510,000	Industry support	Unrestricted funds-the crop protection industry and some grower groups/commodity associations also contributes direct financial resources as well as significant in-kind resources. IR-4 used these resources to supplement USDA funds; $305,829 for additional research activities, $404,373 for office rent, $843,075 to support additional HQ operations and $253,164 for priority setting/research planning workshops, EPA training tour, and related meetings.
$18,094,182	**TOTAL DIRECT FUNDING**	

IR-4 also receives a significant amount of in-kind contributions from multiple sources, including the substantial in-kind contributions provided by SAES/land grant universities by hosting IR-4 field research centers, analytical laboratories and management offices throughout the United States (estimated >$5 million annually) EPA Pesticide Registration Improvement Act fee waivers ($4.417 million in Fiscal Year 2015) and the crop protection industry (their in-kind contributions are conservatively estimated to be a 1:1 match). The government of Canada also make significant in-kind contribution (>$750,000).

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

Future Directions

IR-4 hosts a series of workshops to prioritize future research projects. These open workshops are designed to gain stakeholder input and feedback to determine what the most important research pest management needs are and where resources should be spent. In 2015, IR-4 hosted four workshops.

- Priorities for 2016 research were determined at the September 22-23, 2015 Food Use Workshop held in Chicago, IL. Prior to the workshop, IR-4 facilitates an internet based process where stakeholders identify and nominate projects for consideration at the workshop. Projects given at least one on-line "A" nomination are compiled into a project list utilized during face-to-face deliberations at the workshop. Approximately 200 participants (growers, commodity organizations, university research and extension specialists) develop consensus on the most important chemical/crop research projects for the next growing season. Assessment of project priorities are based on many criteria, including (but not limited to): (1) availability and efficacy of alternative pest management tools (including ongoing projects for the same need) (2) pest damage potential of target pest(s) (3) performance and crop safety of the chemical tool in managing the target pest(s) (4) compatibility of the proposed chemical candidate with Integrated Pest Management (5) uses currently covered by Section 18 emergency exemptions (6) harmonization implications due to lack of international MRLs.

  Following the workshop, a National Research Planning Meeting is held to assign field and laboratory locations for the research projects. If a project is also a priority in Canada, IR-4 will work in cooperation with CN-PMC on these studies of mutual interest. After finalizing field and lab assignments, Study Directors at HQ, draft protocols specific to the individual research study. These draft protocols are developed under federal guidelines as noted in EPAs Harmonized Test Guideline (OPPTS 860) and are distributed to stakeholders and Field Research directors for review and comment before being issued as the final research protocol.

  Based on priorities established at the IR-4 Food Use Workshop, in 2016, the current food residue plan includes 501 field trials. This trial plan includes: 411 trials to be conducted at IR-4 Field Research Centers/other University sites, 54 field trials at ARS sites and 36 trials conducted by Canadian partners (CN-PMC).

  The 2016 Food Use Workshop to identify 2017 research priorities will be held in September 22-23, 2016 in Orlando Florida.

- The Ornamental Horticulture Program will continue to address stakeholder needs by balancing crop safety and efficacy testing for new active ingredients and expanded current registrations for new and important pest species. Based on priorities established at the October 2015 IR-4 Ornamental Horticulture Workshop, IR-4 plans to conduct 532 trials in 2016 including efficacy testing work for thrips efficacy, foliar feeding beetle efficacy, botrytis efficacy, and bacterial disease efficacy. In addition, plant safety or phytotoxicity screening on a wide variety of ornamental crops with specific fungicides, insecticides and herbicides will be conducted.

- The Biopesticide and Organic Support priority setting workshop is held in combination with the annual IR-4 Food Use Workshop on September 24 in Chicago, IL. During the workshop, there were discussions concerning the outcome of the 2015 projects including: were any of the projects promising enough to fund for a 2nd year and did these projects fit the priorities set for 2016. It was determined that Spotted Wing Drosophila, fireblight on apple, Chestnut blight, Varroa mite on honeybee, bacterial management in tomato and whitefly on greenhouse tomato should be funded for a second year. The 2016 Biopesticide and Organic Support Workshop to identify 2017 research priorities will be held in September 21, 2016 in Orlando Florida.

- International research for these priorities will begin in 2016. Many countries committed to conducting the required research, allow for global product acceptance and free trade among countries.

IR-4 takes pride in these accomplishments; providing over 47,000 registrations for food and non-food crops over the 53-year history of the Project. However, there are many issues that remain unresolved. Specialty crop growers/minor use stakeholders still face challenges in managing critical pests that consume their crops and profits. It is often difficult to export certain specialty crops because standards of allowable pesticide residues (MRLs) vary across nations. IR-4's international involvement plays a major role in harmonizing MRLs for allowable pesticide residues in specialty crops. Newly emerging invasive pests, such as Brown Marmorated Stink Bug, Spotted Winged Drosophila, Boxwood Blight, resistant weeds and other pests threaten agriculture and the environment. Recent outbreaks of Zika Virus, West Nile Virus and Dengue fever in the continental US highlight the need for solutions to manage public heath pests as well.

IR-4's existing strategic plan, ***VISION 2020,*** was completed and approved by the IR-4 Project Management Committee in July 2014. This plan details the IR-4 Project background, vision, mission, values, culture, objectives and funding needs and identifies strategic benchmarks and the goals in each program area. See the IR-4 website for details.

The most noteworthy item under this plan include increased emphasis in helping harmonize global standards for pesticide residues in specialty crops to give domestic producers expedited access to lucrative international markets. Congress authorized this activity in the 2014 Farm Bill. Another ongoing change includes increased emphasis on supporting the strategic use of biopesticides not only to control key pests but to assist in the management of pest resistance to pesticides and reduction of chemical residues in food.

Adequate funding remains the most critical current and future challenge for IR-4. In most program areas, IR-4 funding remains at or below levels experienced in 2012. The impact of multiple years of flat funding and escalating costs is affecting IR-4's ability to maintain research levels needed to address grower demands. Specifically, IR-4 conducted 62 new food use studies in 2015 which was 23 less than in 2011. A similar decline was observed in the ornamental horticulture program which anticipates a decline from 1316 trials in 2011 to 673 in 2016.

Many of IR-4 partners are facing funding challenges and some partners have withdrawn from IR-4 involvement due to these challenges. For example, the Cornell University administration did not submit a grant application to USDA-NIFA to support IR-4's FY 2015 Northeast Region operations. This is mainly due to the Federal restriction not allowing Cornell to collect indirect costs on the IR-4 grant. IR-4 has relocated its Northeast Region operations to Rutgers University and University of Maryland.

Recognizing that other partner research institutions may soon refuse to take grant money that does not allow indirect costs, IR-4 has established a "Path Forward Working Group" to develop a strategy, including evaluating the impacts and opportunities for transitioning from the current USDA-NIFA Special Research Grant funding to a Cooperative Agreement approach with allows 10% indirect costs.

As part of the IR-4 Project Vision 2020 Strategic Plan, IR-4 is intending to conduct an Organizational Assessment to review IR-4's existing organization structure and its operational efficiencies within the organization. Some of the specific tasks of the Organizational Assessment is to:

1. To evaluate the organizational structure of the regional centers, their field research centers/field researcher cooperators and dedicated IR-4 analytical laboratories, and the coordinating operations of IR-4 Project Headquarters.
2. To determine, based on the various impacts on the IR-4 Project, if the present organizational structure is still appropriate to meet the current and future needs of the specialty crop producers, processors and consumers.
3. To identify efficient and inefficient operational processes throughout the IR-4 Organization.
4. To examine how ARS operates within the IR-4 process and what role it has in any future reorganizational models. Note: the goal is not to evaluate the ARS organization but how it fits into the IR-4 process.
5. To collect this information and appraise if operational efficiencies and/or savings can be achieved through reorganization of IR-4's units.
6. To propose to the IR-4 Project Management Committee (PMC) any changes to the current organizational structure as well as operational efficiencies/savings that can be achieved through reorganization by recommending models, along with the positive/negative impacts of such changes.

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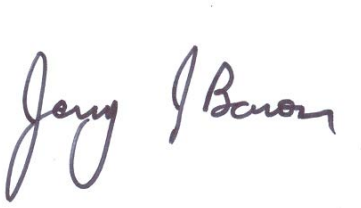
Approved by:



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John Wise, Chair,
IR-4 Project Management Committee
Michigan State University

Douglas Buhler, Chair,
IR-4 Administrative Advisers
Michigan State University

ATTACHMENT 1

Participants in the Process

Stakeholder Representatives

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

Dr. Michael Aerts, Florida Fruit and Vegetable Association
Mr. Mark Arney, Nat'l Watermelon Promotion Board
Mr. Kirk Baumann, Ginseng Board of Wisconsin
Dr. Lori Berger, Ag Business Resources
Dr. Michael Bledsoe, Village Farms, L.P.
Dr. A. Richard Bonanno, Pleasant Valley Farms and CLC Chair
Mr. Bruce Buurma, Buurma Farms Inc.
Mr. James R. Cranney, California Citrus Quality Council
Mr. Alan DeYoung, Van Drunen Farms (partial year)
Dr. Brian R. Flood, Del Monte USA
Ms. Ann E. George, Washington Hop Commission
Mr. Terry Humfeld, Cranberry Institute
Mr. John Keeling, National Potato Council
Mr. Phil Korson, Cherry Marketing Institute
Mr. Eric Maurer, Engage Agro
Mr. Armando Monterraso, Brooks Tropicals
Mr. Dennis Nuxoll, Western Growers Association
Mr. Ray Prewett, Texas Vegetable Association (partial year)
Ms. Laura Phelps, American Mushroom Institute
Mr. Keith Pitts, Marrone Bio Innovations (partial year)
Mr. Ray Ratto, Ratto Brothers
Mr. Steven Salisbury, Mint Industry Research Council
Mr. Paul Schlegel, American Farm Bureau Federation
Ms. Lin Schmale, Society of American Florists
Mr. Todd Scholz, USA Dry Pea & Lentil Council
Dr. Alan Schreiber, Agriculture Development Group, Inc.
Mr. Bob Simerly, National Onion Association
Mr. Berry Tanner, National Watermelon Association (alternative)
Mr. Dave Trinka, MBG Marketing
Mr. Dennis Tristao, J.G. Boswell Company

Cooperating Government Departments and Agencies

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

ATTACHMENT 1 Continued

Crop Protection Industry

ADAMA
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
BetaTec
BioBest
Bio HumaNetics
BioProdex
BioSafe Systems
Bioworks
CAI Limited
Certis USA
Dow AgroSciences
DuPont Agricultural Products
Engage Agro
FMC Corporation
Gowan Company
Hacco, Inc.
Isagro, USA
ISK Biosciences
Janssen Pharmaceutica
K-I Chemical USA Inc.
MGK
Landis International
Lonza Inc.
Luxembourg-Pamol, Inc.
MacDermid Agricultural Solutions, Inc.
Marrone BioInnovations, Inc.
Monsanto Company
Natural Industries
Neudorff
Nichino America, Inc.
Nisso America, Inc.
Novozymes, Inc.
Nufarm Americas, Inc.
OHP
Pace 49, Inc.
SePro Corporation
Sipcam Advan
Summerdale, Inc.
Syngenta Crop Protection Inc.
Syngenta Flowers
TKI Novasource
UPI
Valent Biosciences
Valent USA Corporation
Willowood USA

IR-4 PARTICIPANTS

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Dr. David Soderlund, Cornell University - Regional Director, Northeast Region & PMC Chair (partial year)
Dr. John Wise, Michigan State University – Regional Director, North Central Region, Chair (partial year)

ATTACHMENT 1 Continued

IR-4 Project Headquarters (HQ)

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

Dr. Marija Arsenovic – Manager, Weed Science Activities/Study Director
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Ms. Carolyn Jolly – Study Director/Research Coordinator
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Mr. Raymond Leonard – Study Director/Research Coordinator
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Ms. Sherri Novack – Manager, Communications and Outreach
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ATTACHMENT 1 Continued

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State and Federal IR-4 Liaisons Representatives

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Dr.	D.	Egel	IN
Dr.	R.	Groves	WI
Dr.	R.	Hartzler	IA
Dr.	D.	Heider	WI
Dr.	S.	Kamble	NE
Dr.	C.	Krause	USDA-ARS
Dr.	V.	Krischik	MN
Dr.	S.	Miyazaki	MI
Dr.	M.	Reding	USDA-ARS
Dr.	D.	Williams	IL
Dr.	M.	Williams	USDA-ARS
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VACANT			MO

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Dr.	T.	Mervosh	CT
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Dr.	D.	Polk	NJ
Ms.	C.	Smith	NH
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Dr.	D.	Yarborough	ME

ATTACHMENT 1 Continued

Southern Region

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Dr.	M.	Lewis-Ivey	LA
Mr.	C.	Luper	OK
Mr.	M.	Matocha	TX
Dr.	D.	Monks	NC
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Dr.	M.	Weaver	VA
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Mr.	J.	DeFrancesco	OR
Mr.	C.	Hamilton	NM
Dr.	R.	Hirnyck	ID
Dr.	P.	Kaspari	AK
Dr.	M.	Kawate	HI
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Dr.	S.	Nissen	CO
Dr.	J.	Palumbo	AZ
Dr.	C.	Ransom	UT
Ms.	R.	Sisco	CA
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Regional Field Research Directors

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S. Clay	SD
D. Doohan	OH
M. Hausbeck	MI
D. Heider	WI
B. Jenks	ND
S. Miller	OH
T. Scholz	MN
A. Van Woerkom	MI
B. Zandstra	MI

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R. Bellinder	NY
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T. Freiberger	NJ
C. Hoepting	NY
Z. Jacimovski	NY
N. Lalancette	NJ
M. McGrath	NY
K. Peter	PA

ATTACHMENT 1 Continued

Northeastern Region (Continued)

M. Ross	MD
C. Smart	NY
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M. VanGessel	DE
A. Wyenandt	NJ
D. Yarborough	ME

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D. Alfred	FL
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N. Boyd	FL
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N. Burgos	AR
M. Campos	TX
D. Carrillo	FL
P. Dittmar	FL
L. Estorninos	AR
M. Gutierrez	FL
A. Henn	MS
M. Ivey	LA
K. Jennings	NC
O. Liburd	FL
C. Marconi	TX
J. Martin	KY
W. Mitchem	NC
A. Monterroso	FL
D. Odero	FL
M. Phillips	TX
W. Robles Vazquez	PR
R. Saldana	TX
H. Smith	FL
D. Sutherland	FL
R. Tannenbaum	FL
G. Vallad	FL
S. Yates	FL
S. Zhang	FL

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J. Adaskaveg	CA
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C. Hamilton	NM
B. Hanson	CA
R. Hobbs	CA
J. Kam	HI
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G. Kyser	CA
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C. Oman	CO

ATTACHMENT 1 Continued

Western Region (Continued)

E. Peachey	OR
S. Salisbury	OR
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D. Walsh	WA
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ARS

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R. Boydston	WA
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J. Harvey	WA
L. Horst	OH
P. Wade	SC

Canada

M. Clodius	BC
J. Dubuc	QC
D. Hanscomb	NS
D. Nield	BC
G. Riddle	ON
R. Wismer	ON

ATTACHMENT 2
2015 Food Use Research Projects - Residue Trials

Chemical	Crop	PR #
Acetamiprid	Avocado	11326
Acetochlor	Bean & Pea (Succulent)	B10214
Acifluorfen	Bean (Lima) (Succulent & Dried Shelled)	A6300
Acifluorfen	Pea (Southern)	A6301
Bentazon	Pea (Dry)	11510
Bromoxynil	Grasses (Seed Crop)	11329
Chlorfenapyr	Tomato (GH) (Small)	11606
Chlorothalonil	Sugar Apple	A3721
Clofentezine	Guava	9323
Clopyralid	Caneberry	A5147
Clopyralid	Onion (Dry Bulb)	11600
Cyazofamid	Ginseng	11636
Cyflumetofen	Pepper (GH)	11451
Cyflumetofen	Tomato (GH)	11450
Cyromazine	Pea (Edible Podded & Succulent Shelled)	11503
Difenoconazole + Azoxystrobin	Asparagus	11352
Difenoconazole + Azoxystrobin	Bean & Pea (Edible & Podded)	11604
Difenoconazole + Azoxystrobin	Dragon Fruit (Pitaya)	11271
Difenoconazole + Azoxystrobin	Passion Fruit	11573
Dinotefuran	Basil	8595
Diquat	Avocado	10816
Fenpyroximate	Bean (Succulent Shelled)	11029
Fenpyroximate	Blueberry	11501
Fenpyroximate	Squash (Summer)	9033
Fluazifop-P-Butyl	Celery	2336
Fluazifop-P-Butyl	Papaya	11265
Fluazinam	Tomato	10592
Flumetsulam	Clover (Seed Crop)	11505
Flumioxazin	Edamame (Vegetable Soybean)	11132**
Flumioxazin + Pyroxasulfone	Grasses (Seed Crop)	10885
Flumioxazin + Pyroxasulfone	Sweet Potato	11120
FTH 545	Strawberry	11159**
Imidacloprid	Corn (Seed Crop)	11270
Indaziflam	Asparagus	11429
Indaziflam	Blueberry (Lowbush)	11412**
Indoxacarb	Coffee	11467
Indoxacarb	Grasses (Seed Crop)	A9521
Isoxaben	Caneberry	10248
Kasugamycin	Almond	11461
Kasugamycin	Olive	11137
Kasugamycin	Peach	9888
Linuron	Bean (Dried Shelled)	11508
Linuron + Diuron	Sesame	11396

Chemical	Crop	PR #
Mandipropamid	Grapefruit	11140
Mandipropamid	Lemon	11139
Mandipropamid	Orange	11138
Mefenoxam	Herbs (GH)	11548
Mefenoxam	Tomato (GH)	1700**
Nitrapyrin	Broccoli	A2188
Nitrapyrin	Cabbage	A2022
Nitrapyrin	Celery	A2024
Nitrapyrin	Grapefruit	11316
Nitrapyrin	Greens (Mustard)	A2660
Nitrapyrin	Lemon	11314
Nitrapyrin	Lettuce (Head & Leaf)	A2659
Nitrapyrin	Orange	11315
Novaluron	Sunflower	11344
Oxathiapiprolin	Pomegranate	10915
Paraquat	Sesame	11146
Penoxsulam + Oxyfluorfen	Artichoke (Globe)	11282
Penthiopyrad	Banana	11307
Permethrin	Grapefruit	1953
Potassium Phosphite	Almond	11529
Potassium Phosphite	Pistachio	11530
Potassium Phosphite	Walnut	11504
Propamocarb-HCL	Guava	7171
Propamocarb-HCL	Spinach	11499**
Propiconazole	Broccoli	11586
Propiconazole	Cabbage	11587
Pyriofenone	Cucumber (GH)	11446
Pyroxasulfone	Celery	11324**
Quizalofop	Apple	10033**
Quizalofop	Cherry	10036**
Quizalofop	Peach	10034**
Quizalofop	Pear	10032**
Quizalofop	Plum	10035**
Rimsulfuron	Pomegranate	10606
Saflufenacil	Fig	11557
Sethoxydim	Basil	A2063**
S-Metolachlor/Metolachlor	Rosemary	10819
Spinetoram	Dragon Fruit (Pitaya)	11514
Spinetoram	Grape	11413
Streptomycin	Pepper (Bell & Nonbell)	10290
Sulfoxaflor	Artichoke (Globe)	10858
Thiabendazole	Clover (Seed Crop)	11310
Thiabendazole	Greens (Mustard) (Seed Trt)	11585
Trifluralin	Sesame	11147
Trinexapac-Ethyl	Clover (Seed Crop)	11526
* *indicates joint studies with Canada PMC.		

ATTACHMENT 3
2015 Efficacty/Crop Safety (E/CS) Research Program

Research to complete E/CS needs for pre-2015 projects/residue studies:

Chemical	Crop	PR#	Comments	ARS trials	State university trials
indaziflam	high bush blueberry	10882	2013 residue study; multi-year CS trials (need 3rd year observations)	GA	OR, NC, MI
clomazone	dill	11091	2013 residue study	--	CA
clomazone	cilantro	11092	2013 residue study	--	CA, CA, FL
quizalofop	grape	10031	2nd year trial CA; 1st year trial NY	--	CA, NY
fomesafen	sweet potato	11115	2014 residue study	GA	AR, NC, MD
linuron	sweet potato	11118	2014 residue study	GA	AR, NC, MD
fluazifop	chives	2087	2014 residue study	--	AR, CA, FL, MI
pendimethalin	celery	10746	2014 residue study	--	CA, FL
acifluorfen	edamame	10958	2014 residue study	OH	AR, MI, NY
pyroxasulfone	edamame	11133	2014 residue study	WA	AR, MI, NY
acifluorfen	lima bean	6300	2014 residue study	--	CA, DE
saflufenacil	caneberry	11079	2014 residue study	--	NC, OH, OR, WA
			Totals	5	33

Research to complete E/CS needs for new 2015 residue studies:

Chemical	Crop	PR#	Comments	ARS trials	State university trials
cyantraniliprole	ginseng	10731	2015 residue study		WI, WI
clopyralid	dry bulb onion	11600	2015 residue study		FL, MI, NY, OH
pyroxasulfone	celery	11324	2015 residue study		CA, FL
acifluorfen	pea	6301	2015 residue study		AR, NC
cyflumetofen	GH tomato	11450	2015 residue study		FL
cyflumetofen	GH pepper	11451	2015 residue study		FL
pyriofenone	GH cucumber	11446	2015 residue study		FL, OH
kasugamycin	peach	9888	2015 residue study		CA, NJ, PA
kasugamycin	almond	11461	2015 residue study		CA
indazaflam	asparagus	11429	2015 residue study		CA, NC, NJ
saflufenaxil	fig	11557	2015 residue study		CA, CA
acetamiprid	avocado	11326	2015 residue study		FL
rimsullfuron	pomegranate	10606	2015 residue study		CA
			Totals	0	25

Research in 2015 for PPWS (Pest Problem Without Solution) studies:

Chemical	Crop	PR#	Comments	ARS trials	State university trials
Insecticides	dragon fruit	11601	chilli thrips control		FL, FL
Fungicides	fruiting vegetables	10713	bacterial disease control		FL, LA, MI, NY, OH
			Totals	0	7

Research in 2015 for for high priority regional needs:

Chemical	Crop	PR#	Comments	ARS trials	State university trials
pendimethalin	fava bean	9959	need CS data to add fava bean to label		CA
valifenalate	basil	10296	need new tools for DM resistance management		NJ, NY
			Totals	0	3

ATTACHMENT 4
2015 Submissions to EPA, Registrants, Codex, and State Departments of Agriculture

Pest Control Agent	Type*	Date	Commodity or Crop Group	PR#
Fluazinam	F	2/2/2015	Squash/cucumber subgroup 9B	08916
				09238
				09269
				09255
			Cabbage	07093
			Mayhaw	06796
			Vegetable, tuberous and corm, subgroup 1C	11618
			Lettuce storage stability	B6892
Cyazofamid	F	2/10/2015	Herb subgroup 19A	10265
			Tomato (greenhouse)	10656
			Pepper (greenhouse)	11623
Anthraquinone	B	4/20/2015	Rice	09687*
Pyrethrins+PBO	I	4/27/2015	Herbs and spices	10855*
Pyridaben	I	5/07/2015	Cucumber (greenhouse)	08036
			Fruit, pome, group 11-10	11659
			Nut, tree, group 14-12	11662
			Fruit, stone, group 12-12	11663
			Fruit, citrus, group 10-10	11664
			Fruit, small, vine climbing, except fuzzy kiwifruit, subgroup 13-07F	11660
			Berry, low growing, subgroup 13-07G, except cranberry	11661
FTH 545	F	5/2015	Cantaloupe	11158*
	F	5/2015	Squash (Summer)	11157*
	F	5/2015	Cucumber	11156*
Chlorantraniliprole	I	6/10/2015	Artichoke, globe	10083
			Nut, tree, group 14-12	11201
			Fruit, stone, group 12-12	11200
			Hops	10491
Metaldehyde	M	7/07/2015	Wheat[1]	10335
			Beet, garden, Rutabaga, and Turnip	10338
			Hop	11038
Penflufen	F	7/14/2015	Onion, bulb, subgroup 3-07A Onion, green, subgroup 3-07B	10865
Fluensulfone	N	7/22/15	Vegetable, tuberous and corm, subgroup 1C	10904
				10905
Fomesafen	H	7/24/2015	Berry, low growing, subgroup 13-07G, except cranberry	10282
				10439
			Vegetable, tuberous and corm, subgroup 1C	08084

Pest Control Agent	Type*	Date	Commodity or Crop Group	PR#
			Vegetable, legume, group 6	03011 03472 05403 08083 10476
Fenpyroximate	I	7/28/2015	Watermelon	11182*
Aspergillus flavus strain TC16F, TC35C, TC38B, and TC46G	F	8/10/2015	Corn	1048B
Flumioxazin	H	8/18/2015	Clover Caneberry subgroup 13-07A Brassica, head and stem, subgroup 5A Fruit, citrus, group 10-10 Vegetable, fruiting, group 8-10 Fruit, pome, group 11-10 Fruit, stone, group 12-12 Fruit, small, vine climbing, except fuzzy kiwifruit, subgroup 13-07F Onion, bulb, subgroup 3-07A Berry, low growing, subgroup 13-07G Nut, tree, group 14-12	10605 A10605 09700 10229 10249 10224 10763 10764 10799 11371 11366 11367 11368 11369 11370 11608
Flupyradifurone	I	8/2015	Caneberry Cucumber Pepper (Greenhouse) Pomegranate Tomato (Greenhouse)	10860* 10785* 11244* 10770* 10784*
Clomazone	H	9/01/2015	Edamame Asparagus	11614 10279
Pseudomonas fluorescens strain ACK55	H	9/10/2015	All commodities (conservation of sage grouse habitat and reduction of wildfire risk)	0995B
Halosulfuron	H	10/08/2015	Cucumber	10891*
Pyrethrins+PBO	I	10/16/2015	Mushroom	05954*
Acequinocyl	I	11/11/2015	Avocado Bean (dry shelled) Vegetable, cucurbit, group 9 Vegetable, fruiting, group 8-10 Fruit, citrus, group 10-10 Fruit, pome, group 11-10 Cherry subgroup 12-12A Nut, tree, group 14-12 Tea	09218 08675 08608 11804 11801 11802 11800 11803 11706

Pest Control Agent	Type*	Date	Commodity or Crop Group	PR#
Flonicamid	I	12/01/2015	Vegetable, legume, edible podded, subgroup 6A	
			Pea and bean, succulent shelled, subgroup 6B	10472 10474
			Pea and bean, dry shelled, except soybean, subgroup 6C	10473 10475
			Vegetable, fruiting, group 8-10	10999
Fenamidone	F	12/22/2015	Basil	10120
			Proposed Vegetable, Brassica, head and stem, group 5-15	11813
			Proposed Vegetable, leafy greens, subgroup 4-15A	11814
			Proposed Vegetable, Brassica, leafy greens, subgroup 4-15B	11815
			Proposed Vegetable, leaf petiole, subgroup 22B	11816
			Kohlrabi	11817
			Fennel, Florence	11818
			Celtuce	11819
			Cottonseed subgroup 20C	11820
Oxathiapiprolin	F	12/24/2015	Proposed Vegetable, stalk and stem, subgroup 22A	10623
			Basil	10772
			Caneberry subgroup 13-07A	11720
			Proposed Vegetable, leafy greens, subgroup 4-15A	11855
			Proposed Vegetable, Brassica, leafy greens, subgroup 4-15B	11125
			Proposed Vegetable, Brassica, head and stem, group 5-15	11856
Carbaryl	I	12/11/2015	Cranberry	10789*

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

*Completed Final Reports Submitted to Registrant or other regulatory body to support US growers

ATTACHMENT 5
2015 Tolerance Successes - Permanent Tolerances
Published in the *Federal Register*

Pest Control Agent	Type*	Date	Commodity or Crop Group	PR#	No. of Uses	No. of Tolerances
Flupyradifurone	I	1/23/2015	Bushberry subgroup 13-07B, except cranberry**	10637	19	1
			Prickly pear cactus**	11188	1	2
			Clover**	10747	1	2
Pendimethalin	H	2/11/2015	Hop**	10244	1	1
			Onion, bulb, subgroup 3-07A2	11171	9	1
			Onion, green, subgroup 3-07B2	11172	11	1
			Vegetable, fruiting, group 8-101	11355	12	1
			Fruit, citrus, group 10-101	11167	14	1
			Fruit, pome, group 11-101	11168	5	1
			Fruit, stone, group 12-121	11169	11	1
			Berry, low growing, subgroup 13-07G2	11170	8	1
			Sunflower subgroup 20B2	11360	13	1
Metaldehyde	M	3/4/2015	Vegetable, legume, edible podded, subgroup 6A** Vegetable, foliage of legume, except soybean, subgroup 7A**	10334	12	2
			Pea and bean, succulent shelled, subgroup 6B**	10333 10667	12	1
			Clover (Pacific Northwest only)**	10105	1	2
			Ginseng**	10704	1	1
			Tomato subgroup 8-10A2**	11401	10	1
			Fruit, citrus, group 10-101**	11402	14	1
Boscalid	F	3/18/2015	Dill, seed	08691	1	1
			Herb subgroup 19A	08792 08793	40	1
			Fruit, stone, group 12-121	11384	11	1
			Nut, tree, group 14-121	11385	26	1
Pyraclostrobin	F	4/10/2015	Dill, seed	08691	1	1
			Herb subgroup 19A	08792 08793	40	1
			Fruit, stone, group 12-121	11386	11	1
			Nut, tree, group 14-12, except pistachio1	11387	27	1
Metconazole	F	5/29/2015	Pea and bean, dried shelled, except soybean, subgroup 6C**	10388 10389 11403 11404	24	1
			Sunflower subgroup 20B**	10390 11405	14	1
			Rapeseed subgroup 20A2**	11373	14	1
			Fruit, stone, group 12-121**	11374	11	1
			Nut, tree, group 14-121**	11375	26	1
Sethoxydim	H	6/15/2015	Vegetable, bulb, group 3-07[1]	10940	15	1
			Vegetable, fruiting, group 8-10[1]	10941	12	1
			Fruit, citrus, group 10-10[1]	10936	14	1
			Fruit, pome, group 11-10[1]	10937	5	1
			Caneberry subgroup 13-07A[1]	10933	1	1

Pest Control Agent	Type*	Date	Commodity or Crop Group	PR#	No. of Uses	No. of Tolerances
			Bushberry subgroup 13-07B[6]	09933	11	1
			Fruit, small, vine climbing, except fuzzy kiwifruit, subgroup 13-07F[2]	10938	5	1
			Berry, low growing, except strawberry, subgroup 13-07H[2]	10935	7	1
			Rapeseed subgroup 20A[2]	10939	16	15
			Sunflower subgroup 20B[2]	10939	13	13
			Cottonseed subgroup 20C[2]	10939	0	1
			Borage, meal[6**]	10939	0	1
			Fescue**	04873	1	2
Prohexadione	P	7/08/2015	Strawberry	07773	1	1
			Watercress	10151	1	1
S-Metolachlor	H	7/08/2015	Lettuce	08982 10099 10218	2	1
			Vegetable, fruiting, group 8-10, except tabasco pepper[1]	11280	10	1
			Vegetable, cucurbit, group 9[3]	03659 06656 09406	8	1
			Berry, low growing, subgroup 13-07G, except cranberry	01676	8	1
			Sunflower subgroup 20B	11281	14	1
Novaluron	I	7/22/2015	Avocado	09246	1	1
			Bean, succulent	09780	13	1
			Vegetable, cucurbit, group 9 (addition of greenhouse-grown cucumber)[6]	10237	0	1
			Carrot	09522	1	1
			Vegetable, fruiting, group 8-10[1]	11025	0 [6]	1
			Fruit, pome, group 11-10[1]	11026	5	1
			Cherry subgroup 12-12A[2]	11414	3	1
			Peach subgroup 12-12B and Plum subgroup 12-12C[1]	11415 11416	8	3
Fluazifop-p-butyl	H	8/6/2015	Sweet potato[6**]	02328	0	1
Fludioxonil	F	8/14/2015	Carrot**	11181	1	1
			Fruit, stone, group 12-12[1**]	11449	11	1
Difenoconazole	F	8/26/2015	Artichoke, globe	10387	1	1
			Ginseng	10446	1	1
			Fruit, stone, group 12-12[1]	11441	11	1
			Nut, tree, group 14-12[1]	11442	26	1
Oxathiapiprolin	F	9/4/2015	Ginseng**	10616	1	1
			Leafy greens subgroup 4A**	10653	22	1
			Onion, bulb, subgroup 3-07A**	10617	11	1
			Onion, green, subgroup 3-07B**	10617	15	1
			Pea, succulent shelled**	10837	4	1
			Vegetable, fruiting, group 8-10**	10621 10622	21	1
			Vegetable, cucurbit, group 9**	10607 10618 10620	14	1
Cyprodinil	F	9/09/2015	Artichoke, globe	10387	1	1
			Pomegranate	10613	1	1
			Guava	07127	1	1

Pest Control Agent	Type*	Date	Commodity or Crop Group	PR#	No. of Uses	No. of Tolerances
			Acerola		1	1
			Feijoa		1	1
			Jaboticaba		1	1
			Passionfruit	06983	1	1
			Starfruit		1	1
			Wax jambu		1	1
				11440		
			Fruit, stone, group 12-121	11443	11	1
Halosulfuron-methyl	H	9/17/2015	Fruit, pome, group 11-103	A9722	11	1
			Fruit, small, vine climbing, except fuzzy kiwifruit, subgroup 13-07F (East of the Rockies only)	A7768	6	1
Pyrimethanil	F	10/21/2015	Cucumber (greenhouse only)[6]	10284	1	1
			Tomato subgroup 8-10A[2]	11427	9	1
				11424		
				11497		
			Fruit, citrus, group 10-10[1]	11498	14	1
			Fruit, pome, group 11-10[1]	11425	5	1
			Fruit, stone, group 12-12[1]	11426	11	1
Methoxyfenozide	I	10/28/2015	Chive, fresh leaves	07240	1	1
			Onion, green, subgroup 3-07B, except chive, fresh leaves[6]	07240	0	1
			Herb subgroup 19A, except chive, fresh leaves[6]	07240	0	1
			Nut, tree, group 14-12[1]	11471	26	1
			Fruit, stone, group 12-12, except plum, prune, fresh[1]	11472	10	1
Rimsulfuron	H	10/30/2015	Sorghum (grain)	08604	1	3
Acetamiprid	I	11/04/2015	Clover (for regional registration in the Pacific Northwest only)**	09600	1	2
Nicosulfuron	H	11/04/2015	Sorghum (grain)	08604	1	3
Saflufenacil	H	11/25/2015	Pomegranate**	10786	1	1
Azoxystrobin	F	12/9/2015	Ti palm	10994	1	2
			Quinoa	11634	1	1
			Fruit, stone, group 12-12[1]	11430	11	1
			Nut, tree, group 14-12, except pistachio[1]	11431	11	1
NAA	P	12/14/2015	Pomegranate	05389	1	1
Pendimethalin	H	12/21/2015	Bushberry subgroup 13-07B	10181	18	1
			Caneberry subgroup 13-07A	09840	5	1
			Nut, tree, group 14-12[1]	11454	12	1
Propiconazole	F	12/23/2015	Brassica, leafy greens, subgroup 5B	06236	11	1
			Dill	06589	1	3
			Quinoa	11736	1	1
			Radish	06385	1	2
			Ti palm	10995	1	2
			Watercress	09937	1	1
			Fruit, stone, group 12-12, except plum[1]	11597	11	1
			Nut, tree, group 14-12[1]	11598	27	1
Spinetoram	I	12/24/2015	Berry, low growing, subgroup 13-07G, except cranberry[2]	11219	8	1
			Bushberry subgroup 13-07B[1]	11220	14	1

Pest Control Agent	Type*	Date	Commodity or Crop Group	PR#	No. of Uses	No. of Tolerances
			Caneberry subgroup 13-07A[1]	11221	1	1
				10132		
			Coffee	11067	1	1
			Cottonseed subgroup 20C[2]	11230	0	1
			Fruit, citrus, group 10-10[1]	11222	14	1
			Fruit, pome, group 11-10[1]	11223	5	1
			Fruit, small, vine climbing, except fuzzy kiwifruit, subgroup 13-07F[2]	11224	5	1
			Fruit, stone, group 12-12[1]	11225	11	1
			Nut, tree, group 14-12[1]	11226	27	1
			Onion, bulb, subgroup 3-07A[1]	11227	9	1
			Onion, green, subgroup 3-07B[1]	11228	6	1
			Vegetable, fruiting, group 8-10[1]	11229	12	1
			Quinoa	11686	1	1
Spinosad	I	12/28/2015	Berry, low growing, subgroup 13-07G, except cranberry[2]	11207	8	1
			Bushberry subgroup 13-07B[1]	11208	14	1
			Caneberry subgroup 13-07A[1]	11209	1	1
			Coffee	07331	1	1
			Cottonseed subgroup 20C[2]	11218	0	1
			Fruit, citrus, group 10-10[1]	11210	14	1
			Fruit, pome, group 11-10[1]	11211	5	1
			Fruit, small, vine climbing, except fuzzy kiwifruit, subgroup 13-07F[2]	11212	5	2
			Fruit, stone, group 12-12[1]	11213	11	1
			Nut, tree, group 14-12[1]	11214	27	1
			Onion, bulb, subgroup 3-07A[1]	11215	9	1
			Onion, green, subgroup 3-07B[1]	11216	6	1
			Vegetable, fruiting, group 8-10[1]	11217	12	1
			Quinoa	11642	1	1
				Totals	1175	187

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

[1] Update of established tolerance on old crop group or subgroup

[2] Conversion of established tolerance(s) on representative commodities to a crop group or subgroup tolerance

[3] Conversion of established tolerance(s) on representative commodities *and* submission of new data to complete the requirements for a crop group or subgroup

[4] Response to EPA request for Codex harmonization

[5] Tolerance for indirect or inadvertent residues

[6] Revised tolerance

ATTACHMENT 6
Pending Food Program Submissions to EPA

PR #	Chemical	Commodity (Full name)
08992	2,4-DB	LENTIL
00275	2,4-DB	GUAR
10922	6-BENZYLADENINE	AVOCADO
08600	ACEQUINOCYL	GUAVA
10214	ACETOCHLOR	BEAN & PEA (SUCCULENT)
11871	ALL PESTICIDES	CROP GROUP 18
03735	ATRAZINE	SORGHUM (SWEET)
08052	AVG	CHERRY
11055	AZOXYSTROBIN	BLUEBERRY
11130	BENZOVINDIFLUPYR	ONION (DRY BULB)
09026	BETA-CYFLUTHRIN	FLAX
10002	BIFENAZATE	BANANA
11465	BIFENAZATE	CROP GROUP 14-12
11462	BIFENAZATE	SUBGROUP 12-12A
11463	BIFENAZATE	SUBGROUP 12-12B
11464	BIFENAZATE	SUBGROUP 12-12C
11872	BIFENAZATE	SUBGROUP 20C
11873	BIFENAZATE	SUBGROUP 24A (TEMP)
11000	BIFENTHRIN	CRANBERRY
11164	BIFENTHRIN	LEMON
11016	BIFENTHRIN	APPLE
08490	BIFENTHRIN	GREENS (MUSTARD)
11017	BIFENTHRIN	PEACH
11249	BIFENTHRIN	POMEGRANATE
10578	BIFENTHRIN	AVOCADO
11836	BIFENTHRIN	CROP GROUP 10-10
11838	BIFENTHRIN	CROP GROUP 14-12
11835	BIFENTHRIN	SUBGROUP 08-10A
11860	BIFENTHRIN	SUBGROUP 08-10B
11837	BIFENTHRIN	SUBGROUP 13-07A
09338	BROMOXYNIL	MILLET
10087	CHLORFENAPYR	BASIL & CHIVES (GH)
09215	CHLORFENAPYR	CUCUMBER (GH)
11062	CHLORFENAPYR	CROP GROUP 08-10 (GH)
11734	CHLORFENAPYR	TEA
10367	CHLOROTHALONIL	ALMOND
10859	CHLOROTHALONIL	CHERRY, SOUR
10164	CHLOROTHALONIL	GRAPEFRUIT
05423	CHLOROTHALONIL	GREENS (MUSTARD)
10165	CHLOROTHALONIL	LEMON
00147	CHLOROTHALONIL	LETTUCE (HEAD & LEAF)
06420	CHLOROTHALONIL	LYCHEE
10163	CHLOROTHALONIL	ORANGE
00148	CHLOROTHALONIL	RADISH
00397	CHLOROTHALONIL	SPINACH

PR #	Chemical	Commodity (Full name)
10100	CHLOROTHALONIL	GUAVA
11093	CLETHODIM	ALMOND
10383	CLETHODIM	OKRA
11091	CLOMAZONE	DILL
10839	CLOMAZONE	CANOLA
03624	CLOPYRALID	PEAR
10437	CLOPYRALID	RADISH
11681	CLOPYRALID	STONE FRUITS
11682	CLOPYRALID	SUBGROUP 13-07G
11046	CYANTRANILIPROLE (HGW86)	CANEBERRY
10874	CYANTRANILIPROLE (HGW86)	COFFEE
10328	CYANTRANILIPROLE (HGW86)	STRAWBERRY
10327	CYANTRANILIPROLE (HGW86)	LETTUCE (GH)
08332	DCPA	CARROT
10245	DCPA	PRICKLY PEAR CACTUS
11433	DCPA	CROP GROUP 03-07
11435	DCPA	SUBGROUP 13-07G
11434	DCPA	SUBGROUP 09A
10172	DIFENOCONAZOLE	GUAVA
10802	DIFENOCONAZOLE	PAPAYA
11865	DIFENOCONAZOLE	COTTONSEED
11863	DIFENOCONAZOLE	CROP GROUP 05-14 (TEMP)
11866	DIFENOCONAZOLE	SUBGROUP 13-07F
11864	DIFENOCONAZOLE	SUBGROUP 04-14B (TEMP)
10828	DIFENOCONAZOLE + AZOXYSTROBIN	CRANBERRY
10998	DINOTEFURAN	CUCUMBER (GH)
10817	DIQUAT	GUAVA
10815	DIQUAT	LYCHEE
10766	DIQUAT	ONION (DRY BULB)
09737	DIQUAT	WATERCRESS
10818	DIQUAT	BANANA
10814	DIQUAT	SUGAR APPLE
10669	DIQUAT	PEPPER (BELL & NONBELL)
10668	DIQUAT	TOMATO
02399	DIURON	CHERRY
03071	DIURON	PLUM
10863	EMAMECTIN BENZOATE	ARTICHOKE (GLOBE)
07137	EMAMECTIN BENZOATE	BASIL
10685	EMAMECTIN BENZOATE	CHERRY
10115	ETHEPHON	FIG
11126	ETHOFUMESATE (WILLOWOOD)	BEET (SUGAR)
10049	ETHOPROP	MINT
04124	ETHYLENE	PINEAPPLE
11099	ETOXAZOLE	CORN (SWEET)
07262	FAMOXADONE + CYMOXANIL	BEAN, LIMA (SUCCULENT & DRIED SHELLED)
08875	FAMOXADONE + CYMOXANIL	CARROT
08759	FAMOXADONE + CYMOXANIL	GREENS (MUSTARD)
10677	FAMOXADONE + CYMOXANIL	MANGO

PR #	Chemical	Commodity (Full name)
10812	FAMOXADONE + CYMOXANIL	GINSENG
09741	FENHEXAMID	KIWIFRUIT (PREHARVEST)
07149	FENHEXAMID	ONION
08243	FENHEXAMID	ONION (GH TRANSPLANT)
10506	FENHEXAMID	SUBGROUP 13-07A
10507	FENHEXAMID	SUBGROUP 13-07B
10508	FENHEXAMID	SUBGROUP 13-07E
10509	FENHEXAMID	SUBGROUP 13-07F
10510	FENHEXAMID	SUBGROUP 13-07G
09266	FENPROPATHRIN	GREENS (MUSTARD)
07946	FENPROPATHRIN	SWEET POTATO
09517	FENPROPATHRIN	TURNIP (ROOTS)
11332	FENPROPATHRIN	CROP GROUP 14-12
11333	FENPROPATHRIN	SUBGROUP 12-12A
11334	FENPROPATHRIN	SUBGROUP 12-12B
11335	FENPROPATHRIN	SUBGROUP 12-12C
10008	FENPYROXIMATE	BANANA
11100	FENPYROXIMATE	CELERY
08097	FENPYROXIMATE	CANEBERRY
11246	FENPYROXIMATE	CROP GROUP 14-12
09943	FLONICAMID	ALFALFA, CLOVER
11363	FLUAZIFOP-P-BUTYL	CROP GROUP 10-10
11364	FLUAZIFOP-P-BUTYL	CROP GROUP 12-12
10374	FLUDIOXONIL	CELERY (GH)
11657	FLUENSULFONE	RADISH
10686	FLUMIOXAZIN	GUAYULE
11022	FLUOPICOLIDE	GRAPEFRUIT
11110	FLUOPICOLIDE	LEMON
10121	FLUOPICOLIDE	BASIL
10323	FLUOPICOLIDE	BEAN (SNAP)
10916	FLUOPICOLIDE	HOPS
11021	FLUOPICOLIDE	ORANGE
11658	FLUOPICOLIDE	BASIL
11191	FLUOPICOLIDE	CROP GROUP 08-10
11190	FLUOPICOLIDE	SUBGROUP 13-07F
10285	GLYPHOSATE	PEPPER (CHILI)
08056	GLYPHOSATE	ONION (DRY BULB)
11650	GLYPHOSATE	CROP GROUP 12-12
11651	GLYPHOSATE	CROP GROUP 14-12
08325	HEXAZINONE	BLUEBERRY (HIGH BUSH)
09494	IMAZALIL	MUSHROOM (WHITE BUTTON)
11546	INDAZIFLAM	FIG
11692	INDAZIFLAM	POMEGRANATE
07603	ISOXABEN	APPLE
10247	ISOXABEN	BLUEBERRY
11685	ISOXABEN	SUBGROUP 13-07F
11684	ISOXABEN	TREE NUTS
10705	KASUGAMYCIN	APRICOT

PR #	Chemical	Commodity (Full name)
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
10343	LAMBDA-CYHALOTHRIN	BULB VEGETABLES SUBGROUP 03-07A
10255	LAMBDA-CYHALOTHRIN	BROCCOLI RAAB
09430	LAMBDA-CYHALOTHRIN	MILLET, PEARL
09380	LAMBDA-CYHALOTHRIN	RUTABAGA
10344	LAMBDA-CYHALOTHRIN	TEA
09379	LAMBDA-CYHALOTHRIN	TURNIP (ROOTS)
06684	LAMBDA-CYHALOTHRIN + THIAMETHOXA	GUAVA
10540	LAMBDA-CYHALOTHRIN + THIAMETHOXA	AVOCADO
10221	LINURON	BASIL
08912	MANCOZEB	BLUEBERRY
01703	MEFENOXAM	CUCUMBER (GH)
11376	MESOTRIONE	CROP GROUP 13-07
06388	METRIBUZIN	PEA (EDIBLE PODDED & SUCCULENT SHELLED)
10671	METRIBUZIN	POTATO
03524	NAA	ALMOND
03523	NAA	PLUM
03525	NAA	WALNUT
10956	NOVALURON	LYCHEE
09822	OXYFLUORFEN	COFFEE
03574	OXYFLUORFEN	ONION (GREEN)
09352	OXYFLUORFEN	STRAWBERRY (TRANSPLANTS)
07377	OXYFLUORFEN	TI PALM
04132	OXYFLUORFEN	TOMATO
03616	OXYFLUORFEN	CANEBERRY (RASPBERRY)
11311	OXYTETRACYCLINE	CHERRY
11255	PENDIMETHALIN	SAFFLOWER
11282	PENOXSULAM + OXYFLUORFEN	ARTICHOKE (GLOBE)
10694	PENTHIOPYRAD	BLUEBERRY (HIGH BUSH)
10695	PENTHIOPYRAD	CANEBERRY (RASPBERRY)
11444	PENTHIOPYRAD	LETTUCE (GH)
10022	PENTHIOPYRAD	CILANTRO
10840	PERMETHRIN	TEA
11178	PROMETRYN	SESAME
11078	PROPICONAZOLE + CHLOROTHALONIL	TOMATO (GH)
11445	PYMETROZINE	LETTUCE (GH)
10852	PYRETHRINS + PBO	CROP GROUP 12-12
10793	PYRIFLUQUINAZON	CUCUMBER (GH)
11447	PYRIOFENONE	PEPPER (GH)
10932	PYROXASULFONE	SUNFLOWER
8295	QUINCLORAC	ASPARAGUS
10435	QUINCLORAC	BLUEBERRY
10436	QUINCLORAC	CANEBERRY

PR #	Chemical	Commodity (Full name)
07654	QUINOXYFEN	CUCUMBER
08376	QUINOXYFEN	SQUASH (SUMMER)
11849	QUINOXYFEN	CROP GROUP 12-12
10031	QUIZALOFOP	GRAPE
10657	RIMSULFURON	GRASSES (SEED CROP)
11379	RIMSULFURON	CROP GROUP 10-10
11380	RIMSULFURON	CROP GROUP 11-10
11381	RIMSULFURON	CROP GROUP 12-12
11382	RIMSULFURON	CROP GROUP 14-12
11875	RIMSULFURON	SUBGROUP 08-10A
11378	RIMSULFURON	SUBGROUP 13-07F
11377	RIMSULFURON	TUBEROUS/CORM VEGETABLES
07888	RIMSULFURON (CRANBERRY)	CRANBERRY
10480	S-METOLACHLOR/METOLACHLOR	CHICORY (ROOTS & TOPS)
10673	S-METOLACHLOR/METOLACHLOR	SWISS CHARD
11697	S-METOLACHLOR/METOLACHLOR	CROP GROUP 02
10039	SPIRODICLOFEN	BANANA
09330	SPIRODICLOFEN	SUGAR APPLE
10482	SPIRODICLOFEN	DATE
09971	SPIROMESIFEN	CANTALOUPE
09970	SPIROMESIFEN	CUCUMBER
10800	SPIROMESIFEN	FRUITING VEGETABLES
09842	SPIROMESIFEN	GRASSES
09290	SPIROMESIFEN	OKRA
09972	SPIROMESIFEN	SQUASH (SUMMER)
10551	SPIROMESIFEN	WATERCRESS
10788	SPIROTETRAMAT	CARROT
11455	SPIROTETRAMAT	STONE FRUITS
11456	SPIROTETRAMAT	TREE NUTS
10636	SULFENTRAZONE	MINT
11729	SULFENTRAZONE	CHIA
11653	SULFOXAFLOR	QUINOA
10114	SULFUR DIOXIDE	FIG
10134	TEBUCONAZOLE	TOMATO (GH)
06481	TEBUCONAZOLE	WATERCRESS
09017	TERBACIL	PEACH
08959	TERBACIL	STRAWBERRY (ANNUAL)
11235	TERBACIL	OREGANO
10246	THIAMETHOXAM	CANEBERRY
09709	THIOPHANATE METHYL	BEAN (SNAP)
08614	THIOPHANATE METHYL	PEPPER (FIELD & GH)
10427	TOLFENPYRAD	AVOCADO
10380	TOLFENPYRAD	BLUEBERRY
09657	TOLFENPYRAD	ONION
10869	TOLFENPYRAD	STRAWBERRY
10634	TOLFENPYRAD	TOMATO (GH)
10820	TRIFLURALIN	ROSEMARY
11628	TRIFLURALIN	CROP GROUP 03-07

PR #	Chemical	Commodity (Full name)
11629	TRIFLURALIN	CROP GROUP 08-10
11630	TRIFLURALIN	CROP GROUP 10-10
11631	TRIFLURALIN	CROP GROUP 12-12
11633	TRIFLURALIN	CROP GROUP 14-12
11632	TRIFLURALIN	SUBGROUP 13-07F
09736	ZINC PHOSPHIDE	GRASSES (SEED CROP)

ATTACHMENT 7 – 2015 ORNAMENTAL HORTICULTURE PROGRAM

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ATTACHMENT 8 – 2015 ORNAMENTAL HORTICULTURE PROGRAM

RESEARCH ACTIVITIES

Discipline	Project	Researchers	Crops	Products	Trials
Entomology	BAS 440I Crop Safety *	1	15	1	15
	BYI-2960 Crop Safety *	1	5	1	5
	Cyflumetofen Crop Safety *	7	13	1	21
	Leafminer Efficacy	2	1	7	16
	Mealybug Efficacy	1	1	5	5
	Pyrfluquinazon Crop Safety *	6	9	1	12
	Pyridalyl Crop Safety	1	1	1	1
	Scale Efficacy *	7	4	8	48
	Thrips Efficacy *	3	2	8	16
	Tolfenpyrad Crop Safety *	5	8	1	11
Pathology	A14658C Crop Safety	1	1	1	1
	Acibenzolar Crop Safety *	8	9	1	12
	Benzovindiflupyr + Azoxystrobin (A18126B) Crop Safety *	13	12	1	17
	Botrytis Efficacy *	5	4	12	37
	Cyflufenamid Crop Safety *	2	4	1	4
	Difenconazaole + Azoxystrobin (A13703G) Crop Safety *	8	7	1	11
	Downy Mildew Efficacy	1	1	7	14
	Fluxapyroxad + Pyraclostrobin *	12	21	1	32
	Fusarium Efficacy	1	1	9	9
	Leaf Spot & Anthracnose Efficacy *	4	3	10	31
	Mandestrobin Crop Safety *	1	10	1	10
	Metconazole Crop Safety *	6	10	1	13
	Oxathiapiprolin Crop Safety	2	13	1	13
	Phytophthora Efficacy	2	1	8	15
	Powdery Mildew Efficacy	1	1	7	7
	Pydiflumetofen + Azoxystrobin + Propiconazole Crop Safety	1	1	1	1
	Pydiflumetofen + Fludioxonil Crop Safety	1	4	1	4
	Pydiflumetofen Crop Safety	1	8	1	8
	Tebuconazole Crop Safety	4	4	1	7
	Triticonazole Crop Safety *	8	12	1	15
Weed Science	Crabgrass Efficacy	1	1	5	5
	Dimethenamid-p Crop Safety *	16	24	1	32
	Dithiopyr Crop Safety *	19	48	1	75
	Flumioxazin + Pyroxasulfone Crop Safety	1	3	1	3
	Indaziflam Crop Safety *	8	14	2	17
	Isoxaben Crop Safety *	9	26	1	34
	Mulberry Weed Efficacy	1	1	5	5
	Oxalis Efficacy	1	1	5	5
	Oxyfluorfen + Prodiamine Crop Safety *	6	6	1	9
	Pendimethalin + Dimethenamid-p Crop Safety *	9	14	1	17
	Pendimethalin Crop Safety *	9	23	1	33
	Phyllanthus Efficacy	1	1	5	5
	Spurge Efficacy	1	1	5	5
	Sulfentrazone + Prodiamine Crop Safety *	10	12	1	16

* National Priority Projects

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

ATTACHMENT 9 – SUMMARIES OF 2014 ORNAMENTAL HORTICULTURE RESEARCH

Acibenzolar Crop Safety

Acibenzolar is an active ingredient that stimulates plant defense systems. In 2002, IR-4 started testing Insimmo (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 2014, the IR-4 Project completed 249 trials on 67 ornamental plant genera or species examining phytotoxicity related to foliar and/or drench applications of Insimmo. In these trials, 36 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.

Ametoctradin + Dimethomorph Crop Safety

Orvego, registered with EPA on May 21, 2012 is a combination of ametoctradin (FRAC 45) and dimethomorph (FRAC 40). In 2012, IR-4 started testing Orvego (ametoctradin + dimethomorph) for safety on several ornamental horticulture crops as part of the new fungicide and bactericide crop safety project. In 2013, BASF recommended only finishing ongoing research activities due to observations of very little injury across crops. From 2012 through 2014, the IR-4 Project completed 22 trials on 9 ornamental plant genera or species examining phytotoxicity related to primarily drench applications. No injury or grow reduction was observed for any tested crop.

Aphid Efficacy

In the past, IR-4 had conducted Ornamental Horticulture Surveys to poll growers, landscape care operators, researchers, extension personnel and others affiliated with the ornamental industry on needs and issues related to disease, insect, and weed management. In 2013, aphids were identified as one of the top five important insects of concern. This summary includes a review of experiments conducted from 1998 to 2013 on ornamental horticulture and food crops published in Arthropod Management Tests. During this time period, numerous products representing 35 active ingredients were tested as foliar or soil applications against several species of aphids known to attack ornamental crops. Although there were insufficient data for definitive conclusions, many of the older registered active ingredients, including, acephate, acetamiprid, bifenthrin, chlorpyrifos, dimethoate, flonicamid, imidacloprid, lambda-chyalothrin, malathion, pymetrozine, spirotetramat, and thiamethoxam generally provided effective control. Similarly, several relatively new products, including cyantraniliprole, pyrifluquinazon, sulfoxaflor, and tolfenpyrad were effective.

Bacterial Disease Efficacy

From 2008 to 2014, 54 products were tested through the IR-4 Program as drench or foliar applications against bacterial pathogens. In addition to research collected through the IR-4 program, this summary includes a review of experiments conducted from 2005 to 2014, mainly on tree crops. Species tested included: *Agrobacterium tumefaciens, 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, MasterCop, Phyton 27 and ReZist) and mancozebs (Dithane, Penncozeb, Protect) and biologicals (Cease, Regalia, Rhapsody and Serenade), provided variable efficacy on these bacterial pathogens. Several new products that are included in the IR-4 Bacterial efficacy project looked promising based on their efficacy relative to standards. These include Acibenzolar, CG100, Citrex, HM-0736, Kasumin, Regalia, Taegro, Tanos and ZeroTol. Further research is needed to obtain additional efficacy data to recommend actions to register or amend labels for these pests.

Cyflufenamid Crop Safety

Cyflufenamid is an active ingredient for managing foliar diseases including powdery mildew and botrytis. It is not yet registered by EPA for the ornamental horticulture industry. During 2012 and 2013, the IR-4 Project completed 39 trials on 15 ornamental plant genera or species. In these trials, 9 species or genera exhibited minimal or no injury after foliar applications. For the remaining 7 crops, sufficient information has not yet been generated. However, to date the tested crops are not sensitive to foliar applications up to 4X the proposed high label rate.

ATTACHMENT 9 – Continued

Cyflumetofen Crop Safety
Sultan (cyflumetofen) was registered for use on greenhouse ornamental horticulture crops as foliar sprays in the United States on May 9, 2014 to manage mites. The label does not contain a list of crops tested for tolerance. During 2014, the IR-4 Project conducted 29 trials on 15 ornamental plant species examining phytotoxicity related to cyflumetofen applications. No tested crops exhibited significant injury or growth reduction during these experiments.

Dimethenamid-p Crop Safety
From 2007 to 2015, IR-4 completed 460 trials on Tower EC (dimethenamid-p). The data contained in this report was generated to register uses of dimethenamid-p on and around ornamental horticulture plants with over-the-top applications. The dimethenamid-p 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 139 plant genera or species. Of these, 60 plant species exhibited no or minimal transient injury after application at all three rates. Nine 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. Seven crops – *Catharanthus roseus, Cladrastis*, *Echinacea, Epilobium canum, Muhlenbergia dubia, Teucrium chamaedrys* and *Viburnum opulus* – exhibited significant phytotoxicity at even the lowest rate.

Dithiopyr Crop Safety
Dimension was initially registered in 1992 for ornamental horticulture uses. This initial label contained an extensive list of ornamental horticulture plants in landscapes where Dimension could be used without causing phytotoxicity. In 2006, the new Dimension 2EW label contained registered uses for field container and in ground nursery production, the first dithiopyr product to have these use sites. Starting in 1992, IR-4 examined 83 crops to expand this label to other crops, including several different fern species grown in field containers. Of the researched crops and Dimension formulations, only one crop (*Rosa sp.*) can be added at this time based on the data provided here. It is recommended the trials conducted using emulsifiable concentrate formulations be repeated with Dimension 2EW.

Gladiolus Rust APHIS Project Summary
The project entitled "Determining the impact of registered and non-registered fungicides and disinfestants on *Uromyces transversalis*, the causal agent of gladiolus rust, and their use as mitigation tools in combination with host plant resistance," had eight objectives with the primary goal of developing strategies to locally eradicate gladiolus rust, caused by *Uromyces transversalis*. Fungicides individually and in programs were evaluated and recommendations were included for Mexican growers and two growers in California. Four experiments were conducted screening gladiolus cultivars with more tolerant cultivars identified. In addition to examining survivability of urediniospores in the field, survival of spores under controlled environmental conditions has been examined. Polyclonal antibodies were developed from germinating urediniospores and based on antigens identified through development of cDNA libraries.

Indaziflam Crop Safety
From 2011 through 2014 IR-4 has completed 102 trials evaluating indaziflam granular formulations for crop safety. The data contained in this report was generated to register the use of indaziflam on and around ornamental horticulture plants with over-the-top applications. The rates tested were 0.045, 0.089 and 0.178 pounds active ingredient per acre (lb ai per A) as the 1X, 2X and 4X rates. The indaziflam 0.03%G formulation was applied to 16 plant genera or species, the Marengo G formulation was applied to 28 crops. Of these crops, 7 exhibited no or minimal transient injury after application at all three rates including *Berberis sp.*, *Liriope sp.*, *Ophiopogon japonicus*, *Rhododendron sp.*, *Rosa sp.*, *Taxus media* and certain *Viburnum* species. The remaining crops evaluated have only been screened in 1 or two trials or exhibited minimal to significant injury. Further testing is required on many species before a conclusion can be made confirming crop safety.

ATTACHMENT 9 – Continued

Isoxaben Crop Safety

Gallery 75DF (isoxaben) was initially registered in 1992 for ornamental horticulture uses. This initial label contained an extensive list of ornamental horticulture crops where Gallery could be used without causing phytotoxicity. It also included a short list of crops where Gallery applications were not recommended. Between 1992 and 2013, IR-4 examined 93 crops to expand this label to other crops, including several different fern species grown in field containers. Of these, 24 crop species exhibited no or minimal transient injury with 20 already placed on the Gallery label. Eight crops exhibited injury in this research: *Astilbe sp., Athyrium filix-femina, Buddleia davidii, Dendranthema x morifolium, Digitalis purpurea, Echinacea purpurea, Stachys byzantine,* and *Thymus sp.* A new formulation, Gallery SC, was tested in 2014 and 2015 to determine crop safety on 21 crops in 25 trials. Of these, one species, *Chasmanthium latifolium,* exhibited no or minimal transient injury; this species is already in the Gallery label.

Mesotrione Crop Safety

From 2007 to 2011, IR-4 completed 144 trials on Mesotrione SC. The data contained in this report was generated to register uses of mesotrione on and around ornamental horticulture plants with over-the-top applications. The mesotrione rates were 0.187, 0.25 and 0.37 pounds active ingredient per acre (lb ai per A) as the 1X, 1.5X and 2X rates. Mesotrione SC had been applied to 48 plant genera or species. Of these, nine exhibited no or minimal transient injury after application at all three rates. Twenty one crops exhibited significant phytotoxicity at even the lowest rate: *Buddleia davidii, Cortaderia selloana, Dianthus gratianopolitanus, Echinacea purpurea, Hydrangea quercifolia, Ilex sp., Lagerstroemia indica, Liriope sp., Ophiopogon sp., Phlox paniculata, Phlox subulata, Picea sp., Pseudotsuga menziesii, Rosa sp., Salvia sylvestris, Spiraea sp., Taxus sp., Thuja occidentalis, Veronica sp., Viburnum sp.,* and *Vinca sp.*

Metconazole Crop Safety

Metconazole was registered as Tourney 50WDG in the United States in 2007 as a turf fungicide. In 2010, uses for ornamental horticulture plants in greenhouse, nurseries, and landscapes were added. The commercial label contains a list of 49 woody ornamental plants exhibiting no or minimal injury. However, because metconazole is in the triazole class it could cause symptoms similar to plant growth regulators and additional testing is warranted on additional herbaceous and woody ornamental species. Between 2010 and 2014, the IR-4 Project completed 144 trials on 38 ornamental plant species examining phytotoxicity related to foliar applications of Tourney. In these trials, 21 species or genera exhibited minimal or no injury after foliar applications. Of these, 14 are already on the Tourney label; *Buxus sp., Calibrachoa sp., Hemerocallis sp., Hydrangea sp., Lantana sp., Liriope sp. and Verbena sp.* are the seven 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.

Pendimethalin + Dimethenamid-p Crop Safety

From 2007 to 2013, IR-4 completed 598 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 166 plant genera or species. Of these genera and species, 71 exhibited no or minimal transient injury after application at all three rates. Thirty three (33) crops exhibited little or no phytotoxicity at 2.64 lb ai per acre, but did have some injury at 4.3 and/or 10.6 lb ai per acre, or showed injury after the second application. Of the forty nine (49) 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

Pyrifluquinazone Crop Safety

Pyrifluquinazon was registered for use on greenhouse ornamental horticulture crops as foliar sprays in the United States in 2013 to manage whiteflies, aphids, leafhoppers, chilli thrips, and mealybugs. The label contains a list of crops tested for tolerance. From 2010 to 2014, the IR-4 Project conducted 92 trials on 24 ornamental plant species examining phytotoxicity related to pyrifluquinazon applications. No tested crops exhibited significant injury or growth reduction during these experiments. It is recommended that Bacopa sp. be added to the list of tolerant crops.

Pythium Efficacy

At the IR-4 Ornamental Horticulture Program Workshop in 2009, Pythium Efficacy was selected as a high priority project to expand the knowledge and list of fungicides available to growers for these diseases. In addition to research collected through the IR-4 program, this summary includes a review of experiments conducted from 1999 to 2013 on ornamental horticulture and vegetable crops. During this time period, numerous products representing 40 active ingredients were tested as drench, foliar or soil applications against several *Pythium* species causing root rot and damping-off on ornamentals, and root rot, cottony leak, damping-off and cavity spot on vegetables. *Pythium* species tested included: *P. aphanidermatum, P. irregulare, P. mamillatum, P. dissotocum, P. myriotylum,P. ultimum* and *P. vipa.* Most trials were conducted on *P. aphanidermatum* and *P. ultimum.* Although there were insufficient data for definitive conclusions, several relatively new products that are included in the Pythium efficacy project looked promising. These were Adorn, Disarm, Fenstop, Heritage and Pageant. V-10208 also looked promising. The phosphorus acids/phosphorus acid generators (Agri-Fos, Alude, K-Phite, Magellan, Phostrol or Vital) provided mix results. Acibenzolar, BW240/Rootshield Plus and CG100 were generally ineffective. The established standards Subdue Maxx and Terrazole/Truban generally performed well. Conversely, the registered biological products Companion/QRD 713, PlantShield/RootShield and SoilGard generally looked ineffective. The data from these trials suggest that the effectiveness of some fungicides in controlling Pythium root rot may vary, depending on the species of *Pythium* or crop.

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 2013, the IR-4 Project conducted 225 trials on 49 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.

Tebuconazole Crop Safety

Tebuconazole was first registered in 1994 for peanut diseases. Since then its food use label has expanded to several other food crops. The first noncrop registration of Torque 3.6SC (tebuconazole) occurred in 2010 for ornamental horticulture growers, professional landscape managers and for golf course turf. Tebuconazole manages foliar ornamental horticulture diseases including powdery mildew and rusts. However, given that triazoles have a tendency to also exhibit impacts similar to growth regulators, the crop safety profile for Torque 3.6SC is not well known. From 2012 through 2014, the IR-4 Project completed 45 trials on 15 ornamental plant genera or species. In these trials, 9 species or genera exhibited minimal or no injury after foliar applications. Torque caused stunting in Pansy and Zinnia at the higher application rates. In one trial, Narcissus exhibited moderate injury after the third application; additional trials are warranted to determine whether number of applications or the crop cultivar might be the contributing factor for injury. For the remaining 2 crops, not sufficient information has been generated.

ATTACHMENT 9 – Continued

Thrips Efficacy Summary

For the last 9 years, the IR-4 Ornamental Horticulture Workshop has ranked developing efficacy data on new products to manage thrips as a High Priority Project. Thrips remain an important threat for several reasons: 1) the damage thrips cause to ornamental horticulture plants, decreasing the value of the infested crops; 2) the tospoviruses (tomato spotted wilt, impatiens necrotic ringspot) they can vector; 3) the newly arrived invasive species which impact at least 250 different ornamental horticulture species; and 4) growers lack the ability to rotate among 3 to 4 different modes of actions to effectively manage resistance development in the thrips populations they must control to maintain economic viability. From 2005 through 2015, 81 products representing 53 different active ingredients were tested for thrips management. These products represented both biological and chemical tools. Some products were already registered but more data were needed particularly with the newly invasive thrips species or they were considered standards to measure the level of efficacy achieved with other materials. Other products were in development but have not yet been registered with the EPA. The five thrips species tested in the IR-4 program were Chilli Thrips (*Scirtothrips dorsalis*), Gladiolus Thrips (*Thrips simplex*), Privet Thrips (*Dendothrips ornatus*), Weeping Fig Thrips (*Gynaikothrips uzeli*), and Western Flower Thrips (*Frankliniella occidentalis*).

Tolfenpyrad Crop Safety

Tolfenpyrad was first registered as Hachi-Hachi 15 EC in the United States on July 28, 2010 for the control of aphids, leafhoppers, scales, thrips, whiteflies, and early instar lepidopteran larvae on ornamental horticulture crops grown in greenhouses. An expansion of this label for outdoor uses is planned. The IR-4 Project completed 160 trials on 24 ornamental plant species from 2010 through 2014 examining phytotoxicity related to foliar applications of Hachi-Hachi 15EC or Hachi-Hachi SC. In this report, 11 species or genera exhibited minimal or no injury after foliar treatments of Hachi-Hachi 15EC (tolfenpyrad) at 21, 48 and 84 fl oz per 100 gal. All can be added to the label as crops tested for tolerance: (*Alyssum sp., Angelonia sp., Antirhinnum sp., Begonia sp., Chrysanthemum/Dendranthemum sp., Dahlia sp., Petunia sp,. Tagetes sp., Verbena sp., Viola sp.* and *Zinnia sp.*). For Hachi-Hachi SC, 12 crops can be listed on the label as crops tested for tolerance (*Alyssum sp., Angelonia sp., Antirhinnum sp., Bacopa sp., Begonia sp., Dahlia sp., Gerbera sp., Petunia sp., Tagetes sp., Verbena sp., Viola sp.* and *Zinnia sp.*), and two crops should be included in listing of crops where treatments are not recommended: *Impatiens* sp. and *Impatiens*, New Guinea Hybrids.

Triticonazole Crop Safety

Triticonazole was registered as Trinity 2SC in the United States in 2007 as a turf fungicide. Since that time it has been under development to expand to ornamental horticulture diseases. Because triticonazole is in the triazole class, it could cause symptoms similar to plant growth regulators and testing is warranted on additional herbaceous and woody ornamental species. Between 2010 and 2014, the IR-4 Project completed 166 trials on 38 ornamental plant species examining phytotoxicity related to foliar applications of Trinity 2SC. In these trials, 24 species or genera exhibited minimal or no injury after foliar applications. Of these, five are not yet listed on the label: *Alyssum sp, Buxus sp., Cornus sp., Lantana sp.,* and *Osteospermum sp*.

ATTACHMENT 10- Biopesticide and Organic Support Program

2015 Grant Awards

- Efficacy evaluations of biopesticides for management of Spotted Wing Drosophila.
- Efficacy evaluations of biopesticides for management of Fireblight apple in organic apple production.
- Efficacy evaluations of chestnut transformed with the OxO gene for management of chestnut blight.
- Development of hypovirulent strains of Chestnut Blight for topical applications in Chestnut.
- Efficacy evaluations of biopesticides for management of Varroa mite in Honeybees
- Development of Agrobacterium transformed Walnut for resistance to crown gall in walnut
- Efficacy evaluations of a modified sterile insect technique for management of diamondback moth in cabbage.
- Efficacy evaluations of biopesticides for management of Clavibacter in tomato
- Efficacy evaluations of biopesticides for management of Bacterial tomato spot and spec in tomato
- Efficacy evaluations of biopesticides for management of Downy mildew in organic basil.
- Efficacy evaluations of AF36 for management of aflatoxin producing fungi in figs
- Efficacy evaluations of biopesticides for management of Whitefly in GH tomato.

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Biopesticide Regulatory Support Package Approved in 2015

Product	Crop	PR Number	TYPE	Registration Type	Uses
9,10 anthraquinone	Rice	09687	Insecticide	Section 3	1
Potassium salts Hop Beta Acids	Honeybees	0432B	Insecticide	Section 3	2
Aspergillus flavus AF36	Cotton	0052B	Fungicide	Amendment	1
Aspergillus flavus AF36	Corn	0378B	Fungicide	Amendment	1
Aspergillus flavus AF36	Pistachio	0372B	Fungicide	Amendment	1

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Everyone who eats has an interest in the IR-4 Project whether they know it or not. The IR-4 Project is a vital part of the country's food security system and should be considered a national strategic imperative."
Bob Simerly,
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Agronomist, McCain Foods USA, Inc.