2011 Annual Report

Clear Advances in Uncertain Times

Advances in the Food Program

Advances in Ornamental Horticulture

Advances in Biopesticides and Organic Support

Advances in Public Health Pesticides

ANNUAL REPORT OF THE IR-4 PROJECT (NRSP*)
January 1, 2011 - December 31, 2011

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

Background

The IR-4 Project was established in 1963 by the Directors of the State Agricultural Experiment Stations (SAES) and United States Department of Agriculture (USDA) to provide a solution to the "Minor Use Problem". The Minor Use Problem existed then and still remains a problem today because companies that develop and sell plant protection products (PPP or pesticides) often focus their resources in major markets where there is favorable return on investment. These companies do not consider specialty crops (fruits, vegetables, herbs, ornamentals and other high value horticultural crops) and other minor uses of PPP as a priority business objective because the potential sales in these small markets does not justify the investment in the development of the required data for registration. As a result, there are often many pest management voids in specialty crops and minor use markets.

IR-4's core activity is to facilitate the registration of conventional pesticides, especially reduced risk products, for specialty food crops and other minor uses. In 1977, IR-4 expanded its core objectives to include registration of PPP for the protection of nursery/floral crops and Christmas trees. In 1982 the objective to support biopesticides was added. For all three objectives (Food, Ornamental Horticulture and Biopesticide and Organic Support Programs) IR-4 provides national coordination, technical guidance and funding for field trials/field research, and when appropriate, laboratory services to develop the appropriate data required by the US Environmental Protection Agency (EPA) and the crop protection industry to register specialty crops and minor uses. 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.

The IR-4 Project accomplishes its responsibilities by working in close cooperation with many groups and associations. Some of the major partners/cooperators include specialty crop growers/commodity organizations, the State Agricultural Experiment Stations/land grant university system (SAES), the crop protection industry, the United States Department of Agriculture units (including Agriculture Research Service-ARS; Foreign Agriculture Service-FAS; National Institute of Food and Agriculture-NIFA; Animal and Plant Health Inspection Service-APHIS), US Environmental Protection Agency (EPA), the Department of Defense-Deployed Warfighter Protection Program (DWFP), California's Department of Pesticide Regulation (CA-DPR) and Canada's Pest Management Regulatory Agency (PMRA) as well as 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.

The IR-4 Project is funded by USDA in partnership with the SAES. The majority of USDA funding for the IR-4 Project comes through NIFA. USDA-ARS established a companion minor use program in 1976 to provide further program support. Recently, USDA-FAS provided IR-4 with resources to work on international activities to support specialty crop exports and pesticide regulatory harmonization. APHIS has funded IR-4 to do work on selected invasive species. The SAES contributes financial resources through Multi-State Research Funds and a significant amount of in-kind contributions by hosting IR-4 field research centers, analytical laboratories and management offices throughout the United States. The crop protection industry also contributes direct financial resources as well as significant in-kind resources.

IR-4 continues to follow the guidance coming out of the 2008 Strategic Planning Conference which served as the framework for the IR-4 Strategic Plan 2009 to 2014. This plan proposed to strengthen the existing core Food, Ornamental Horticulture and Biopesticide and Organic Support Programs by enhancing them with additional sub-objectives. In the Food Program, the plan called for an increase in the effort to ensure that growers can efficiently use the registrations that IR-4 facilitated. This includes the development of additional efficacy data when necessary, to encourage the companies to actively market new uses. Additionally, IR-4 will aid in the harmonization of international Maximum Residue Levels (MRLs) between US and its global trading partners. In the Ornamental Program, more emphasis is being placed on efficacy testing, including the testing of new products to manage invasive plant pests. The Biopesticide Program's mission was enhanced to support the development of pest management tools for use in crops destined for organic markets. And as mentioned previously, IR-4 added a new

cooperative project with USDA-ARS and the Department of Defense's DWFP to provide regulatory support for public health pesticides.

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

Food Program

The regulatory approval of safe and effective plant protection products to assist in the production of food crops continues to be the central objective of the IR-4 Project. IR-4 is committed to provide the support required to give growers the tools they need to be successful and competitive in today's markets. In most cases IR-4 develops residue data to support new registrations for specialty crops. However, the need for product performance and crop safety data has increased over the past few years due to the companies requesting some efficacy and/or crop safety data prior to marketing a new use. IR-4 efforts to expand crop groups and use of extrapolation based on our residue studies have all contributed to the greater need for efficacy and crop safety data. Nevertheless, the IR-4 residue program accounts for the largest allocation of IR-4 resources, with approximately 75% of the grant provided to generate these data.

Research Activities – Food Residue

Since 1963, IR-4 stakeholders have submitted 10,951 requests for assistance to the IR-4 Food Program. Of these, 575 are currently considered researchable projects that remain documented needs of specialty crop growers. The others have been addressed through previous research and regulatory submissions or cannot be registered at this time. In 2011, a total of 205 new project requests were submitted to IR-4 by various stakeholders.

IR-4's research priorities for 2011 were determined by IR-4 stakeholders during the September, 2010 IR-4 Food Use Workshop, in Summerlin, NV. Based on the outcome of that workshop and other priority setting mechanisms, IR-4 scheduled 90 studies consisting of 512 field trials, including 59 from our Canadian partners. The specific studies including the test chemical and crop for 2011 are shown in Attachment 2.

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

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

The need for IR-4 to develop product performance and crop safety data to support labeling of new uses for specialty crop pest management tools has become an enhanced priority in recent years, and in many cases the data is required by registrants prior to actively marketing the new uses. In 2011 IR-4 dedicated $231,000 in funding to support E/CS research. This funding supported research to address needs for 26 projects, including 62 state university trials and an additional 17 trials by ARS (see Attachment 3 – "2011 Efficacy/Crop Safety (E/CS) Research Program"). In addition, CN-PMC conducted 2 E/CS trials. These trials can be used to support new uses in the U.S. which will benefit specialty crop stakeholders.

Submissions and Success

In 2011, IR-4 submitted data to EPA for 31 chemicals involving 179 IR-4 projects. Additionally IR-4 submitted petitions to add new crops to existing crop groups. IR-4 also submitted 7 more packages to cooperating registrants for label amendments, conditional registrations or to address re-registration requirements to maintain use of a product (see Attachment 4). These numbers are much higher than last year and are an indication that many of the submissions that were pending from last year were indeed submitted to EPA and the backlog of submissions is being reduced.

The IR-4 Food Use Program continues to work smarter and more efficiently to deliver new PPP for specialty crop growers. In 2011, IR-4 made remarkable progress by shortening study timelines for two new products and taking the bundling of IR-4 submissions to a new level; all of these activities provide for even greater efficiencies for the registrants and EPA.

Specifically, at the 2010 FUW two new products, BYI-02960 (insecticide) and QGU-42 (fungicide), were selected by IR-4 stakeholders as high priority products on a number of commodities. The cooperating registrants provided some assistance to IR-4 by agreeing to include analysis of IR-4 samples with their own analytical work. As well, both registrants have already agreed to submit the IR-4 data to EPA as part of their initial submission for these products and pay the associated fees to EPA. After a very successful collaborative effort by every facet of the IR-4 Project (and the Pest Management Centre in Canada), IR-4 completed all of the required field work for these projects in 2011 and the samples are currently being analyzed. IR-4 expects the results from this collaboration will be registrations for new products as early as 2014 for BYI-02960 and 2015 for QGU-42. As an added bonus, these products are being considered for Global Joint Reviews by a number of countries and should therefore have global MRLs in place to support the export of US commodities at nearly the same time the registrations are granted in the US.

Another highlight in 2011 was IR-4's response to EPA's challenge to IR-4 to increase efficiency by bundling as many uses as possible around each active ingredient submission. On March 28, 2011, IR-4 submitted 5 administrative volumes for 5 active ingredients, 14 final reports (IR-4 studies), 21 end-use product labels, and 78 tolerance requests to EPA. This was the largest bundled submission in IR-4 history and will likely provide more than 350 new uses to growers.

IR-4 also submitted a large number of data packages to Joint Meeting on Pesticide Residues (JMPR) in 2011 that will be used to establish Codex MRLs. These submissions included four active ingredients covering over 30 commodities. These submissions can also be viewed in Attachment 4.

EPA established a total of 70 permanent tolerances in 2011 based on IR-4 submissions. These tolerances, considering crop grouping and crop definitions, will support up to 382 new specialty crop uses that could be added to product labels. A complete list of these new uses and new crop groups can be found in Attachment 5. In total, EPA reviewed 15 chemistries for IR-4 in 2011, which is substantially lower compared to previous years. There were a number of factors that account for this significant decrease in reviews at EPA in 2011. A primary factor was the cumulative assessment of pyrethroid insecticides by EPA in 2011. This delayed decisions on a number of IR-4 submissions. The good news is that the cumulative assessment was very positive and we are expecting those decisions in 2012. Many other IR-4 submissions are at EPA (as noted in the submissions section here) that will also increase the number of uses expected for approval in 2012.

The 382 new use registrations in 2011 bring the IR-4 48 year total of clearances to 13,761. The Biopesticide Program added 3 new uses (see Attachment 10). Therefore the combined total number of new food uses by IR-4 in 2011 is 385.

In 2010, IR-4 initiated a new process to evaluate labels to determine if the new uses approved by EPA are available to growers. Through this process, IR-4 confirmed in 2010 that of the 786 potential new uses, 614 were listed on product labels indicating approximately an 80% success rate. Of the 20% remaining (mostly for tolerances that were granted late in 2010) IR-4 re-evaluated those labels to see if uses not added in 2010 were added in 2011. IR-4 was able to confirm that nearly all of the remaining 172 uses were indeed added to product labels, with some of those uses on Special Local Needs-24c labels. This indicates a nearly 100% success rate of IR-4 supported tolerances being added to product labels. For the tolerances granted in 2011, IR-4's analysis of the labels indicated that of the potential 382 uses, 220 were on labels for a nearly 60% success rate. The remaining uses not found on product labels will be re-evaluated throughout 2012 to determine if the uses will be ultimately added to a product label. This information was collected from the CDMS website (http://www.cdms.net/LabelsMsds/) or from information received directly from registrants (see Attachment 5 for details).

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

Regulatory Compliance

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

The Annual QA Planning Meeting was held on March 15-16, 2011 in Houston, TX. At this meeting, the audit plan for 2011 was created. For 2011, regular inspections included 24 facility, 212 field in-life, 128 analytical in-life, 110 analytical summary report/data audits and 669 field data book audits. During the 2011 calendar year, 83 final reports and amended reports were audited.

Members of the IR-4 QAU were also involved in three EPA GLP compliance inspections in 2011 by the EPA for GLP compliance and data integrity. A total of 122 IR-4 related facility inspections for GLP compliance have occurred since April 27, 1997. IR-4 facilities continue to maintain high standards and fully meet the GLP requirements.

Crop Grouping Initiative

Crop grouping enables the establishment of residue tolerances for a group of crops based on residue data from representative crops from the group or subgroup. The IR-4 Project, with input from the International Crop Grouping Consulting Committee (ICGCC), continues to lead an effort to update the US and Canada crop group regulation to incorporate "orphan" crops that are not currently members of a crop group, and to develop new crop groups and subgroups. The ultimate goal is to increase efficiency in data development/data review associated with pesticide tolerances and to pursue a harmonized international crop grouping system to facilitate international MRLs and international trade.

Proposed revisions to the Leafy Vegetables Crop Group 4, *Brassica* (Cole) Vegetable Crop Group 5 and the proposed new group Stalk, Stem and Leaf Petiole group were submitted to the EPA in 2011. These crop groups were analyzed by the EPA's Health Effects Division and then were reviewed by the Chemistry and Safety Advisory Council (ChemSAC) with input from the Canadian Pest Management Regulatory Agency (PMRA). The ICGCC and IR-4 are also currently working on revisions to the Root and Tuber Crop Group 1 and Leaves of Root and Tuber Vegetables Crop Group 2.

The proposed rule for revisions to the current crop grouping regulations for the Stone Fruit group 12-11 and the Tree Nut crop group 14-11 was published in the *Federal Register* on November 9, 2011.

Efforts to harmonize crop grouping systems between the US, Canada and Codex Committee of Pesticide Residues (CCPR) continue with cooperative efforts between the US and the Netherlands for revisions to the Bulb Vegetable, Berries and Small Fruits, Edible Fungi, Fruiting Vegetables (except Cucurbits), Oilseed, Citrus Fruits, Pome Fruit, Stone Fruit, Tree Nut, Herb and Spice, Tropical Fruits, Leafy Vegetables, Stalk and Stem and Brassica Vegetable commodity groups. It is anticipated that CCPR will make a final approval for fruit types in 2012. Also, a proposed Table 2 for representative commodities for vegetables as an addition to the document "Draft Principles and Guidance on the Selection of Representative Commodities for the Extrapolation of MRLs to Commodity Groups" has been developed for inclusion on the agenda at the 2012 CCPR meeting.

International Activities:

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

In North America, IR-4 cooperates with Canada and its Minor Use Program, the Pest Management Centre (PMC) of Agriculture and AgriFood Canada. In 2011, 12 new cooperative projects were started that consisted of 78 IR-4 field trials in the US and 59 PMC trials in Canada. Four of the studies were managed and funded by CN-PMC, with them serving as Study Director and Sponsor. It should also be noted that one of the joint studies managed by IR-4 was part of a global residue study to collect data for the new insecticide BYI-02960 on blueberry. Data were collected

from a total of 27 field sites in 9 countries (Australia, Canada, Chile, Denmark, Italy, New Zealand, Spain, UK, and United States). The CN-PMC also provides significant contributions to IR-4 efficacy and crop safety research and shares ornamental efficacy and crop safety. There also continues to be a good exchange of personnel, with CN-PMC participating in various IR-4 meetings and vice versa.

The minor use joint review process by EPA and Canada's Pest Management Regulatory Agency continues to save resources on both sides of the border, since only one agency is reviewing the residue data; but more importantly, both agencies are establishing maximum residue limits (MRLs) at the same level, at the same time, that prevent trade irritants before they happen. EPA and PMRA completed three joint reviews in 2011 for the active ingredients fluazinam, triflusulfuron-methyl, and novaluron.

In 2011, IR-4 also made a number of data submissions to JMPR/ CCPR that should support additional Codex MRLs in the future. These submissions included cyromazine, imidacloprid , trifloxystrobin, and methoxyfenozide (see Attachment 4). Other submissions of IR-4 data were made by cooperating registrants and committee consultants. Codex approvals from IR-4 submissions in 2011 include uses for extoxazole (hops, cucumber, mint), fenpyroximate (fruiting vegetables, cucurbits, grape) and novaluron (berries, beans, Brassica vegetables, cucurbits, fruiting vegetables, stone fruit, and Swiss chard).

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

Ornamental Horticulture Program

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

Research Activities

In 2011, IR-4 conducted 1,199 ornamental horticulture research trials to support registrations in the greenhouse, nursery, landscape, Christmas tree, and forestry industries. Of these 572 were efficacy trials designed to compare different products to manage pests, diseases and weeds and to measure the impact of growth regulators; the remaining trials were conducted to determine the level of phytotoxicity to crops with herbicides used to manage common weeds in and around nurseries. Please see Table 1 for a summary of research activities and Attachment 7 for a complete listing of 2011 field cooperators and Attachment 8 for research activities listed by project.

Table 1. Summary of IR-4's 2011 Ornamental Horticulture Program Research Activities.

Category	**2011**		
	Efficacy	Crop Safety	Total
Number of Studies (PR Numbers) with Planned Trials	339	421	760
Number of Trials	572	627	1,199

Submissions and Successes

During 2011, 21 data summaries were compiled based upon research reports submitted by researchers. See Attachment 9 for Abstracts from the individual reports. The summary reports included Acibenzolar Crop Safety, Bacterial Disease Efficacy, Dimethenamid-p Crop Safety, Dimethenamid-p + Pendimethalin Crop Safety, Early Post Emergence Efficacy, Flumioxazin Crop Safety, Fluopicolide Crop Safety, Fusarium Data Review, Halosulfuron

Crop Safety, Isoxaben Crop Safety, Liverwort Efficacy, Mesotrione Crop Safety, Metconazole Crop Safety, Oxyfluorfen + Prodiamine Crop Safety, PGR Effect on Shelf Life of Herbaceous Ornamentals, Pythium Data Summary, F6875 (Sulfentrazone + Prodiamine) Crop Safety, Sulfosulfuron Crop Safety, Thrips Efficacy, Trifluralin + Isoxaben Crop Safety and Triticonazole Crop Safety. Data from 4,290 field 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. 2011 Ornamental Horticulture Program Research Summaries.

Region	**Number of Trials**
North Central	463
North East	453
Southern	1,433
Western	832
USDA-ARS	1,260
Total	4,290

During 2011**,** 4 new products were registered with EPA using label directions based partially on the efficacy or crop safety IR-4 generated: Basagran T/O (bentazon), Micora (mandipropamid), Sulfentrazone 4F, TickEx EC (*Metarhizium anisophliae*). Four label amendments were granted to add new crops partially based on IR-4 data submitted to manufacturers: two for Freehand (pendimethalin + dimethenamid-p), Hachi-Hachi (tolfenpyrad), Safari 20SG (dinotefuran). IR-4 data also contributed to 3 state registrations where efficacy data were reviewed: Adorn (fluopicolide), Overture (pyridalyl) and Palladium (cyprodinil + fludioxanil). IR-4 data from 679 field trials contributed to these actions. This impacted 2,572 ornamental crops. See Table 3 for details.

Table 3. Ornamental Horticulture Program Contributions to 2011 Registrations.

Category	**2010**		
	Efficacy	Crop Safety	Total
New US EPA Product Registrations [a]	2	2	4
US EPA Label Amendments [b]	1	3	4
State Registrations [c]	2	1	3
Number of Trials Contributing to Registrations [d]	148	531	679
North Central	23	40	63
North East	22	61	83
Southern	51	172	223
Western	37	58	95
USDA-ARS	15	200	215
Number of Impacted Crops [e]	2,404	168	2,572

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

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

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

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

[e] The number of impacted crops is an estimate of the total plant species grown commercially for ornamental uses impacted by the IR-4 data. For example, *Phytophthora cinnamomi* is known to infect 204 plant species. By adding *P. cinnamomi* to the Segway label, IR-4 data has impacted 204 crops.

Biopesticide and Organic Support Program

The IR-4 Biopesticide and Organic Support Program has the goal of facilitating the registration of crop protection products classified by EPA as Biopesticides. IR-4 has four major functions in the biopesticide arena including: (1) an “Early Stage” grants program to fund research proposals for products whose core data have not yet been submitted

to EPA; (2) an "Advanced Stage" grants program to fund research proposals for products that have been registered by EPA or are in the registration process and additional data is needed to assist with expansion of the registration to new crops or to new pests; (3) a "Demonstration" grants program to fund large-scale demonstration plots to gather information and provide outreach indicating that biopesticides can be a useful tool in pest management systems; and (4) a registration assistance program to provide university and USDA researchers as well as small biopesticide companies with regulatory advice and petition preparation assistance.

Research Activities

The Biopesticide Research Program is in its thirteenth year of competitive grant funding of projects, amounting to over $5.9 million in grants to researchers since its inception. In 2011, the biopesticide grant program funded 6 Early Stage, 12 Advanced Stage and 4 Demonstration Stage projects (see Attachment 10). These were conducted by 17 different universities and USDA research units and on fruits and vegetables, tropical crops, honeybees, turf and ornamentals. The demonstration stage grants were co-reviewed by EPA and IR-4.

Submissions and Successes

In 2011, IR-4 submissions to EPA included amended volumes for Bacteriophage of *Clavibacter michiganensis* subsp. *michiganensis* on tomato, and *Aspergillus flavus* AF36 on pistachio. New registration packages were submitted for Oriental beetle pheromone and carob moth pheromone. IR-4 submissions for EPA biochemical classification included packages for hops beta acid and Lysine. In 2011, registration approvals included Bacteriophage of *Clavibacter michiganensis* subsp. *Michiganensis* on tomato and AF36 on corn. Through these activities 2 new food uses (3 crops) were registered (see Attachment 10).

From efficacy research funded through the biopesticide grant program, there were 5 additions of crops to biopesticide labels (see Attachment 10). In addition, a total of 26 Emergency Exemptions for 9,10 Anthraquinone were supported in 2011 including Avipel Liquid for Corn (10 states), Avipel Dry formulation for Corn (13 states), AV-1011 for rice in Louisiana and Florida and the Avipel Liquid in Sunflower in South Dakota.

The internet based Biopesticide and Organic Product Label Database that is maintained by IR-4 had 43,578 visits since 2007, with about 6,000 visits in 2011 alone, and is undergoing continual updating. The label database development was initially funded through an EPA Region 2 grant. It continues to be a valuable tool as noted by the activity.

The Public Health Pesticides Program

IR-4's newest initiative, the Public Health Pesticide (PHP) Program, assists in the development and registration of minor use of pesticides that protect the public from vector-borne diseases such as West Nile Virus or Lyme Disease. Additionally, the public faces risks from the reintroduction of malaria or the emergence of novel diseases such as Dengue Fever spread by mosquitoes, ticks, sand-flies, and other disease vectors, as well as the nuisance, economic costs, and loss of enjoyment of public and private areas caused by these public health pests. The IR-4 PHP Program is cooperatively funded by the Department of Defense (DoD), through the Deployed Warfighter Protection Program (DWFP), and the USDA-ARS. IR-4's role is to identify potential new or underutilized vector control tools and to assist with the development and regulatory needs of vector control products.

In 2011, the PHP program completed a number of significant specific regulatory submittals. A first-ever magnitude of the residue study by IR-4 on ultra-low-volume (ULV) spray applied from a moving aircraft was completed, and the data was submitted to EPA with a request for an all-crop tolerance for the mosquito adulticide etofenprox. IR-4 facilitated Experimental Use Permits (EUP's) for the states of Florida and New Jersey to allow experimental applications by the U.S. Navy and the Rutgers University Center for Vector Biology of the insecticide pyriproxyfen to manage Asian tiger mosquito in urban environments. IR-4 served as agent for the Armed Forces Pest Management Board (AFPMB), to obtain a company number for the AFPMB, and to obtain certification of Rutgers University as a Pesticide Producing Establishment. These constituted the first regulatory submittals ever by the AFPMB, and marked the initiation of a process of collaboration with the Department of Defense and EPA to ensure that military members overseas will have access to EPA-approved pesticides.

In addition to these activities towards development and registration of new materials, IR-4 has worked to ensure that new data requirements for existing vector control products do not create major gaps in the vector control toolbox. IR-4 collaborated with registrants of the mosquitocides resmethrin and temephos to petition for reduced data requirements for these PHP's that were facing unaffordable reregistration data requirements, arguing on the basis of public need, limited exposure patterns, and existing data on similar materials. Recognizing that new data requirements could threaten other PHP's in the near future, and that the market for these materials may be too small to afford extensive data collection, IR-4 initiated in 2011 the drafting of a white paper to document the mosquito pest problem in the U.S., the products available for mosquito control and in the development pipeline, challenges to the availability of these products, and any additional public health pest control needs of vector control professionals and the public in general. Having the relevant information in a single document provides an opportunity to help the user community formally define its priorities for research, regulatory support, training and education, and funding for the coming years.

Impact

IR-4 Project deliverables to stakeholders are documented in the specific program sections (Food Use Program, Ornamental Horticulture Program, the Biopesticide and Organic Support Program and the Public Health Program). It is safe to say that without the existence of the IR-4 Project, only a limited number of safe and effective crop protection chemicals and biological alternatives would be available for use on food and ornamental specialty crops and minor uses.

Specialty crop growers often share antidotal comments to report on the impact of the IR-4 Project to their business. Some recent quotes include: ***The IR-4 program has been instrumental in obtaining the crop protection materials we need to maintain an efficient and sustainable farm operation. The small fruit industry, being one of the smaller agriculture industries, often is not included when new chemistries are brought to market. We need the IR-4 program to continue fighting for us and we fully support their work." — Will Unger, Farm Manager/Frozen Sales, Oregon Berry Packing, Inc***. Additionally, Bruce Buurma, a vegetable grower with operations in Ohio, Michigan, Florida and Georgia (and IR-4 Commodity Liaison Committee member) noted, ***"Without IR-4, the North Central Region would be lacking in fresh fruits and vegetables and ornamental crops. IR-4 research has brought valuable pest control tools to growers in our region. This makes it possible for growers to bring safe, diverse and reasonably priced plants and produce to homes throughout the North Central Region and the U.S."***

In an effort to capture a solid assessment of program value, the IR-4 Project commissioned Michigan State University's Center of Economic Analysis to conduct a study on the economic impact of IR-4 Project's activities in the Food, Ornamental Horticulture and Biopesticide and Organic Support programs. Please note the Public Health Program, because of the limited time in operation, was not included in the study.

The Executive Summary of the report[1] noted, ***"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. It should be noted that estimated economic impacts do not take into consideration health or environmental impacts, or associated economic outcomes of such impacts. Economic impact estimates do measure the direct and secondary effects of IR-4 registered pesticides' contribution to increased agricultural output of minor use crops and associated impacts of IR-4 expenditures for research and pesticide registrations. The findings suggest that 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 higher varieties and lower costs to food and ornamental crops, and the industry benefits through better global competitiveness of U.S. 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 $7.3 billion."*** The report went on to break down the specific contributions of the three core research objectives and noted that the Food Program generates economic activity sufficient to support 87,792 US jobs and add $6.1 Billion to the annual gross domestic product. The Ornamental Horticulture Program generates a total of 14,501 full and part

[1] Miller, S.R. and A. Leschewski. .Economic Impacts of the IR-4 Project and IR-4 Project Programs. December 28, 2011. Center for Economic Analysis, Michigan State University.

time jobs and contributes $1.0 Billion to the annual gross domestic product. The Biopesticide and Organic Support Program is estimated to generate 2,358 jobs and contribute $155 million to the annual gross domestic product.

FY 2011 Appropriations and other funding

Total direct funding for the IR-4 Project during calendar year 2011 was approximately $18 million. This included the FY 2011 Congressional appropriation through NIFA amounting to $12.156 million. This was a decrease of $24,000 from the FY 2010 appropriation of $12.180 million. The amount allocated to the USDA-ARS Minor Use Program remains slightly below $4.0 million. The Directors of the State Agricultural Experiment Stations provided IR-4 (NRSP-4) $481,182 through a Multi-state Research Funds grant. USDA-Foreign Agriculture Service granted nearly $500,000 to cover IR-4's international activities including the Global Residue Study. A cooperative project between IR-4/Department of Defense-Deployed Warfighter Protection Program/USDA-ARS provided $260,000 for regulatory support of public health pesticides. The crop protection industry was able to assist the IR-4 Project by providing approximately $1.462 million in grants.

The direct funding of $18 million does not include the substantial in-kind contributions provided by SAES/land grant universities, EPA, the Canadian Pest Management Centre and the crop protection industry. For example, many IR-4 research units are housed at state funded research stations. The host institutions contribute indirect and direct costs as leverage on the IR-4 funds at our field research centers/critical sites, analytical laboratories and management offices. The crop protection industry provides characterized test substance and analytical standards to be used in residue studies and they also provide significant technical assistance. EPA waives the Pesticide Registration Improvement Act review fees associated with IR-4 submissions and the CN-PMC work on cooperative projects reduces the amount of work IR-4 would have to do if it was a domestic only project.

As mentioned above, the crop protection industry provided $1.462 million in direct funds. IR-4 used $915,942 of these resources to supplement research activities - $464,453 for additional research trials (sample processing, sample shipping), fund $382,189 for IR-4 Headquarters operations, and provide $69,300 resources for the Food Use and Ornamental Horticulture Priority Setting Workshops. The remainder of the resources will be used in an attempt to maintain productivity as research expenses increase while governments' direct and indirect contributions are potentially reduced.

Future Directions

On an annual basis, IR-4 goes through an extensive and transparent process to gain stakeholder input and feedback to determine which are the most important research pest management needs and where resources should be spent. In 2011, IR-4 introduced a new and streamlined process to ascertain priorities in the Food Program. The new process eliminated the past practices of giving each pest management discipline a specific allocation of priority slots. The new process encouraged a holistic approach to determine the most critical needs within each specific specialty or minor use crops. The new process was successfully introduced at the 2011 Food Use Workshop conducted September 13 & 14 in Cary, NC. The outcome of this workshop and subsequent discussions with stakeholders is a research plan for 2012 which includes 95 magnitude of residue studies consisting of 520 field trials. Additionally, IR-4 will continue to fund efficacy/crop safety research. IR-4 will continue to fine tune the priority setting process in the Food Crop area.

The Ornamental Horticulture Program held its priority setting workshop October 4-7 in Sacramento, CA. There was ample dialogue among the participants to identify the most important pest management needs. The priorities set at the workshop will lead to 15 research projects on various ornamental species. Some of the priorities selected at this workshop will be part of IR-4 2013 field program.

Within the Biopesticide and Organic Support Program, IR-4 publishes a Request for Applications to solicit proposals for research funding. IR-4 received 40 proposals for 2012 research. Of these, 14 were considered for early stage or pre-development, biopesticides. The remainder was for biopesticides that were already labeled with the goal of the proposed work to expand the registration to new crops and/or new pests or demonstrate to stakeholders that the biopesticide when used correctly could be part of a successful pest management system. Funding decisions on proposals will be made by March 2012.

IR-4 continues to search for opportunities to improve process, gain efficiencies and/or reduce costs. We have made great strides over the past five years in process improvements which allow IR-4 to get the most out of the

government and private funding. IR-4 anticipates it will be making further investments in technology that will attempt to keep productivity and deliverables (registrations) stable. However, it will be increasingly difficult to maintain productivity as expenses continue to rapidly escalate at the same time state and federal government investment for agriculture research in general and specifically IR-4 continues to be reduced or flat. IR-4 can no longer continue to ***"do more with less***". There will be a direct loss of productivity if funding authorities do not provide adequate resources.

One area where IR-4 envisions opportunities for increased efficiencies is working in cooperation with other countries to bi-laterally or multi-laterally develop data for specialty crops/minor uses. Working cooperatively, IR-4 can leverage other countries' contributions to reduce specific costs in the United States. IR-4 has been working in cooperation with Canada for 15 years on a small proportion of projects annually and has achieved great savings. In 2011, IR-4 piloted a global residue study to support registration of a new insecticide on blueberry. In cooperation with other " IR-4 like" research organizations in other countries, IR-4 managed data development in US, Canada, Australia, New Zealand, Chile, Spain, Italy, Denmark, and the United Kingdom. The data from this study will be submitted in 2012 to numerous regulatory authorities across the globe.

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

IR-4, along with the UN Food and Agriculture Organization (FAO), EPA, and USDA Foreign Agriculture Service is a co-sponsor of the Second Global Minor Use Summit, February 21-23, 2012 in Rome, Italy at FAO's Headquarters. IR-4 is serving as lead organizer of this global meeting. This Summit will bring together approximately 250 representatives from developed countries, developing countries, growers, commodity organizations, the crop protection industry, agriculture research, agricultural policy, regulatory authorities and others who have interest in the Minor Use Problem with specialty crops and other minor uses. The anticipated outcome of the Summit is a five year plan to facilitate cooperation for synchronized global minor use registrations.

PUBLICATIONS/PRESENTATIONS

Arsenovic, M., D.L. Kunkel, and J.J. Baron. 2011. The IR-4 Project: Update on Weed Control Projects (Food Uses). Proceedings Northeastern Weed Science Society, Volume 65, p. 72.

Arsenovic, M., D.L. Kunkel, and J. J. Baron. 2011. IR-4 Project: Update on Weed Control Projects. WSSA Meeting, Portland, OR. Oral Presentation.

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Fraelich, B.A., B. T. Scully, S.M. Schneider, and C.L. Palmer, IR-4 Headquarters, Rutgers University, Princeton, NJ. 2011. Interregional Research Program IR-4 for the Field Assessment of Fungicides, Herbicides and Insecticides/Acaricides on Ornamental Horticultural Crops in Southeastern U.S. Poster at American Society for Horticulture Science Annual Meeting, September, 2011.

Ludwig, S.W., C.L. Palmer, T. Bunnell, J.C. Adams, B. Balogh, P. Hernandez, A. Walston. Managing western flower thrips in floriculture production with tolfenpyrad (Hachi-Hachi™). Presentation at Entomology Society of America Annual Meeting, November 2011.

Ludwig, S.W., C.L. Palmer, T. Bunnell, J.C. Adams, B. Balogh, P. Hernandez, A. Walston. Managing key pests of ornamental crops with tolfenpyrad (Hachi-Hachi™). Poster at Entomology Society of America Annual Meeting, November 2011.

Novack, S. 2011. IR-4 Newsletter. Vol. 42 No. 1, January 2011.

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Palmer, C.L., J. Baron, and E. Vea. 2011. Update on the 2010 Weed Science Research Program and 2010 Research Priorities. Proceedings of the 65th Northeastern Weed Science Society. January 2011.

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Starner, V.R., D. Carpenter and K. Samoil. 2011. Invited presentation "2011 Protocols and Field Data Books - What's New" at the IR-4 Northcentral/Southern Region Field Training, Gainesville, FL, 2/22-23/2011.

Starner, V.R., J.J. Baron and D.L. Kunkel. 2011. Invited lecture "The IR-4 Project at Rutgers" 3/9/11 in Rutgers Entomology course "Agricultural Entomology and Pest Management" taught by Dr. George Hamilton.

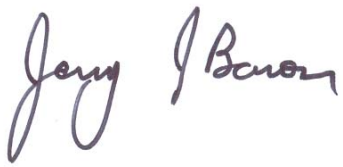
Starner, V.R., J.J. Baron and D.L. Kunkel. 2011. Invited presentation "IR-4 Update from Headquarters" at the IR-4 Western Region SLR Meeting, Davis, CA, 3/15-16/2011.

Starner, V.R., J.J. Baron, D.L. Kunkel and K. Dorschner. 2011. Invited presentation "Brown Marmorated Stink Bug Solutions – How the IR-4 Project Can Help" at the BMSB Working Group Meeting, Biglerville, PA, 6/20-21/2011.

Starner, V.R. and S. Novack. 2011. "In Search of Brown Marmorated Stink Bug Solutions", IR-4/EPA/USDA 2011 Field Tour Book, 6/22/2011, 28 pages.

Valencia-Botin, A., J. W. Buck, S.N. Jeffers, C.L. Palmer. Managing Gladiolus Rust in Mexico With Fungicides. Poster Presentation at 2011 American Phytopathological Society Annual Meeting. August, 2011.

Approved by:



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

ATTACHMENT 1

Participants in the Process

Stakeholder Representatives

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

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

Cooperating Government Departments and Agencies

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

ATTACHMENT 1 Continued

Crop Protection Industry

AgBio Development Inc.
AgraQuest Inc.
Agrimar
AgroSource Inc.
Albaugh, Inc.
Amvac Chemical Corporation
Arkion Life Sciences
Arysta LifeScience North America Corp.
BASF Corporation
Bayer CropScience USA
Bayer Environmental Science
BioBest
Bioworks
Certis USA
Cheminova
Chemtura AgroSolutions
Cleary Chemical
Dow AgroSciences
DuPont Agricultural Products
Engage Agro
FMC Corporation
Gowan Company
Isagro, USA
ISK Biosciences
Janssen Pharmaceutica
K-I Chemical USA Inc.
MGK
Landis International
Lonza Inc.
Makhteshim-Agan N.A. Inc.
Marrone BioInnovations, Inc.
Monsanto Company
Natural Industries
Neudorff
Nichino America, Inc.
Nisso America, Inc.
Novozymes, Inc.
Nufarm Americas, Inc.
OHP
Sankyo Agro Co., Ltd.
SePro
Sipcam Advan
Summerdale, Inc.
Syngenta Crop Protection Inc.
Syngenta Flowers
TKI
UPI
Valent Bioscience
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ATTACHMENT 1 Continued

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ATTACHMENT 1 Continued

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ATTACHMENT 1 Continued

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D. Stewart	CA

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I. Gallego	Spain
A. Geelen	New Zealand
S. Lange	New Zealand
M. Montagna	Australia
G. Murdoch	Australia
K. Paaske	Denmark
S. Parker	United Kingdom

ATTACHMENT 2
2011 Food Use Research Projects – Residue Trials

CHEMICAL	CROP	PR #
• Abamectin	Strawberry	8019
• Abamectin	Tomato (GH)	5076
• Azoxystrobin	Caneberry	10574
• Azoxystrobin	Cranberry	10573
• BYI 02960	Blueberry	10637
• BYI 02960	Clover (red) (seed crop)	10747
• BYI 02960	Prickly Pear Cactus	10722
• Carfentrazone-Ethyl	Asparagus	10278
• Chlorantraniliprole	Hops	A10491
• Chlorothalonil	Guava	10100
• Chlorothalonil	Lettuce (Head & Leaf)	147
• Clothianidin	Cranberry	10699
• Cyantraniliprole (HGW86)	Carrot	10364
• Cyantraniliprole (HGW86)	Radish	10641
• Cyantraniliprole (HGW86)	Sunflower (Seed treatment)	10640
• Cyazofamid	Tomato (GH)	10656
• Cyprodinil + Fludioxonil	Guava	7127
• Cyprodinil + Fludioxonil	Pomegranate (Post harvest)	10613
• Difenoconazole + Cyprodinil	Cucumber (GH)	10665
• Diflubenzuron	Alfalfa	B8678
• Diflubenzuron	Peanut	A9891
• Diquat	Onion (Dry Bulb)	10766
• Diquat	Pepper (Bell & Non-Bell)	10669
• Diquat	Tomato	10668
• Emamectin benzoate	Cherry	10685
• Etoxazole	Hops	B8873
• Famoxadone + Cymoxanil	Mango	10677
• Fenamidone	Basil	10120
• Fenpropathrin	Greens (Mustard)	A9266
• Fenpropathrin	Turnip (Roots)	9517
• Flonicamid	Bean (Dried Shelled)	10475
• Flonicamid	Mint	9358
• Flonicamid	Tomato (Field & GH)	8556
• Fluazifop-P-Butyl	Lettuce (Head & Leaf)	2072
• Fluazifop-P-Butyl	Onion (Green)	3405
• Fluazifop-P-Butyl	Strawberry (Perennial)	A2085
• Flumioxazin	Clover (Seed Crop)	10605
• Fluopicolid	Basil	10121
• Glyphosate	Pepper (Chili)	10285
• Glyphosate	Strawberry	6312
• Indaziflam	Coffee	10654

CHEMICAL	CROP	PR #
• Lambda-Cyhalothrin	Rice (Wild)	8850
• Lambda-Cyhalothrin + Thiamethoxam	Avocado	10540
• Mefenoxam	Wasabi	10375
• Mefenoxam + Copper	Caneberry (Raspberry)	C1169
• Mesotrione	Grape	9786
• Metaldehyde	Bean (Succulent Shelled)	10667
• Metaldehyde	Beet (Garden)	10338
• Metaldehyde	Ginseng	10704
• Metaldehyde	Wheat	10335
• Metrafenone	Peach	10369
• NAA	Pomegranate	A5389
• Penthiopyrad	Caneberry	10695
• Pendimethalin	Blueberry (High Bush)	10181
• Pendimethalin	Caneberry	9840
• Propamocarb-HCL	Guava	7171
• Pyrethrins + PBO	Caneberry	10720
• Pyrethrins + PBO	Citrus	10724
• Pyrethrins + PBO	Strawberry	10719
• Pyrethrins + PBO	Tree Nuts	5979
• Pyridaben	Cucumber (GH)	8036
• Pyrifluquinazon	Pepper (Bell) (GH)	10555
• QGU42	Bean	10837
• QGU42	Cantaloupe	10620
• QGU42	Cucumber (Field & GH)	10618
• QGU42	Ginseng	10616
• QGU42	Lettuce (Head & Leaf)	10653
• QGU42	Pepper (Bell & Non-Bell)	10621
• QGU42	Squash (Summer)	10619
• Quinoxyfen	Tomato	9289
• Rimsulfuron	Cranberry	7888
• Rimsulfuron	Grasses (Rangeland)	A10679
• Rimsulfuron	Grasses (Seed Crop	10657
• Simazine	Currant	5465
• S-Metolachlor	Chicory (Roots & Tops)	10480
• S-Metolachlor	Swiss Chard	10673
• Spinosad	Cherry	10664
• Spinosad	Plum	10675
• Spirodiclofen	Date	10482
• Spirodiclofen	Sugar Apple	A9330
• Spirodiclofen	Watercress	10551
• Spirotetramat	Pineapple	10635
• Sulfentrazone	Mint	10636
• Tolfenpyrad	Onion	9657
• Tolfenpyrad	Tomato (GH)	10634
• Triflumizone	Hops	10798

Attachment 3 - 2011 Efficacy/Crop Safety (E/CS) Research Program

Weed Science:

Chemical	Crop	PR#	Comments	CS trials planned	E trials planned	ARS trials	State trials
carfentrazone-ethyl	asparagus	10278	2010-11 residue study	4	none	WA	AR, CA, MI
clopyralid	radish	10437	2010 residue study	5	none	OH	FL, OH, OR, WI
flufenacet + metribuzin	timothy hay	10372	covered by grass tolerance; need 1 CS trial	1	none	WA	--
linuron	basil	10221	2009 residue study	4	none	SC, TX	AR, NY
mesotrione	grape	09786	2011 residue study; multi-year CS trials	4	none	WA	CA, NY, NY
pendimethalin	blueberry	10181	2011 residue study; multi-year CS trials	2	none	GA, WA	--
pendimethalin	caneberry	09840	2011 residue study; multi-year CS trials	5	none	--	AR, MI, NC, OR, WA
pendimethalin	cauliflower	06504	tolerance exists; need CS data to add crop to label	6	none	--	AR, CA, NC, NY, OH, OR
quinclorac	caneberry	10436	2010 residue study; multi-year CS trials	5	none	--	AR, MI, NC, OR, WA
saflufenacil	succulent pea	10358	2nd yr CS to add crop to marketing label	5	none	WA	AR, NC, NY, WI
s-metolachlor	chicory	10480	2011 residue study	1	none	WA	--
sulfentrazone	apple	07770	Complete 3rd yr of multi-yr CS trials	4	none	--	NY, WV, NC, MI

Plant Pathology:

Chemical	Crop	PR#	Comments	CS trials planned	E trials planned	ARS trials	State trials
acibenzolar	bell pepper	07116	tolerance exists; need E/CS data to add crop to label	collect from E trials	8	GA, OH, SC, TX	FL, GA, OH, NY
cyazofamid	lima/snap beans	09532/ 09094	need E/CS data to add crops to label	collect from E trials	3	--	FL, MI, NY
cyprodinil + fludioxonil	carambola	07125	tolerance covered by guava; need E/CS data to add crop to label	collect from E trial	1	--	FL
cyprodinil + fludioxonil	guava	07127	2010-11 residue study	collect from E trial	1	--	FL
famoxadone + cymoxanil	mango	10677	2011-12 residue study	collect from E trial	1	--	FL

Attachment 3 - 2011 Efficacy/Crop Safety (E/CS) Research Program - Continued

Plant Pathology:

Chemical	Crop	PR#	Comments	CS trials planned	E trials planned	ARS trials	State trials
fluazinam	spinach	06890	2010 residue study, need E/CS data before reg.	collect from E trial	1	--	CA
fludioxonil	carambola, postharvest	09912	tolerance covered by other tropicals; need E/CS data to add crop/use to label	collect from E trial	1	--	FL
mandipropamid	snap beans	10324	2010 residue study, need E/CS data before reg.; covered by cyazofamid E/CS trials above	collect from E trials	(see 09532/ 09094 above)	--	--
metrafenone	cherry	10370	2010 residue study, need E/CS data before reg.	collect from E trials	2	--	CA, WA
metrafenone	cantaloupe, summer squash	10477/ 10478	2010 residue studies, need E/CS data before reg.	collect from E trials	4	--	CA, GA, IN, NY
metrafenone	tomato	10467	2010 residue study, need E/CS data before reg.	collect from E trials	2	--	CA, OH
propiconazole	radish	06385	2010 residue study, need E/CS data before reg.	collect from E trials	2	--	OH, VA
quinoxyfen	tomato	09289	2011 residue study, need E/CS data before reg.	collect from E trials	6	GA, OH, SC	CA, FL, OH
triflumizole	GH cucumber	09300	2009 residue study, need E/CS data before reg.	collect from E trial	1	--	OH

ATTACHMENT 4 – Registration Packages Submitted in 2011

Completed Petitions or Final Reports Submitted to EPA

Pest Control Agent / Type*		Commodity or Crop Group	PR#	Date
Methoxyfenozide	I	Fruit, citrus, group 10-10	A9367	Feb 24 2011
		Vegetable, root, except sugar beet, subgroup 1B (shorten PHIs for 1A commodities other than sugar beet and establish a 1B tolerance and a separate tolerance for sugar beet)	09884 09895	
Bifenazate	I	Herb subgroup 19A	08846	Mar 01 2011
		Timothy grass (forage and hay)	09037	
		Vegetable, fruiting, group 8-10	---	
		Fruit, pome, group 11-10	---	
Fenpyrazamine (V-10135)	F	Caneberry subgroup 13-07A	09444	Mar 28 2011
		Bushberry subgroup 13-07B	09445	
		Ginseng	09453	
		Pistachio	09452	
Azoxystrobin + Fludioxonil + Difenoconazole	F	Potato (post-harvest)	A9860 09224 10131	Mar 28 2011
Azoxystrobin	F	Onion, bulb, subgroup 3-07A	10345	Mar 28 2011
		Onion, green, subgroup 3-07B	10346	
		Caneberry subgroup 13-07A	10347	
		Bushberry subgroup 13-07B	10348	
		Fruit, small, vine climbing, except fuzzy kiwifruit, subgroup 13-07F	10349	
		Berry, low growing, subgroup 13-07G	10350	
		Wasabi	10549	
		Dragonfruit	10609	
Cyprodinil + Fludioxonil	F	Pepper (bell and non-bell)	09140 09567	Mar 28 2011
		Spinach	10006	
		Lemon	A8297 B8297	
		Dragonfruit	10611	
Cyprodinil	F	Onion, bulb, subgroup 3-07A	10511	Mar 28 2011
		Onion, green, subgroup 3-07B	10512	
		Caneberry subgroup 13-07A	10513	
		Bushberry subgroup 13-07B	10514	
		Fruit, small, vine climbing, except fuzzy kiwifruit, subgroup 13-07F	10515	
		Berry, low growing, subgroup 13-07G	10516	
Fludioxonil	F	Ginseng	09349	Mar 28 2011
		Onion, bulb, subgroup 3-07A	10522	
		Onion, green, subgroup 3-07B	10523	
		Bushberry subgroup 13-07B	10079 10525	
		Fruit, small, vine climbing, except fuzzy kiwifruit, subgroup 13-07F	10526	
		Berry, low growing, subgroup 13-07G	10527	
		Sugar apple	10517	
		Lychee	10518	
		Papaya	10519	
		Guava	10521	
		Pineapple	10203	
		Carambola	09912	

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

ATTACHMENT 4 – Registration Packages Submitted in 2011 - Continued

Completed Petitions or Final Reports Submitted to EPA

Propiconazole + Fludioxonil	F	Tomato (post-harvest)	10182 10493	Mar 28 2011
Propiconazole	F	Bean (snap)	06508 09295	Mar 28 2011
		Bean (succulent and dried shelled)	09437	
		Bean (dried shelled)	02008	
		Fruit, citrus, group 10-10 (post-harvest) Orange Grapefruit Lemon	09715 09615 09616 09617	
		Fruit, stone, group 12 (post-harvest) Cherry Plum Peach	09787 09621 09622 09623	
Dinotefuran	I	Vegetable, tuberous and corm, subgroup 1C	10727	Apr 18 2011
		Onion, bulb, subgroup 3-07A	08645	
		Onion, green, subgroup 3-07B Chives	09550 08596	
		Fruit, small, vine climbing, except fuzzy kiwifruit, subgroup 13-07F	10728	
		Berry, low growing, except strawberry, subgroup 13-07H	09832	
		Peach	09548	
		Watercress	09514	
Acequinocyl	I	Melon subgroup 9A	08607	Apr 20 2011
		Caneberry subgroup 13-07A	09273	
		Berry, low growing, except strawberry, subgroup 13-07H	10586	
		Fruit, small, vine climbing, except fuzzy kiwifruit, subgroup 13-07F	10585	
		Vegetable soybean, succulent (edamame)	10769	
		Bean, succulent shelled	08674 10768	
		Cucumber	08606 08859	
		Cherry	09629	
Pendimethalin	H	Lettuce, leaf	09061	May 20 2011
		Brassica, leafy greens, subgroup 5B Turnip, greens	A1986 01988 01989 01987	
		Vegetable soybean, succulent (edamame)	10286	
		Melon subgroup 9A	09397	
		Fruit, small, vine climbing, except grape, subgroup 13-07E	A6681	
Fenpyroximate	I	Bean, snap	09942	May 31 2011
		Avocado Black sapote Canistel Mamey sapote Mango Papaya Sapodilla Star apple	10007	
		Cucumber	09032	

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ATTACHMENT 4 – Registration Packages Submitted in 2011- Continued

Completed Petitions or Final Reports Submitted to EPA

		Vegetable, fruiting, group 8-10 (to replace tolerance on Vegetable, fruiting, group 8)	10783	
		Fruit, citrus, group 10-10 (to replace tolerance on Fruit, citrus, group 10)	10781	
		Fruit, pome, group 11-10 (to replace tolerance on Fruit, pome, group 11)	10782	
		Tea	10647	
Clopyralid	H	Apple	03623	Jun 02 2011
		Brassica, leafy greens, subgroup 5B	10761	
		Rapeseed subgroup 20A, except Camelina (Gold of Pleasure)	10762	
Thifensulfuron methyl	H	Chicory	09417	Jun 07 2011
Rimsulfuron	H	Chicory	09417	Jun 07 2011
Sulfentrazone	H	Turnip	07915	Jun 14 2011
		Rhubarb	09408	
		Wheat (Spring, Pacific Northwest only)	08722	
		Sunflower subgroup 20B	06910	
Dinotefuran	I	Berry, low growing, except strawberry, subgroup 13-07H	09832	Jun 17 2011
		Watercress	09514	
		Onion, green, subgroup 3-07B	09550	
		Onion, bulb, subgroup 3-07A	08645	
		Peach	09548	
		Vegetable, tuberous and corm, subgroup 1C	10727	
		Fruit, small, vine climbing, except fuzzy kiwifruit, subgroup 13-07F	10728	
		Chive	08596	
S-metolachlor	H	Cilantro	07486	Jul 06 2011
		Garden beet leaves	09595	
Dinotefuran	I	Tea	10838	Jul 07 2011
Emamectin benzoate	I	Vegetable, cucurbit, group 9	06987 08939 08940 08941	Jul 13 2011
Buprofezin	I	Brassica, leafy greens, subgroup 5B	09005 09006	Aug 02 2011
		Turnip greens	09007	
		Vegetable, fruiting, group 8-10, except nonbell pepper	10735	
		Fruit, citrus, group 10-10	10736	
		Fruit, pome, group 11-10	10737	
		Bean, succulent	---	
		Persimmon	10541	
		Tea	10646	
Acetamiprid	I	Asparagus	09905 09939	Aug 30 2011
		Brassica, leafy greens, subgroup 5B	09271	
		Turnip greens	---	
		Corn, sweet	10216	
		Vegetable, fruiting, group 8-10	10776	
		Fruit, citrus, group 10-10	10774	
		Fruit, pome, group 11-10	10775	

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ATTACHMENT 4 – Registration Packages Submitted in 2011- Continued

Completed Petitions or Final Reports Submitted to EPA

Etofenprox	I	Food and Feed Commodities (intended to remove cropland and pastureland application restrictions from mosquito control label)	B10315	Sep 27 2011
Cyazofamid	F	Bean, succulent	09094	Oct 11 2011
		Bean, succulent, shelled	09532	
		Leafy greens subgroup 4A	10037	
		Basil, fresh and dried leaves	10118	
		Vegetable, tuberous and corm, subgroup 1C	---	
		Vegetable, fruiting, group 8-09	---	
Flonicamid	I	Berry, low growing, subgroup 13-07G	09604	Nov 10 2011
		Cucumber (for greenhouse use)	08551	
		Rapeseed subgroup 20A	09783	
Pyriproxyfen	I	Vegetable, bulb, group 3-07	10738	Nov 28 2011
		Vegetable, fruiting, group 8-10	10739	
		Fruit, citrus, group 10-10	10740	
		Fruit, pome, group 11-10	10741	
		Caneberry subgroup 13-07A	10742	
		Bushberry subgroup 13-07B	10743	
		Berry, low growing, except strawberry, subgroup 13-07H	10744	
		Herb subgroup 19A	08908 08909 08913 10745	
EPTC	H	Watermelon	09991	Nov 28 2011
		Fruit, citrus, group 10-10	10926	
		Sunflower subgroup 20B	10927	
Fluazinam	F	Melon subgroup 9A	07097	Dec 16 2011
		Pepper/Eggplant subgroup 8-10B	09556	
Quinclorac	H	Rhubarb	10135	Dec 16 2011
		Berry, low growing, except strawberry, subgroup 13-07H	08000	
Spirotetramat	I	Taro leaves	10581	Dec 16 2011
		Watercress	09948	
		Pomegranate	10113	
		Banana	10042	
		Bulb vegetables group 3-07	09983 10942	
		Berry, low growing, except strawberry, subgroup 13-07H	10198	
		Bushberry subgroup 13-07B	10194	
		Artichoke, globe	10243	
		Pineapple	10635	
		Coffee	10041	
		Vegetable, fruiting, group 8-10	10928	
		Fruit, pome, group 11-10	10930	
		Fruit, citrus, group 10-10	10929	
Fluazinam	F	Melon subgroup 9A	07097	Dec 16 2011
		Pepper/Eggplant subgroup 8-10B	09556	

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ATTACHMENT 4 – Registration Packages Submitted in 2011- Continued

Completed Final Reports Submitted to Registrant for Label Expansion, Conditional Registrations, or to Support Reregistration

Pest Control Agent / Type*		Commodity	PR#	Date
Hexythiazox	I	Pepper (Field/Greenhouse, Bell and Nonbell)	09818	May 10 2011
Novaluron	I	Dried Plum (Storage Stability)	A9048	May 11 2011
Novaluron	I	Cucumber (Greenhouse)	10237	Jul 25 2011
Pyriproxyfen	I	Papaya	09486	Oct 05 2011
Permethrin	I	Tomato (small fruited)	10359	Oct 05 2011
		Collard greens	10360	
Tebuconazole	F	Greens, mustard	B6233	Dec 14 2011

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

New or Revised Crop Groups

Crop Group or Subgroup	Date	No. of Uses
Vegetable, leafy, except brassica, group 4 (revised)	May 13 2011	To be determined
Vegetable, brassica, head and stem, group 5 (currently Vegetable, brassica, leafy, group 5)	Jun 16 2011	To be determined

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

Pest Control Agent / Type*		Commodity	Date
Cyromazine	I	Bean, succulent	Dec 05 2011
Imidacloprid	I	Artichoke	Dec 05 2011
		Avocado	
		Papaya	
		Lychee	
		Guava	
		Bean, dry	
		Lentil	
		Garbanzo bean	
		Persimmon	
		Banana	
		Celery	
Trifloxystrobin	F	Vegetable, root, except sugar beet, subgroup 1B	Dec 05 2011
		Radish and turnip tops	
		Papaya	
		Asparagus	
Methoxyfenozide	I	Artichoke	Dec 19 2011
		Onion, green	
		Fruit, citrus	
		Pea, dry	
		Lentil	
		Garbanzo bean	
		Pea and bean, edible podded	
		Pomegranate	
		Papaya	
		Avocado	
		Lychee	
		Guava	

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ATTACHMENT 4 – Registration Packages Submitted in 2011- Continued

Biochemical Classification Request Submitted to EPA

Pest Control Agent / Type*		Commodity or Crop Group	PR#	Date
Lysine	H	Turf	0880B	Jun 08 2011

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

Petition to Establish Exemption from the Requirement of a Tolerance

Pest Control Agent / Type*		Commodity or Crop Group	PR#	Date
(Z,E)-7,9-11-Dodecatrienyl formate	I	Fruit, citrus, group 10 Fruit, pome, group 11 Fruit, stone, group 12 Nut, tree, group 14 Almond Carob Date Fig Pistachio Pomegranate		Nov 07 2011

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

ATTACHMENT 5 - New Tolerances and Approvals – 2011

Permanent Tolerances published in the Federal Register

Pest Control Agent / Type*		Date	Commodity or Crop Group	PR#	No. of Uses	No. of Tolerances
Fluazinam	F	Jan 19 2011	Carrot	07094	1	1
			Apple	06797	1	2
Mefenoxam	F	Jan 26 2011	Bean, snap**	08371 08430	1	1
			Bushberry subgroup 13-07B (Delete Lingonberry) **	---	18	1
			Caneberry subgroup 13-07A**	01169	5	1
			Onion, bulb, subgroup 3-07A**	---	11	1
			Onion, green, subgroup 3-07B**	---	15	1
			Spinach**	08431	---	1
Sulfentrazone	H	Feb 02 2011	Vegetable, tuberous and corm, subgroup 1C (Delete tolerance on Potato)	07723	16	1
			Brassica, head and stem, subgroup 5A (Delete tolerance on Cabbage)	07724 08064 08065	10	1
			Brassica, leafy greens, subgroup 5B	07581 07912 07914 09355	8	1
			Vegetable, fruiting, group 8-10	07957 08048 09025	21	1
			Melon subgroup 9A	07911 07917 08049 08445	3	1
			Pea, succulent	06520	7	1
			Strawberry	07044	1	1
			Flax	07584	1	1
Fomesafen	H	Mar 09 2011	Pepper (Bell and Nonbell)	09677	2	2
			Potato**	08084	1	1
			Tomato, tomatillo	08082	2	1
Etoxazole	I	Apr 13 2011	Avocado** Mango** Papaya** Black sapote** Canistel** Mamey sapote** Sapodilla** Star apple**	09738 09216 09292	8	8
			Pepper/eggplant subgroup 8-10B **	09234 09814	10	1
			Melon subgroup 9A (replaces Vegetable, cucurbit subgroup 9A tolerance) **	09018	0	1
			Squash/cucumber subgroup 9B (replaces Cucumber tolerance) **	09205	10	1
			Caneberry subgroup 13-07A**	08096	5	1

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**This use (some crops) has been found on an approved market label

ATTACHMENT 5 - New Tolerances and Approvals – 2011- Continued

Permanent Tolerances published in the Federal Register

			Fruit, small, vine climbing, except fuzzy kiwifruit, subgroup 13-07F (replaces Grape tolerance) **	10342	5	1
			Berry, low growing, subgroup 13-07G (replaces Strawberry tolerance) **	10341	8	1
			Tea	10552	1	1
Fluopicolide	F	Apr 20 2011	Vegetable, root, subgroup 1A (adds sugar beet and carrot) **	09893 09913	2	1
Triflusulfuron-methyl	H	Apr 22 2011	Beet, garden**	08043	2	2
Propiconazole	F	May 11 2011	Onion, bulb, subgroup 3-07A (replaces tolerance on Onion, bulb) **	10501	3	1
			Onion, green, subgroup 3-07B (replaces tolerance on Onion, green) **	10502	6	1
			Caneberry subgroup 13-07A (replaces tolerance on Caneberry subgroup 13A) **	10503	1	1
			Mint**	09419	2	1
			Berry, low growing, subgroup 13-07G, except cranberry (replaces tolerance on Strawberry) **	10505	7	1
			Bushberry subgroup 13-07B (replaces tolerance on Bushberry subgroup 13B)	10504	14	1
Chlorantran-iliprole	I	Jul 27 2011	Vegetable, root and tuber, group 1 Beet, sugar, molasses**	---	37	2
			Vegetable, leaves of root and tuber, group 2**	10217	16	1
			Onion, bulb, subgroup 3-07A**	---	11	1
			Berry, large shrub/tree, subgroup 13-07C**	---	13	1
			Berry, low growing, subgroup 13-07G**	---	9	1
			Ti, leaves and root	---	1	2
(All of the chlorantraniliprole tolerances resulted from an IR-4/registrant proposal for data extrapolation.)						
Metconazole	F	Aug 17 2011	Bushberry subgroup 13-07B	09501	19	1
			Vegetable, tuberous and corm, subgroup 1C	09861 09890	17	1
Tetraconazole	F	Aug 29 2011	Fruit, small, vine climbing, except fuzzy kiwifruit, subgroup 13-07F (replaces grape tolerance) **	09663	5	1
			Berry, low growing, subgroup 13-07G**	09662	9	1
Dicamba	H	Sep 09 2011	Teff	10195	1	3
2,4-D	H	Sep 09 2011	Teff	10195	1	3
Novaluron	I	Sep 09 2011	Sweet corn**	09838	1	3
Abamectin	I	Nov 09 2011	Onion, bulb, subgroup 3-07A	07237	11	1
			Chive	07102	1	2
			Bean, dry, seed	05001 06594	22	1
				Totals	382	70

*F=fungicide, H=herbicide, I=insecticide/acaricide, M=molluscide, P=plant growth regulator, R=rodenticide
**This use (some crops) has been found on an approved market label.

ATTACHMENT 5 - New Tolerances and Approvals – 2011 - Continued

Exemption from the Requirement of a Tolerance

Pest Control Agent / Type*		Date	Commodity or Crop Group	PR#	No. of Uses
Aspergillus flavus AF36	F	Mar 23 2011	Corn	378B	1
Lytic bacteriophage of *Clavibacter michiganensis* subspecies *michiganensis*	B	Oct 26 2011	Tomato, tomatillo	0430B	2
				Totals	3

*B=Bactericide, F=fungicide

Time-Limited Tolerances for section 18 Emergency Uses

Pest Control Agent / Type*		Date	Commodity or Crop Group	PR#	No. of Uses	No. of Tolerances	Expiration Date
Propiconazole	F	May 11 2011	Avocado	09914	1	1	Dec 31 2013
Mandipropamid	F	Sep 09 2011	Basil	10124	1	2	Dec 31 2012
Sulfur dioxide	F	Sep 14 2011	Fig	10114	1	1	Dec 31 2014

*F=fungicide

International Maximum Residue Limits Established with IR-4 Assistance - JAPAN

Pest Control Agent / Type*		Date	Commodity or Crop Group	PR#	No. of MRLs
Fludioxonil	F	Aug 31 2011	Chinese citron Lemon Orange Grapefruit Lime Other citrus fruit	07947	6
			Peach	06934	1
			Nectarine Apricot	06944	2
			Plum	06943	1
			Cherry	06933	1
			Kiwifruit	07639	1
			Apple	07568	1
			Pear	07569	1
			Quince	---	1
			Loquat	---	1
			Pomegranate	08085	1
				Totals	17

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

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

Product	Crop(s)
1,3-Dichloropropene	Pineapple
2,4-D	Strawberry
2,4-DB	Lentil
Acetamiprid	Clover
Atrazine	Sorghum (Sweet)
AVG	Cherry, Peach, Plum
Bifenazate	Banana
Boscalid + Pyraclostrobin	Artichoke (Globe), Celeriac, Endive, Persimmon
Bromoxynil	Millet
Captan	Ginseng
Carfentrazone-ethyl	Teff
Chlorfenapyr	Basil, Chives
Chlorothalonil	Grapefruit, Radish
Clethodim	Apple, Blueberry (Lowbush), Camelina, Cuphea, Goji Berry, Pear, Plum
Clomazone	Broccoli, Pea (Southern), Rhubarb
Cyantraniliprole	Cranberry, Cucumber, Onion, Pepper (Bell & Non-Bell), Tomato
Cyazofamid	Arracacha, Spinach
Cyprodinil + Fludioxonil	Cucumber
DCPA	Carrot, Prickly Pear Cactus
Difenoconazole	Apple, Pear
Difenoconazole + Cyprodinil	Artichoke
Diflubenzuron	Eggplant, Okra, Orange, Peach, Plum
Diquat	Canola, Watercress
Diuron	Cherry, Plum
Esfenvalerate	Canola
Ethalfluralin	Camelina
Ethephon	Fig, Sweet Potato, Tomato
Ethofumesate	Carrot, Cereal Grain, Cilantro, Dill
Ethoprop	Mint
Famoxadone + Cymoxanil	Bean (Lima) (Succulent & Dried Shelled), Greens (Mustard)
Fenamidone	Ginseng

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

Product	Crop(s)
Fenhexamid	Kiwifruit (Preharvest), Onion (Bulb & Green) Subgroups
Fenoxaprop-Ethyl	Grasses (Seed Crop)
Fenpyroximate	Cherry, Potato
Flonicamid	Alfalfa (Seed Crop)
Fluazifop-P-Butyl	Coffee
Flucarbazone-Sodium	Grasses (Seed Crop)
Flumioxazin	Artichoke (Globe), Cabbage, Guayule, Olive, Pomegranate, Prickly Pear Cactus
Flutolanil	Carrot, Ginseng, Radish
Fomesafen	Cantaloupe, Edamame, Pea (Edible Podded & Succulent Shelled), Squash
Glyphosate	Carrot, Mustard (Seed), Sesame, Sweet Potato, Teff
Halosulfuron	Artichoke (Globe), Caneberry (Blackberry)
Imazalil	Mushroom
Imazosulfuron	Cantaloupe, Potato
Imidacloprid	Oyster
Indoxacarb	Bean (Dried Shelled), Bean (Snap),
Iodomethane	Asparagus, Caneberry, Eggplant, Pepper (Bell & Non-Bell)
Kasugamycin	Cherry
Lambda-Cyhalothrin	Asparagus, Carrot, Greens (Mustard), Millet, Pearl, Okra, Radish, Rutabaga, Tea, Turnip (Roots)
Linuron	Coriander (Fresh & Seed), Dill
Mancozeb	Blueberry, Guava, Lychee
Mandipropamid	Basil (Field & GH), Ginseng, Tomato (GH)
Mesotrione	Currant (Red)
Metaldehyde	Bean & Pea (Edible Podded), Bushberry Subgroup, Canberry Subgroup, Celery, Clover (Seed Crop), Corn (Field), Grasses (Seed Crop), Low Growing Berry Subgroup, Mint, Rhubarb, Soybean, Swiss Chard, Taro (Wetland)
Methiocarb	Artichoke (Globe)
Methoxyfenozide	Basil, Date, Sorghum
Metribuzin	Pea (Edible Podded & Succulent Shelled), Tanier
NAA	Almond, Avocado, Plum, Rambutan, Walnut
Novaluron	Bean, Lima (Succulent & Dried Shelled), Carrot, Cucumber
Oxyfluorfen	Coffee, Onion (Green), Strawberry (Transplants), Ti Palm, Tomato
Paraquat	Mayhaw

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

Product	Crop(s)
Pendimethalin	Leek
Permethrin	Collard, Dragon Fruit, Tea, Tomato
Prohexadione Calcium	Watercress
Prometryn	Bean (Snap), Carrot, Dill
Pronamide	Grasses (Orchard, Seed Crop), Grasses (Pasture), Lettuce (Leaf), Safflower
Propiconazole	Watercress
Quinoxyfen	Hops
Sethoxydim	Blueberry, Grasses
S-Metolachlor	Cantaloupe, Lettuce (Head), Squash (Summer)
Spiromesifen	Cantaloupe, Cucumber, Grasses
Streptomycin	Grapefruit
Sulfur Dioxide	Fig
Tebuconazole	Watercress
Terbacil	Peach, Strawberry (Annual)
Thiacloprid	Blueberry
Thiamethoxam	Caneberry
Thidiazuron	Grape
Thifensulfuron-Methyl	Tomato
Thiophanate Methyl	Pepper (Field & GH)
Zinc Phosphide	Grasses (Seed Crop)

ATTACHMENT 7 – 2011 ORNAMENTAL HORTICULTURE PROGRAM

FIELD COOPERATORS

NORTHCENTRAL REGION

Dr. L. Canas	OH
Mr. T. Davis	MI
Dr. M. Hausbeck	MI
Dr. W. Kirk	MI
Dr. H. Mathers	OH
Dr. M. Mickelbart	IN
Dr. D. Nielsen	OH
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NORTHEAST REGION

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Dr. N. Catlin	NY
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Dr. E. Buss	FL
Dr. Y. Chen	LA
Dr. J. Chong	SC
Dr. M. Czarnota	GA
Dr. J. Derr	VA
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Dr. B. Pemberton	TX
Dr. M. Reddy	AL
Dr. K. Steddom	TX
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WESTERN REGION

Dr. A. Chase	CA
Dr. G. Chastagner	OR
Dr. J. DeFrancesco	OR
Dr. T. Grasswitz	NM
Dr. A. Hara	HI
Dr. Cai-Zhong Jiang	CA
Dr. J. Klett	CO
Dr. H. Lieth	CA
Dr. M. Parrella	CA
Dr. E. Peachey	CA
Dr. J. Pscheidt	OR
Dr. B. Uber	CA
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Dr. E. Beste	MD
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Mr. B. Fraelich	GA
Mr. R. Frank	MD
Mr. T. Freiberger	NJ
Dr. N. Grunwald	OR
Dr. J. Harvey	WA
Dr. M. Reding	OH
Mr. P. Wade	SC

ATTACHMENT 8 – 2011 ORNAMENTAL HORTICULTURE PROGRAM

RESEARCH ACTIVITIES

Discipline	Project	Number of Researchers	Number of Crops	Number of Products	Number of Trials
Entomology	Impact on Beneficial Organisms *	2	1	6	34
	Mealybug Efficacy *	4	4	14	38
	NNI-0101 Crop Safety *	4	12	1	19
	Pyridalyl Crop Safety *	3	7	1	10
	Scale Efficacy *	7	7	15	74
	Spirotetramat Crop Safety *	8	24	1	73
	Stink Bug Efficacy	1	1	11	11
	Thrips Efficacy *	1	1	8	8
	Tolfenpyrad Crop Safety *	5	14	2	59
	White Grub & Root Weevil Efficacy	1	1	1	1
	Mite (not spider mites) Efficacy	1	1	6	6
Moluscides	Mollusc Efficacy	1	1	8	8
Plant Growth Regulators	Herbaceous Branching *	5	2	3	42
	Woody Ornamental Branching *	6	2	3	18
Plant Pathology	Bacterial Efficacy *	5	7	19	61
	Acibenzolar Crop Safety *	7	16	1	38
	Botrytis Efficacy	3	2	6	12
	Fluopicolide (V-10161) Crop Safety *	4	8	1	10
	Fusarium Efficacy *	3	3	15	29
	Leaf Spot & Blight Efficacy	1	1	9	9
	Metconazole Crop Safety *	7	16	1	25
	Pythium Efficacy *	4	3	13	73
	Rust Efficacy *	3	4	32	91
	Triticonazole Crop Safety *	8	26	1	40
Weed Science	Dimethenamid-p Crop Safety *	12	27	1	33
	Early Post Emergent Efficacy *	2	1	4	15
	F6875 Crop Safety *	9	17	2	25
	Flumioxazin Crop Safety *	5	6	1	7
	Halosulfuron Crop Safety	2	3	1	3
	Indaziflam Crop Safety *	9	17	1	25
	Isoxaben Crop Safety *	5	8	1	11
	Liverwort Efficacy *	5	10	13	121
	Mesotrione Crop Safety *	6	11	1	14
	Ornamental Grass Crop Safety to Herbicides	1	2	2	4
	Oxyfluorfen + Prodiamine Crop Safety *	7	9	1	13
	Pendimethalin + Dimethenamid-p Crop Safety *	14	42	1	57
	Sulfosulfuron Crop Safety *	9	24	1	32
	Trifluralin + Isoxaben Crop Safety *	13	32	1	48

* High Priority Projects

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

ATTACHMENT 9 – SUMMARIES OF 2011 ORNAMENTAL HORTICULTURE RESEARCH

Acibenzolar Crop Safety

Acibenzolar is an active ingredient that stimulates plant defense systems. In 2002, IR-4 started testing acibenzolar for safety on several ornamental horticulture crops. In 2008, IR-4 continued crop safety screening after a renewed interest in bringing this active ingredient to ornamental horticulture growers. From 2002 through 2010, the IR-4 Project completed 179 trials on 52 ornamental plant genera or species examining phytotoxicity related to foliar and/or drench applications of acibenzolar. In these trials, 22 species or genera exhibited minimal or no injury after foliar applications. Based on this information, it is recommended that all but 2 of these crops be added to a list of tolerant plants when this active ingredient gains registration. While there was sufficient evidence of minimal or no injury for *Dianthus sp.* and *Pelargonium x hortorum*, a single trial for each crop did elicit moderate to severe injury. Further investigation on cultivar or species differences may be warranted.

Bacterial Disease Efficacy

From 2008 to 2010, 46 products were tested through the IR-4 Program as drench or foliar applications against bacterial pathogens). Species tested included: *Erwinia amylovora, E. chrysanthemi*, *P. chicorii*, *P. marginalis, P. syringae, Pseudomonas* sp., *Xanthomonas campestris* and *Xanthomonas* spp. In general, all products, including the standard copper containing bactericides (Camelot, CuPRO, Cuprofix, Cuprofix MZ, Junction, Kocide, Phyton 27 and ReZist) and mancozebs (Dithane, Penncozeb, Protect) and biologicals (Cease, Rhapsody), provided variable efficacy on these bacterial pathogens. Several new products that are included in the 2010 Bacterial efficacy project looked promising based on their efficacy relative to standards. These include Acibenzolar, CG100, Citrex, HM-0736, Kasumin, Regalia, SP2015 and Taegro. Further research is needed to obtain additional efficacy data to recommend actions to register or amend labels for these pests.

Dimethenamid-p Crop Safety

From 2007 to 2010, IR-4 completed 290 trials on Tower EC (dimethenamid-p). The data contained in this report was generated to register uses of dimethenamid on and around ornamental horticulture plants with over-the-top applications. The dimethenamid rates in the testing program were 0.97, 1.94 and 3.88 pounds active ingredient per acre (lb ai per A) as the 1X, 2X and 4X rates. Tower EC had been applied to 89 plant genera or species. Of these, 39 plant species exhibited no or minimal transient injury after application at all three rates. Four crops exhibited no phytotoxicity at 0.97 and 1.94 lb ai per acre but did have some injury at 3.88 lb ai per acre: *Rhododendron sp., Salvia nemorosa/sylvestris, Syringae sp.* and *Viburnum nudum*. One crop, *Viburnum opulus*, exhibited significant phytotoxicity at even the lowest rate.

Dimethenamid-p + Pendimethalin Crop Safety

From 2007 to 2010, IR-4 completed 452 trials on Freehand G (BAS 659 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 over-the-top applications. The Freehand rates in this testing program were 2.65, 5.3 and 10.6 pounds active ingredient per acre (lb ai per A) as the 1X, 2X and 4X rates. Freehand G had been applied to 147 plant genera or species. Of these, 59 exhibited no or minimal transient injury after application at all three rates. Twelve crops exhibited no phytotoxicity at 2.65 and 5.3 lb ai per acre, but did have some injury at 10.6 lb ai per acre: *Acer rubrum, Campanula sp., Catharanthus roseus, Ceanothus sp., Cotoneaster sp., Heuchera sp., Ligustrum sp., Nepeta x faasseni, Oenothera sp., Phlox subulata, Solidago sphacelata, and Vinca sp.* Twelve crops exhibited significant phytotoxicity at even the lowest rate: *Amsonia hubrichtii, Aquilegia sp., Armeria maritima, Calamagrostis acutiflora, Coreopsis auriculata, Festuca ovina glauca, Impatiens sp. (New Guinea Hybrids), Lamium galeobdolon, Pennisetum setaceum, Phlox paniculata, Scabiosa sp.,* and *Veronica spicata.*

Early Post Emergence Efficacy

From 2008 through 2011, fourteen pre-emergent herbicides were tested across the United States through the IR-4 Ornamental Horticulture Program to determine whether they can control emerged weeds at the cotyledon to 1 leaf or 2 to 4 leaf stage. Three troublesome weeds were targeted initially including bittercress oxalis and spurge with Eclipta and Phyllanthus added later. Bittercress (*Cardamine sp.)* was controlled at the early postemergence application timings with Certainty at 0.035 to 0.094 lb ai/A, EXC3898 at 2.1 to 3.1 lb ai/A, Gallery 75 DF at 1.0 lb ai/A and V-10142 (imazasulfuron) at 0.38 and 0.75 lb ai/A. Emerged oxalis (*Oxalis sp.)* seedlings showed significant impact

with early postemergence applications of Casoron 4G at 4 lb ai/A, Certainty at 0.035 and 0.094 lb ai/A, Gallery at 0.5 and 1.0 lb ai/A, indaziflam at 50 and 100 g/ha, SureGuard at 0.562 lb ai/A, Tower at 0.97 lb ai/A and V-10142 0.75 lb ai/A applications. Spurge *(Chamaesyce sp.)* control was demonstrated at early postemergence timings with 1.5 lb ai/A of Tower and 4.0 lb ai/A of Pendulum. Limited experiments with Broadstar 0.25G and Broadstar VC1604, FreeHand, and HGH-63 showed promise on at least one of these weed species. Additionally, eclipta *(Eclipta sp.)* was found to be controlled in limited testing by Casoron 4 (lb ai/A), Certainty (0.035 and 0.094 lb ai/A), SureGuard (0.383 lb ai/A), Tower (0.97 and 1.94 lb ai/A) and Basagran (1.0 lb ai/A) when applied early postemergence. Phyllanthus *(Phyllanthus sp.)* was also controlled by these products with the exception of Basagran. These findings benefit growers by identifying select preemergence herbicides which control specific weeds at early emergence stages in container grown ornamentals.

F6875 (Sulfentrazone + Prodiamine) Crop Safety

Since 2007 IR-4 has completed 218 trials with products containing sulfentrazone + prodiamine (F6875 0.3G and F6875 4SC) on 80 crops. The data contained in this report was generated to register uses of sulfentrazone + prodiamine formulation on and around ornamental horticulture plants with over-the-top applications. The rates tested were 0.375, 0.75 and 1.5 pounds active ingredient per acre (lb ai per A) as the 1X, 2X and 4X rates. The F6875 0.3G formulation was applied to 79 plant genera or species. Of these, 18 species exhibited no or minimal transient injury after application at all three rates. Ten crops (*Buddleia davidii, Echinacea sp., Hemerocallis sp., Hosta sp., Iris sp., Lobularia maritima, Ophiopogon sp., Phlox paniculata, Phlox subulata, Tsuga heterophylla*) exhibited phytotoxicity at even the lowest rate. F6875 4SC was tested on 14 genera or species of which two species exhibited little to no injury at all three rates. Three species (*Buddleia davidii, Echinacea purpurea and Hydrangea sp.)* demonstrated significant injury even at the lowest rate.

Flumioxazin Crop Safety

During 2008 and 2010, IR-4 completed 189 trials on Broadstar 0.25G VC1604 (flumioxazin). The data contained in this report was generated to confirm registered uses of flumioxazin on and around ornamental horticulture plants with over-the-top applications. The flumioxazin rates in the testing program were 0.375, 0.75, and 1.5 pounds active ingredient per acre (lb ai per A) as the 1X, 2X and 4X rates. Broadstar 0.25G VC1604 was applied to 82 plant genera or species. Of these crops, 68 exhibited no or minimal transient injury after application at all three rates. One crop, *Sedum sp.*, exhibited phytotoxicity at the 2 X and 4X rates, but 13 species or genera need additional information to clarify crop response.

Fluopicolide Crop Safety

Fluopicolide was registered as Adorn 4SC in the United States in 2008 for control of Pythium, Phytophthora and downy mildew in ornamental plants. State registrations in California and New York occurred in 2010 and 2011, respectively. Adorn 4SC may be applied on container, bench, or bed grown ornamentals in greenhouses, lathehouses, shadehouses or outdoor landscapes, and on conifers including Christmas trees in outdoor landscapes. The commercial label contains a list of 22 ornamental plants exhibiting no or minimal injury. During 2008 to 2010, the IR-4 Project completed 76 trials on 38 ornamental plant species examining phytotoxicity related to drench and foliar applications of Adorn 4SC. In all trials except one, treated plants exhibited minimal or no injury to drench and foliar applications. Sufficient trials showed 9 species or genera exhibiting minimal or no injury. Of these, 3 are already on the Adorn label; *Acer palmatum, Begonia sp., Calibrachoa sp., Juniperus sp., Petunia sp, and Vinca sp.* are the six crops not yet listed. Based on this information, it is recommended that these be added to the list of tolerant plants on the Adorn 4SC label.

Fusarium Data Review

From 2001 to 2011, numerous products representing 24 active ingredients were evaluated in greenhouse and field trials as soil drench, foliar, in-furrow, drip irrigation or tuber soak applications against several *Fusarium* species causing rots (crown, stem and tuber rots) and wilt on ornamentals, and wilt and root rot on vegetables. *Fusarium* species tested included: *F. avenaceum, F. communi, F. oxysporum* and *F. solani*. Most trials were conducted on *F. oxysporum* on larkspur, lisianthus and watermelon. Although there were insufficient data for definitive conclusions, several relatively new products showed promising, though inconsistent, efficacy comparable to the standards. These include acibenzolar, Heritage (azoxystrobin), Compass (trifloxystrobin), Hurricane (fludioxonil+mefenoxam),

Insignia (pyraclostrobin), SP2169, Tourney (metconazole) and Trinity (triticonazole). BW240, (*Trichoderma harzianum & T. virens*), CG100 (organic acid), Pageant (boscalid+pyraclostrobin) and Palladium (cyprodinil+fludioxonil) provided no to mediocre efficacy. Proline (prothioconazole) provided consistently good control of *F. oxysporum* in watermelon trials. The established standards 3336 and Medallion generally provided inconsistent efficacy while Terraguard was effective in one trial.

Halosulfuron Crop Safety

Since 1995 IR-4 has completed 370 trials with products containing halosulfuron (Sedgehammer, Manage) on 276 crops. The data contained in this report was generated to expand the current SedgeHammer label to include both directed and over the top applications on certain plant species along with adding nursery production sites. The halosulfuron rates in the 2006 and 2007 testing program were 0.045, 0.09 and 0.18 pounds active ingredient per acre (lb ai per A) as the 1X, 2X and 4X rates. In 2008, 2009, 2010 halosulfuron rates were 0.031, 0.063, and 0.125 lb ai per acre; the lowest registered rate is 0.031 lb ai/A.

Of the 276 in-ground or container grown plant genera or species examined, 36 crops exhibited no or minimal transient injury after application at all three rates. Eleven crops exhibited no phytotoxicity at 0.045 lb ai per acre but did have some injury at the higher rates. Twenty four crops exhibited phytotoxicity at even the lowest rate.

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 2010, IR-4 examined 67 crops to expand this label to other crops, including several different fern species grown in field containers. Of these, 21 crop species exhibited no or minimal transient injury with 18 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.*

Liverwort Efficacy

Data in this report was generated to evaluate several products for post-emergent control of liverworts (*Marchantia sp*.). Liverworts are among the most serious weeds of container grown ornamentals. Classified as bryophytes these simple plants thrive on water and nitrogen for reproduction but can also survive long dry periods. The Society of American Florists ranked liverwort seventh in a national survey for worst nursery pests while Oregon regards it as No. 1. (Miller, Laura, Ornamental Outlook, *Liver What?,* 2007). During the 2004 and 2009, IR-4 Ornamental Horticulture Workshops, a project was prioritized to screen for efficacious products to manage post-emergent liverwort in container grown ornamentals grown primarily under cover in greenhouses or hoop houses, use sites with very few registered herbicides. This research was conducted across the United States in 1976, 2005, 2006, 2009 and 2010 to evaluate several registered products for liverwort control.

Treatments with proven effectiveness in multiple trials include Bryophyter (oregano oil) at 2% v/v, Greenmatch (d-limonene) at 20% v/v , Racer (ammonium nonanoate) at 5% v/v, Scythe (pelargonic acid) at 5-10% v/v, SureGuard (flumioxazin) at 0.375 lb ai/A, Tower (dimethenamid-p) at 3.0 lb ai/A, V-10233 (flumioxazin) at 10 fl oz/A, and WeedPharm (acetic acid) 20% v/v. In limited experiments, Broadstar 0.25G (0.25 lb/A), Ronstar 2G (4.0 lb ai/A) and EC (2 lb ai/A) and Showcase 2.5G (2.5 lb ai/A) also demonstrated good control. Contact type treatments such as Scythe and Bryophyter were fast acting but generally required more than one application to remain effective (>80% control) during the trial period. Treatments with unacceptable or inconsistent liverwort control include Champ, Freehand, Junction, Quicksilver, Sporan, Terracyte Pro, and Xeroton.

Mesotrione Crop Safety

From 2007 to 2010, IR-4 completed 124 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, seven 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. In 2010, the IR-4 Project complete 51 trials on 18 ornamental plant species examining phytotoxicity related to foliar applications of Tourney. In these trials, 9 species or genera exhibited minimal or no injury after foliar applications. Of these, 6 are already on the Tourney label; *Hemerocallis sp*., *Hydrangea sp.* and *Liriope sp.* are the three crops not yet listed. Based on this information, it is recommended that these be added to the list of tolerant plants on the Tourney 50WDG label. Four crops exhibited stunting: Begonia, Impatiens, Pansy, and Zinnia.

Oxyfluorfen + Prodiamine Crop Safety

In 2009 and 2010 IR-4 completed 47 trials evaluating Biathlon (oxyfluorfen + prodiamine) crop safety. The data contained in this report was generated to register uses of oxyfluorfen + prodiamine on and around ornamental horticulture plants with over-the-top applications. The rates tested were 2.75, 5.5 and 11.0 pounds active ingredient per acre (lb ai per acre) as the 1X, 2X and 4X rates. Biathlon was applied to nineteen plant genera or species. Of these, eight plant species exhibited no or minimal transient injury after application at all three rates. None of the tested crops in three or more trials consistently exhibited significant phytotoxicity at any rate. Eleven crop species require further testing.

PGR Effect on Shelf Life of Herbaceous Ornamentals

Potted plants like geranium and impatiens are typically grown in the warmer regions of the United States and require shipping to reach northern markets for sale to homeowners. Stresses such as darkness, temperature fluctuations and increased ethylene levels during shipment may accelerate plant senescence when they reach retail benches. Decreases in plant quality characterized by bud and flower drop, leaf yellowing and abscission, and greater susceptibility to stresses such as drought at retail locations are common problems resulting in considerable losses. Development and registration of plant growth regulators (PGR's) that help overcome shipping stress, and enhance shelf life quality are of great interest to the potted ornamental horticulture industry. At the IR-4 2005 Annual Workshop, evaluating products to enhance shelf quality and display life of potted ornamentals became a high priority project within the PGR discipline.

From 2006 through 2010, ten products representing six different active ingredients were tested for enhanced shelf life in potted ornamental species including potted geranium, impatiens, New Guinea impatiens, poinsettia and tulip. Six active ingredients 1) ABA, 2) 6-BA, 3) GA_{4+7}, 4) 6-BA + GA_{4+7}, 5) thidiazuron and 6) sodium silver thiosulfate were identified as promising for this research and compared to the standard 1-methylcyclopropene (EthylBloc). Some products (Configure) were in development for use on ornamentals while others (Argylene, MaxCel/Exilis Plus, Fascination/Fresco, NovaGib/Provide, TDZ) have been registered with the EPA for other uses.

The GA_{4+7} products generally were not phytotoxic to geranium and had some positive effects but increased height and peduncle length were unacceptable. Products containing 6-BA at 100 ppm caused significant injury on geranium which varied by cultivar. Limited testing on New Guinea impatiens and *Impatiens walleriana* suggests that ABA applications may improve days to wilting on select varieties. GA_{4+7} treatments to *Impatiens walleriana* increased flower number but caused stretch in both *Impatiens walleriana* and New Guinea impatiens. A single experiment involving TDZ treatments at 5 and 10 uM showed promise in improving geranium and poinsettia postharvest life although it delayed flowering in geranium. Limited testing with TDZ and Fascination (6-BA+GA_{4+7}+6-BA) suggest beneficial effects on *Tulip sp.* Results are not adequate at this time to consider registration of any of the products tested on any of the herbaceous species studied. Further research is needed to fine tune rates and test new products as they become available.

ATTACHMENT 9 – Continued

Pythium Data Summary

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 2010 on ornamental horticulture and vegetable crops. During this time period, numerous products representing 33 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 a 2010 Pythium efficacy project looked promising. These were Adorn, Disarm, Fenstop, Heritage and Pageant. V-10208 also looked promising. The phosphorus acids/phosphorus acid generators (Ari-Fos, Alude, K-Phite, Magellan, Phostrol or Vital) provided mix results. BW240 and CG100 were generally ineffective. The established standards Subdue Maxx and Terrazole/Truban generally performed well. Conversely, the registered biological products Companion/QRD 713, PlantShield/RootShield and SoilGard generally looked ineffective. The data from these trials suggest that the effectiveness of some fungicides in controlling Pythium root rot may vary, depending on the species of *Pythium* or crop.

Sulfosulfuron Crop Safety

Since 2005 IR-4 has completed 98 trials with sulfosulfuron (Certainty 75WDG) on 81 plant genera or species. The data contained in this report was generated to register uses of sulfosulfuron on and around ornamental horticulture plants with over-the-top applications. The sulfosulfuron rates in the testing programs were 1.25, 2.5 and 5 oz product per acre (0.0586, 0.117, and 0.188 lb ai per acre) as the 1X, 2X and 4X rates. Of the 74 plant genera or species tested, no crops exhibited no or minimal transient injury after application at all three rates in 3 trials. Three crops (*Armeria maritima, Buddleia sp,* and *Lavandula angustifolia*) exhibited minimal or transient injury at the lowest rate, but there was commercially unacceptable injury at the higher rates. For 12 crops, there was significant injury even mortality: *Agastache sp, Asclepias tuberosa, Clematis sp., Chrysogonum virginianum var austral, Cornus sericea, Helianthus sp., Juglans nigra, Lamium maculatum, Pseudotsuga menziesii, Quercus alba, Ruscus hypophyllum,* and *Viburnum dentate.* For the remaining crops, more trials are needed to determine response.

Thrips Efficacy

For the last 5 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 2006 through 2010, 57 products representing 48 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*).

Trifluralin + Isoxaben Crop Safety

In an effort to provide weed management tools to growers of a wide variety of nursery ornamental crops this research was undertaken to expand the three pre-emergent herbicide labels: Pendulum 2G (pendimethalin), Pennant Magnum (s-metolachlor), and Snapshot 2.5TG (trifluralin + isoxaben). This report covers only Snapshot 2.5TG. The rates chosen for this research were 2.5, 5, and 10 pounds active ingredient per acre (lb ai per A) as a 1/2X, 1X and 2X rates. From 2004 to 2010, IR-4 completed 386 trials on Snapshot 2.5TG. One hundred thirty seven different species were examined. Of these, 56 species exhibited no or minimal transient injury after application at all three rates. Eight crops exhibited no phytotoxicity at 2.5 or 5.0 lb ai per acre, but did have some injury at the higher rate of 10 lb ai per

acre. Twenty-one species exhibited phytotoxicity at the 5 lb ai per acre rate. For the remaining 52 crops, IR-4 would recommend generating additional data because either fewer than 3 trials were conducted or different locations exhibited different responses.

Triticonazole Crop Safety

Triticonazole was registered as Trinity 2SC in the United States in 2007 as a turf fungicide. Since that time it has been under development to expand to ornamental horticulture diseases. Because triticonazole is in the triazole class, it could cause symptoms similar to plant growth regulators and testing is warranted on additional herbaceous and woody ornamental species. In 2010, the IR-4 Project complete 51 trials on 18 ornamental plant species examining phytotoxicity related to foliar applications of Trinity 2SC. In these trials, 8 species or genera exhibited minimal or no injury after foliar applications. Based on this information, it is recommended that these crops (*Acer sp., Hemerocallis sp., Hydrangea sp., Liriope sp., Malus sp., Rhododendron sp* (azalea), *Rhododendron sp.* (rhododendron), and *Rosa sp.)* be added to a list of tolerant plants on the Trinity 2SC label.

ATTACHMENT 10- Biopesticide and Organic Support Program

Biopesticide Grant Proposals Funded 2011

Grant Stage—Early

- Field applications of MBI-203 for control of Colorado potato beetle and potato leafhopper in potato
- Development of Attract & Kill Systems for Brown Marmorated Stink Bug
- Evaluating Biopesticides for management of black root rot in established strawberry plantings
- Use of Bacillus mycoides isolate J (BmJ) induced resistance in management of Sclerotinia white mold of potato and integrated management of potato virus Y using Bmj, insecticides and rouging
- Improving the Efficacy of C-8 using the Gubler-Thomas Risk Index Model
- Toward the development of a microbial control strategy for Varroa mite

Grant Stage—Advanced

- Efficacy of CX-9090 for management of powdery mildew on cantaloupe
- Field-wide Oriental Beetle mating Disruption in Blueberries: A New, More Realistic Approach for its Control
- Refinement of Integrated Biofungicide Programs for Peach Brown Rot Control
- Evaluation of biopesticides for control of bacterial wilt on tomato
- Evaluating biopesticides for disease control in blueberries
- Use of GA3 to Increase Yield of the "Hass" Avocado: Demonstration of a Dose Response
- Control of wireworm in potatoes & watermelon
- Efficacy of Biofungicide Products at the Advanced Stage of Development for Foliar Diseases in Organically-Produced Tomato
- Efficacy of Biofungicide Products at the advanced state of development for downy mildew of basil
- Evaluation of X17-2 Papaya for Management of Papaya Ringspot Virus
- Biologically based alternatives for broadleaf weed control in turf and ornamentals
- Efficacy & Feasibility of Application of SolviNix LC (Tobacco Mild Green Mosaic Tobamovirus) with a Wet-Blade Mower for Integration with Mowing

ATTACHMENT 10 – Continued

Biopesticide Grant Proposals Funded 2011

Grant Stage—Demonstration

- Evaluation of SPLAT-MAT with Methyl Eugenol for Suppression of Oriental Fruit Flies (Diptera: Tephritidae) in Papaya Orchards

- Evaluation of biopesticides for the management of whitefly-transmitted Tomato yellow leaf curl virus in Tomato

- Demonstration of a biopesticide management program for western flower thrips control in greenhouse bedding plant production

- Efficacy of biofungicide products at the demonstration stage of development for foliar diseases in organically-produced tomato

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ATTACHMENT 10 – Continued

Biopesticide Registration Packages Submitted in 2011

Product	Crop	PR Number	TYPE	Registration Type
Bacteriophage of *Clavibacter michiganensis*	Tomato	0430B	Bateriacide	Amendment
Aspergillus flavus AF36	Pistachio		Fungicide	Amendment
Oriental Beetle Pheromone	Numerous crops	0240B	Insecticide	Amendment

Registrations Associated with Registration and Tolerance Packages Submitted to EPA

Pest Control Agent / Type*		Commodity or Crop Group	PR#	No. of Uses	No. of Tolerances
Bacteriophage of *Clavibacter michiganensis*	F	Tomato, tomatillo	430B	2	1
Aspergillus flavus AF36	F	Corn	378B	1	1

New Uses Supported by the Biopesticide Efficacy Grant Program

Active Ingredient	Crop	PR Number
Paciliomyces fumosoroseu	Cabbage	756B
	Turnip	756B
Chromobacterium subtsugae	Cabbage	755B
	Turnip	755B
	Potato	845B

FIFRA Section 18 -Seed Treatment Labels

- **Avipel Liquid for Corn** Louisiana, Michigan, Minnesota, Mississippi, South Dakota, Texas, Wisconsin, Florida, Vermont, Virginia
- **Avipel Dry for Corn** Louisiana, Michigan, Minnesota, Mississippi, North Dakota, South Dakota, Texas, Wisconsin, Maine, Utah, Deleware, Virginia
- **AV-1011 for Rice** Louisiana, Florida
- **Avipel liquid for Sunflower**- South Dakota

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