For over forty years, the IR-4 Project has been the major resource for supplying pest management tools for specialty crops by developing research data to support registration clearances.

Traditionally, agrichemical companies conduct only limited research on specialty crops. This results in few pest management options being labeled for specialty crop growers. In 1963, the Land Grant Universities recognized this need and established the IR-4 Project to provide a means for U.S. growers to have specialty crops included on chemical labels. The success of the IR-4 Project, with additional USDA funding, is proven and can be measured in its development of data to support nearly 20,000 food use and ornamental horticulture label clearances.

**Specialty Crops Include Most**

**Food Use**
- Fruits
- Vegetables
- Herbs
- Nuts
- Spices

**Ornamental Horticulture**
- Nursery
- Greenhouse
- Christmas trees
- Landscape
- Sod Farms

Even though these crops are classified low acreage, their value is substantial. They make up about 46% of U.S. agricultural crop production and $43 billion in sales.

Specialty crops are grown throughout the US and twenty-six states derive more than 50% of their agricultural crop sales from specialty crops.

**Priorities & New Technologies**

IR-4 uses an extensive stakeholder driven process to prioritize research to ensure that it is focusing on the most critical pest management needs of specialty crop producers. The priority setting process engages representatives from state and federal agricultural scientific communities, state extension systems, commodity and grower groups, the crop protection industry, food processors, and state and federal regulators.

Since 2000, over 80% of IR-4’s research effort has involved new pest management technologies with biosticides and lower risk chemistries.

This new technology effort is accomplished through a three pronged approach consisting of:
1) partnering with the agricultural chemical companies,
2) educating specialty crop stakeholders, and
3) partnering with the Environmental Protection Agency (EPA) to facilitate specialty crop registrations.

**IR-4 Working in Cooperation**

IR-4 recognizes that without access to new crop protection technologies, it cannot assist specialty crop growers. IR-4 scientists approach crop protection companies and encourage them to work with IR-4 on new product development strategies. This results in the companies including more specialty crops in their development plans. Often IR-4 and companies work collaboratively on new products. Companies develop supporting data on major crops and IR-4 develops data on specialty crops. Then the entire data package is submitted to the EPA. For the first time, specialty crop growers have access to new product technology at the same time as major crop growers.

**Partnering Brings Success**

IR-4 and the Environmental Protection Agency (EPA) formed the IR-4 / EPA Technical Working Group (TWG), which began in 1999 for the purpose of enhanced coordination. This cooperation has benefitted specialty crop growers and both organizations by allowing enhanced efficiency in data development and review.
The other aspect of IR-4's emphasis on new technology is the educational facet of providing the latest information. It became clear that with mergers and acquisitions, chemical companies were working with reduced staffs. Thus federal and state research / extension scientists were not always given the ability to test the newest products. IR-4 instituted a mechanism, through the publication of The New Pest Control Products/Transition Solutions List, to inform the public about the availability of new technologies. The goal of this publication is to help growers learn about new technologies to assist in the transition away from crop protection tools that are deemed vulnerable due to the Food Quality Protection Act (FQPA) and implement the new Reduced Risk products.

**The IR-4 Organization**

IR-4 operates as a unique partnership between the Land Grant University system and the USDA (ARS and CSREES) to accomplish its goal. The Headquarters staff is located at New Jersey’s Agricultural Experiment Station at Rutgers University, the USDA / ARS management is located at Beltsville, Maryland and the four regional staffs are located at the University of California / Davis; University of Florida / Gainesville; Michigan State University / East Lansing; and Cornell University / Geneva, New York. All of these units operate independently under the umbrella of the Project Management Committee (PMC).

The PMC meets three times a year to review the status of ongoing programs, develop operational budgets, develop strategic plans, and ensure that the program's overall goals are being met. Its members include, the IR-4 Executive Director, the four Regional Directors, the ARS National IR-4 Director, the Administrative Advisers (one for each of the four regions and the USDA / ARS Advisor), the USDA / CSREES IR-4 National Program Leader and the Chair of the Commodity Liaison Committee (CLC).

The CLC serves as a bridge between IR-4 and the growers of specialty crops to make sure that the program continues to focus on significant pest management problems. They provide guidance and advice and encourage their members, other commodity organizations and specialty crop growers to submit Project Clearance Requests (PCR’s) to define pest control problems needing IR-4 support. Another important CLC role is to support federal IR-4 funding and budget initiatives and to help secure other sources of extramural funding.

IR-4 Headquarters provides the overall program coordination with the various internal and external partners.

Regional Directors are responsible for the staff and programs in their regions, which are managed by Regional Field Coordinators (RFC), Regional Laboratory Coordinators (RLC) and Regional Quality Assurance Coordinators (RQAC). With an average of 100 residue projects, nearly 700 field trials, over 1,200 (in 2005) ornamental efficacy and crop tolerance trials and over 50 Biopesticide Program projects, the collaborative coordination of these projects and trials is remarkable. Yet, IR-4 does it and its success is evidenced by the results.
**IR-4 Accommplishments in 2005**

**IR-4 Food Use Program**

The IR-4 Project had an outstanding year in 2005 by obtaining 991 clearances for specialty crops. The EPA continues to review and grant decisions on a large number of IR-4 data submissions, which accounted for more than 50% of the EPA new uses for existing products approved between 2001 and 2005. Since 1963, IR-4 food use data have contributed to the approval of over 9,300 registrations.

In 2005, IR-4 implemented new procedures resulting from the Pesticide Registration Improvement Act (PRIA) of 2004 (Fee for Service), the EPA issued their multi-year workplan (http://www.epa.gov/opprd001/workplan/newuse.htm). The plan projects that IR-4 has 154 reports scheduled for review in 2006. Overall the EPA should be maintaining 50% of its overall workplan related to the number of IR-4 new uses.

Additionally, the 2005 annual IR-4 stakeholder priority setting Food Use Workshop drew a record attendance of over 200 stakeholders who worked together to define high priority needs for the 2006 specialty crop research program.

**IR-4 Biopesticide Program**

The primary objective of the IR-4 Biopesticide Research Program is to further the development and registration of biopesticides for use in pest management systems for specialty crops or for minor uses on major crops.

IR-4 data supported 39 new biopesticide food uses for eight products. These included: *Reynoutria sachalinsensis* on all food commodities for 28 new food uses; *AgriPhage* on Tomato and Pepper; *Polyoxin-D* (Endorse) on Ginseng; *Bacillus subtilis* (Serenade) on Horseradish; *Psuedomonas syringae* (Bio Save ESC11) on Sweet Potato; *Muscodor albus* (Arabesque) on orange, cherry, and grape; *Paecilomyces lilacinus* strain 251 (MeloCon) on Tomato and pepper; and *Alternaria destruens* Strain 059 (Smolder) for control of Dodder (*Cuscuta* spp.) in cranberry. The biopesticide program also funded 56 efficacy projects, several of which were co-funded by the EPA. Many of these products are important to the organic market.

**Pilot Efficacy Program**

In 2005, IR-4 funded a pilot efficacy program to identify potential products that effectively managed the target pests, *thrips* in onion and *Phytophthora capsici* in squash and pepper.

For onion thrips, treatments were identified and cooperators enlisted for efficacy evaluations in many onion production regions. One product, formetanate hydrochloride, was identified as extremely efficacious by all cooperators and will be a high priority residue study in 2006.

To assist in learning more about *Phytophthora capsici*, IR-4 sponsored a *Phytophthora capsici* Workshop that brought together scientists who identified trial strategies to fight this disease.

Additionally, the program identified potential non-phytotoxic herbicides for *leafy vegetables* and *herbs*.

**IR-4 Ornamental Horticulture Program**

In 2005, IR-4 conducted over 1,200 ornamental horticulture research trials to support registrations in the greenhouse, nursery, landscape, Christmas tree, and forestry industries. Of these, 186 were efficacy trials focusing on tools to manage insects and mites; 224 were efficacy trials with fungicides; 8 were plant response trials for plant growth regulators; and the remaining trials were conducted to determine the level of phytotoxicity to crops with herbicides used to manage common weeds in and around nurseries.
The current EPA Crop Grouping Regulations include 500 specialty crops. As a result of the IR-4 Crop Grouping project, the EPA will increase that number to at least 1000, increasing the number of specialty crops that will be considered in each IR-4 petition submission.

Through the effort of the International Crop Grouping Consulting Committee (ICGCC), which consists of over 170 members representing over 30 countries, a number of crop group petitions were submitted to the EPA in 2005, among those, bulb vegetables has been approved and the EPA is reviewing several others.

To bring the new crop groups to final federal approval and publication, IR-4 worked with the EPA to develop a rule making process; a Regulation Workgroup will be formed within the EPA/OPP in early 2006.

In September, 2005, IR-4 facilitated the first ICGCC meeting to discuss world harmonization of crop classification. Nine countries were represented. As a follow up to this meeting, representatives from the IR-4/EPA Crop Grouping Working Group and the CODEX Revision Workgroup met in the Netherlands to discuss technical issues about the cooperation between the US and the CODEX crop classification revision projects. Members developed a five-year harmonization work plan, which will be presented in the CCPR (CODEX Committee on Pesticide Residues) annual meeting in April 2006.

Methyl Bromide Alternatives

IR-4 has begun to reduce its role in the Methyl Bromide Alternatives Programs since methyl bromide has officially been phased out and is being used only with approved critical use exemptions (CUE’s) in commodities where acceptable methyl bromide alternatives are not in place.

In 2005, IR-4 facilitated support for products that have been accepted for registration by the EPA. They included Basamid (dazomet) for strawberries and tomatoes and a new product registration for post harvest protection of stored spices, nutmeats, in-shell nuts, cocoa and cocoa beans, Propoxide 892 (propylene oxide/carbon dioxide mix 8:92%).
The U.S. Land Grant System supports IR-4 with grants of approximately $0.5 million and in-kind funding valued at over $10 million annually. They provide: four GLP Laboratories, 25 research farms, offices, infrastructure and administrative support and expertise. IR-4 could not operate effectively without this support.

The IR-4 / EPA Technical Working Group (TWG) was initiated in 1999 for the purpose of meeting quarterly to explore initiatives that facilitate specialty crop registrations. The TWG provides a means for the EPA to review the annual IR-4 residue program and discuss data evaluations and summaries that are prepared for final reports. The TWG has also taken a leadership role with the Agency on electronic petition submission and IR-4 plans to submit all of its petitions to the EPA electronically in 2006. Using electronic submissions could reduce the EPA's resources for reviewing IR-4 data by 35%.

IR-4 and Agriculture and Agri-Food Canada (AAFC) are cooperating jointly in generating data on specialty crops and are recognized as members of the North American Free Trade Agreement (NAFTA) Technical Working Group (TWG) on Pesticides.

In the past six years, IR-4 supported over 4,450 new uses that were registered in the U.S. but only a few of these uses were made available to Canadian growers. The recognition of cooperative projects allow the EPA and Canada's Pest Management Regulatory Agency to simultaneously review and accept submissions.

The partnership between the IR-4 Project and the Canadians began in 1996 and over the past nine years has contributed to 91 cooperating projects involving 207 joint residue trials conducted in Canada. Members of the AAFC Pest Management Centre have been active participants in annual IR-4 Food Use and Ornamental Horticulture Workshops and National Research Planning Meetings.

In February 2005, over 150 researchers, commodity representatives, and industry personnel participated in a Strategic Planning Conference to discuss their needs and share inputs in helping IR-4 consider its strategic direction. Recommendations from this Conference played a major role in helping the IR-4 PMC put together a Strategic Plan for 2006-2008, which includes new initiatives for Seed Technology, Aquatic Herbicides and a Global Specialty Crop Program.

This has been approved as a new program initiative with additional acquired funding. Aquatic weeds, particularly non-native invasive species, are serious threats to the natural and production-based ecosystems in the U.S. They have become a major national problem, as key waterways (rivers, reservoirs, canals, etc.) are interconnected, traversing political boundaries throughout the country, and allowing for convenient avenues for movement of aquatic weeds. The proliferation and continued spread of these weeds restricts water movement in flood control and irrigation canals, increases sedimentation rates in reservoirs, reduces biodiversity, threatens endangered species (plants and animals), degrades water quality, increases mosquito breeding habitat, and causes major economic losses to agriculture, recreation, fisheries, electric power generation, and property values. Faced with the threat of a growing national aquatic weed problem and with few practical solutions on the horizon, the Aquatic Herbicide Working Group is collaborating with IR-4 to discuss the serious need for new products. This new program initiative will expand the IR-4 Project mission to include weed control in irrigated canals and other aquatic sites.

In 2005, and with industry funding, IR-4 began seed technology research in Brassica vegetables and cucurbits in Washington and California (Phoma spp. control in crucifers), and cucumber beetle control on cucurbits in North Carolina, New York, and Ohio. Studies will continue in 2006 with multiple pest control products in Texas-grown onions, carrots, radish and cabbage, as well as control of insects in spinach, collards and other Brassica vegetables in Arkansas, Tennessee, and Virginia. Additionally, a number of tests which target plant parasitic nematodes in tomato, pepper and cucurbits will be run in Florida, Alabama, and possibly other locations. Efforts will also focus on the support of special labeling to address immediate pest control needs in the Pacific Northwest (24 C label for thiabendazole to control Black Leg) and Section 18 emergency use for clothianidin to control onion maggot.
Global Specialty Crop Program

As IR-4 registrations increase, new minor use problems begin to emerge. Although U.S. growers have access to newer, lower risk pest management products, many are reluctant to use them due to international trade barriers that are created from the lack of Maximum Residue Limits (MRL’s) being established for these new products in countries where they export their crops. Unfortunately, in many cases, U.S. growers are still using the older, less environmentally friendly pest management products on commodities that will be shipped abroad. Therefore, it is critically important that global MRL’s and registrations be established, rather than segmented country by country. Global registrations are needed to level the playing field for U.S. specialty crop growers who wish to export their crops. They will also promote the use of the new, safer products which will be integrated more rapidly into production systems thus providing even greater protection for applicators, consumers and the environment.

Recognizing this need and considering the work IR-4 has already contributed to international concerns, IR-4 is uniquely positioned, with its expertise in both specialty crops and partnerships, to manage a Global Specialty Crop Initiative. This initiative could also play a major role in assisting with international reviews for JMPR (Food and Agriculture/World Health Organization Joint Meeting on Pesticide Residues) or by participating more actively on CODEX and OEDC (Organization of Economic Cooperation and Development) committees. This Global initiative would enhance global registrations and reduce trade barriers, while at the same time further promote the use of new, safer pest control products.

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