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

Newsletter

Vol. 44 No. 2 Spring 2013

Celebrating 50 Years in Washington, DC

Over 100 people gathered at the Washington, DC offices of McDermott Will & Emery, to celebrate the IR-4 Project's 50th anniversary. The event, sponsored by the Minor Crop Farmer Alliance and the IR-4 Commodity Liaison Committee, included congratulatory speeches from Congressman Sam Farr (CA & Ranking Member of House Appropriations Agriculture Subcommittee); USDA-National Institute of Food and Agriculture, Director, Dr. Sonny Ramaswamy; USDA-Agriculture Research Service Administrator, Dr. Edward Knipling; US Environmental Protection Agency Acting Assistant Administrator for the Office of Chemical Safety and Pollution Prevention, Mr. Jim Jones. These and other individuals provided reflections about their interactions with IR-4.

Endorsing IR-4's efforts, Congressman Farr stated, "IR-4 is a tremendously important program because it helps provide the research that EPA needs in order to make more crop protection products available to specialty crop growers. The work of IR-4 helps our growers produce safe, healthy, fruits, vegetables, flowers, and all of the other specialty crops that are so important to U.S. agriculture."

California is the country's leading specialty crop producing state. California's fruit and vegetable industry annually produces about $17 billion worth of crops for domestic and export markets. Ornamental crops add another $3.3 billion. The Central Coast tri-county region that Congressman Farr represents grows more crops than any single state. He continued, "Being able to grow healthy crops, free of pest damage, is critically important to growers in California and throughout the country. I want to assure you that we on the Ag Appropriations Subcommittee understand the importance of IR-4, and will continue to support its efforts."

Dr. Sonny Ramaswamy offered congratulations and commented, "I have a long history of working with IR-4. On behalf of USDA, we've had a very long relationship. It's good to be a part of this wonderful team. The partnership between USDA and everyone affiliated with IR-4 has helped add almost $7.5 billion to our nation's GDP and created about 110,000 jobs. It's about food security and improving the economy. I want to congratulate everyone here on the 50th anniversary. It's tremendous to be a part of it, and thank you for letting me be a part of it as well."

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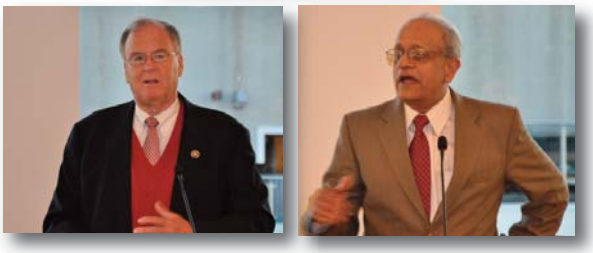

Congressman Sam Farr, CA (left) and USDA-NIFA Director, Sonny Ramaswamy congratulate IR-4 on its successful history and shared their visions for the future of specialty crop agriculture and IR-4.

Inside this issue...

Washington

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Mr. Jim Jones recounted his involvement in the longtime relationship between EPA and IR-4, "Being with the IR-4 community always brings a smile to my face. It's because of the strong partnership. The entire community of IR-4, USDA, EPA, and the user community recognized a long time ago that if we were going to get something done we were going to have to work together. We all want affordable, safe, and abundant food. We were able to move the ball forward in getting approvals for products, which has benefited the growers who use them. To this day, I have yet to work with an institution that fundamentally understands the meaning of partnerships like the team at IR-4. You need to solve difficult problems together. By working with the team at IR-4, they've done that over and over again. The success stories speak for themselves. It's been an amazing experience working with an institution that understands what partnership means. It's something I applaud IR'4s leadership past and present for, and I know we will see that partnership continue to deliver in the future."

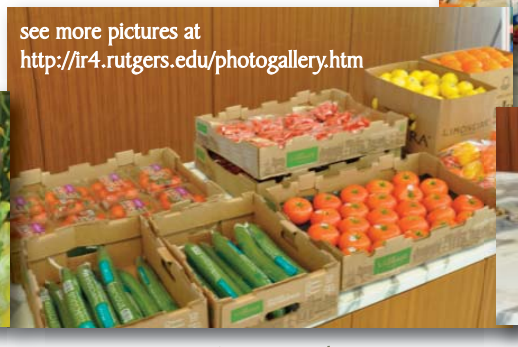
Dr. Edward Knipling also congratulated IR-4 on its 50th year and remarked on the outcomes of IR-4 and its long and successful relationship with the USDA-ARS Minor Use Program. Working together, the two partner programs are providing the much needed pest management tools for both food and ornamental crop growers.

Florida Fruit and Vegetable Association Vice President of Industry resources, and Minor Crop Farmer Alliance Chair, Dan Botts, commented on IR-4 stating, "It has been my privilege to work with IR-4 for over thirty years, through four executive directors and seeing the program spread its wings to become an integral and critical program working for specialty crop producers. The specialty crop industry and my membership owe a debt of gratitude to the persistent dedication to quality research and successful advocacy that is a corner stone of this program. I look forward to another 50 years of success."

IR-4 Commodity Liaison Chair and Pleasant Valley Gardens owner, Rich Bonanno talked about the value of IR-4 to the hundreds of specialty crop commodities in the United States. Being the owner of both ornamental nurseries and produce farms, Rich has a unique perspective on how pests can travel from ornamental plants to agricultural crops and understands first-hand how growers count on IR-4 research to help them navigate pest problems.

Many of the commodity groups which IR-4 supports contributed edible displays of tomatoes, cucumbers, peppers, cranberries, mints, nuts, and mushrooms along with a display of various dry peas and lentils and SAF, which represents ornamental horticulture growers, provided flower arrangements for every table. Guests were encouraged to "shop" among the displays and take the fresh produce home to their families.

IR-4 Executive Director, Jerry Baron, stated, "Our economy and quality of life have been improved by the efforts of IR-4, but the story doesn't end at fifty years; as pests become resistant and new pests emerge from other countries, newer technologies will need research. IR-4 is looking forward to the next fifty years of helping specialty crop growers continue to fight pests to protect their valuable commodities."



see more pictures at
http://ir4.rutgers.edu/photogallery.htm

Celebrating 50 Years at Rutgers University SEBS

On April 16, 2013, the IR-4 Project (IR-4) celebrated a milestone by hosting its 50th anniversary at the Rutgers University School of Environmental and Biological Science (SEBS).

IR-4 was established by the USDA and the State Agricultural Experiment Station Directors in 1963 to provide state-of-the-art pest management tools for specialty crops.

IR-4 began as a two person operation at Rutgers funded by the USDA with $25 thousand and has grown to a national program with 125 employees and direct funding of $18 million annually. Including the valuable resources of dedicated research plots, analytical laboratories, and office space, IR-4 estimates its in-kind support from Land-Grant Universities, EPA, Canada and industry to be equal to the direct support of $18 million, making its annual operating budget at over $36 million.

During the celebration, The Cranbury Institute's Horticulture Advisor, John Wilson, gave a presentation discussing the importance of IR-4 to specialty crop growers. "IR-4's research provides data for approval of newer and safer insecticides, herbicides and fungicides," he noted, and then reminded the audience that "this research also enables emergency exemptions that reduce crop loss." Wilson recognized IR-4's partnership with Canada that has helped ease trade restrictions for the cranberry industry.

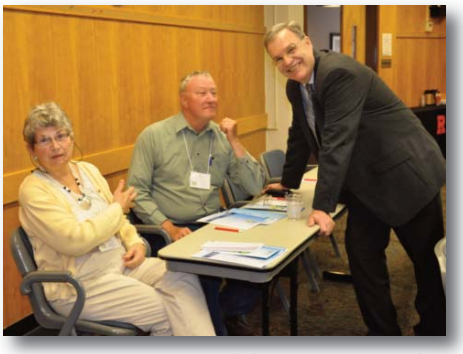
The Cranbury Institute's John Wilson discusses the importance of IR-4 to specialty crop growers.

USDA National Institute of Food and Agriculture (NIFA) Deputy Director Ralph Otto PhD., along with SEBS Executive Dean, Robert Goodman, congratulated IR-4 on its success over the years. "When looking at the next fifty years," Otto said, "increased population density will lead to higher rates of disease transmission, which positions IR-4's Public Health Pesticide Program very well for the future."

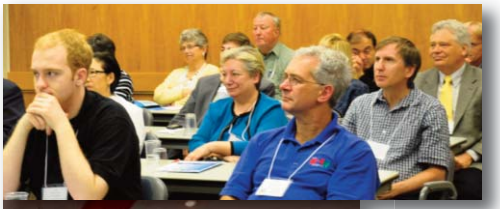
In recognizing IR-4's strengths, Otto talked about IR-4's strong relationship with its allies and their willingness to fight for IR-4 in the political arena. Going forward, Otto challenged IR-4 and those in attendance to look at and engage another untapped ally, the 50 million 4-H alumni throughout the United States who are very active in promoting agriculture in local, national and international venues.

In his concluding remarks, Otto acknowledged IR-4's greatest strength -- its people, including those at IR-4 headquarters, its regional leadership teams and its "advocates extraordinaire", specialty crop producers and other stakeholders, who all help IR-4 accomplish its mission of facilitating registration of sustainable pest management technology for specialty crops and minor uses.

RU SEBS Executive Dean, Robert Goodman congratulates IR-4 on its 50 years.



NIFA Deputy Director, Ralph Otto reunites with his own RU PhD advisor, Jim Applegate and Jim's wife Carol.

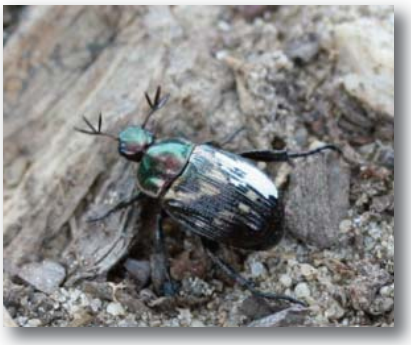


The festivities began with a seminar about IR-4's history and successes and was followed by a light reception featuring a cake with the IR-4 50th anniversary logo.

Oriental Beetle Mating Disruptio Among IR-4, Unive

— by Cesar Rodriguez-Saona, Dean Polk, Rutgers

Oriental beetles are invasive pests, probably native to the Philippine Islands. In the northeast US, it was first detected in Connecticut in 1920, and since then it has become an important pest of turf, ornamentals, and several food crops in the region, including blueberries. The larvae can cause considerable damage by feeding on the roots of plants. Application of traditional chemical insecticides against this pest may be expensive, and susceptibility of grubs to



Oriental beetle male

pesticides decreases with age, whereas damage potential increases. At the present time only imidacloprid is labeled for use against oriental beetle grubs in food crops. Repeated spraying of insecticides may promote insecticide resistance, reduction of natural enemies, and secondary pest outbreaks.

The major component of the oriental beetle sex pheromone was identified in 1993-1994 as ketone (Z)-7-tetradecen-2-one. The identification of the female sex pheromone of the oriental beetle has made possible research into the development of pheromone-based management strategies, most notably mating disruption.

In many insects, including the oriental beetle, sexually receptive females attract males by emitting a chemical signal, or sex pheromone. By following the pheromone plume gradient, a male may eventually get close enough to the calling female to find her; at closer distances, visual as well as olfactory cues may be involved.

In 1998-1999, research on oriental beetle mating disruption was initiated by Dr. Sridhar Polavarapu (Rutgers University) at the P.E. Marucci Center. Dr. Polavarapu first tested a microencapsulated formulation of the pheromone for mating disruption of the oriental beetle. However, the fact that the oriental beetle pheromone is a ketone, restricted its use of sprayable formulations in food crops. Ketones, unlike other pheromone chemistries (e.g., alcohol, aldehydes, or acetates), do not have tolerance exemptions.

In 2002-2003, Dr. Polavarapu and colleagues, working with AgBio, Inc. and ChemTica Internacional (distributing and manufacturing companies), tested retrievable dispensers to disrupt oriental beetle mating. The efficacy of mating disruption in these trials was typically evaluated by measuring "trap shut-down" (the decrease in captures of males in pheromone traps in pheromone treated plots relative to control plots), and decrease in mating rates of tethered virgin females deployed in the field.

In blueberry field trials, not only were pheromone trap captures and mating rates reduced on pheromone-treated plots, but at the end of a season of pheromone treatment, the number of grubs collected from the root zone of blueberries was reduced significantly as well. These early studies found the dispensers to be effective at disrupting oriental beetle mating when deployed at 50-75 g AI/ha.

on: A Successful Collaboration
ersity, and Industry

s University, Erik Wenninger, University of Idaho

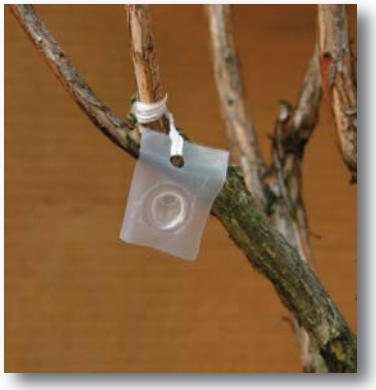
In 2005-2008, we subsequently tested reduced pheromone rates of 2.5-5 g AI/ha to make costs of mating disruption more affordable while maintaining efficacy. Dr. Polavarapu's and our studies on oriental beetle mating disruption were supported by IR-4 beginning in 2001.

The IR-4 Project biopesticide program has funded oriental beetle research on ornamentals and turf as well.

Mating disruption of insect pests relies on saturation of a target area with synthetic sex pheromone to negatively affect male orientation to calling females. The goal is to disrupt communication between the sexes, thereby preventing males from finding and fertilizing females, which should ultimately lead to lower pest densities. The means by which treatment with synthetic sex pheromone interferes with normal orientation behavior are still poorly understood for most insects, but the likely mechanisms include

(1) sensory fatigue,
(2) competition between point sources of pheromone and females (competitive attraction),
(3) camouflaging of the female's pheromone plume.

AgBio bubble for oriental beetle mating disruption in a blueberry field. The bubble releases synthetic oriental beetle sex pheromone.



Retrievable AgBio dispensers

In a project funded by IR-4 (2008-2009) we recently determined that, at least with low-dose dispensers, mating disruption for oriental beetle works by competitive attraction as the behavioral mechanism of disruption; thus, increasing the density of dispensers per hectare (acre) will provide better disruption. More recently (2011), IR-4 has funded a project to evaluate "field-wide oriental beetle mating disruption in blueberries: a new, more realistic approach for its control."

Mating disruption for the oriental beetle shows promise across a range of systems, including blueberry, cranberry, turf, and ornamentals. Several factors contribute to the strong potential of successful mating disruption of the oriental beetle. First, the pheromone blend used for oriental beetle is simpler than that required for many moths, i.e., a single component. Second, female dispersal is limited, so the possibility of immigration of mated females onto a site undergoing mating disruption treatment will likely be small. Third, most males may be able to mate at most only once per evening, so the ability of a few males to fertilize a large number of females is limited. Finally, work in blueberry has demonstrated successful disruption with extremely low application rates, as indicated above. This makes the cost of mating disruption for the oriental beetle comparable with using insecticides, and should increase the likelihood that mating disruption will be developed as part of an integrated approach to pest management in blueberry and in other systems.

IR-4 also prepared and submitted the pheromone registration and tolerance exemption package to EPA. These efforts are the result of a productive collaboration among IR-4, university personnel, and industry.

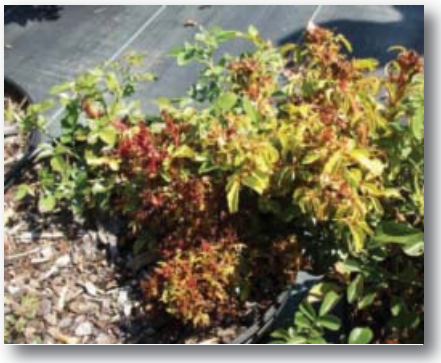
In May 2012, we received news from Dr. Jan Meneley (president, AgBio Inc.) that the retrievable dispensers for mating disruption of oriental beetle had become commercially available.

This is great news for our growers, and will likely reduce insecticide use and its associated environmental impacts, while maintaining control of oriental beetles.

Rose Rosette Disease

— by Cristi Palmer, IR-4 Ornamental Horticulture Manager

It is not often that virus diseases actually kill their host plant. Rose Rosette Disease (RRD) does. Infected roses can die within two years, but in many cases infected roses can live for several years and serve as a source of the disease for surrounding plantings. This disease was first observed in the Rocky Mountains in the 1940's, but RRD was only recently described as being caused by a double-stranded RNA virus in the Emaravirus group. This virus is vectored by and can replicate within the eriophyid mite, *Phyllocoptes fructiphilus*, which further complicates RRD management – since eriophyid mites are notoriously difficult to manage with biological or chemical tools – because, once infected, a mite can continue to be a vector throughout its life.



Symptoms of Rose Rosette Disease: Witches' brooms and small distorted leaves. *Photos on this page courtesy of Star Roses and Plants.*

It is suspected that both the virus and vector are native to the western U.S. and that RRD only blossomed into a major disease with the introduction of *Rosa multiflora* after the Second World War. At the time, those introducing this non-native rose had the best of intentions: to deter soil erosion and to create natural green fences for livestock. However, song birds readily ate the rose hips and quickly spread multiflora rose far from the original plantings. This rose is now considered a noxious weed species throughout the U.S. and has contributed to shifts in understory flora in unmanaged areas. Since multiflora rose is not native to the U.S. and RRD has only been observed on the North American continent, it is also possible the eriophyid mite hitchhiked along unnoticed and then fed upon infected native roses. Since the 1940's, RRD has slowly spread east and in recent years has been discovered in the New England states.

In addition to being vectored by *P. fructiphilus*, this virus is suspected of moving through stem grafting during production and naturally formed root grafts between adjacent roses.

If RRD was restricted to multiflora rose, there would be little concern about this disease. While rose appears to be the only susceptible ROSACEAE host, most members of the genetically complex modern rose are susceptible to RRD as are numerous rose species. *Rosa bracteata* is the notable exception. Part of the restricted host range for RRD is more than likely because *P. fructiphilus* feeds solely on rose species.

Symptoms of Rose Rosette Disease: Leaf reddening and rapid stem elongation.

As RRD has spread through multiflora rose populations, rose growers and aficionados have become more concerned about preserving and maintaining roses for residential, commercial, and public enjoyment. On April 15 and 16, 2013, Star Roses and Plants and Conard-Pyle hosted an RRD Summit where about 100 propagators, growers, retailers, researchers, regulators and members of allied industries came together to share information and create a multi-partite effort to better understand this disease and develop management strategies. In order to implement these strategies, a cross-functional team was formed to study RRD and communicate new management strategies to growers, landscape managers and homeowners. The team, led by Joe Bischoff from the American Nursery Landscape Association, will facilitate further research and information dissemination in an effort to bring solutions in managing this troubling disease.

Compton/Markle Award Winner, Paul Frandsen

— by Paul Frandsen

2013 Compton/ Markle Award Winner, Paul Frandsen with his advisor, Dr. Karl Kjer.

As a 3rd year PhD student in the Rutgers Department of Entomology. I am currently serving as the Graduate Entomology Student Association President. Through service in this capacity, I have been presented with wonderful opportunities for interaction with faculty members representing the students in the monthly faculty meeting and as the contact person for outreach opportunities. Many of these opportunities include teaching young children to appreciate insects and biology. These experiences are among the most rewarding of the various activities I've participated in as a PhD student. I have been in charge of planning the Rutgers Entomology booth at Ag Field Day, an annual event on Rutgers' Cook Campus, the last two years.

My current research is focused on the phylogenetics and historical biogeography of caddisflies (Order: Trichoptera). I also have an interest in computational methods and bioinformatics analysis. Through use of new molecular sequencing technologies, we are in the process of gathering several hundred genes for several hundred caddisflies, representative of the diversity within the order, to unravel the trichopteran tree of life.

Associated with this project are interesting questions to answer about biogeography and how current distributions have been shaped by historical events. I enjoy traveling and have had opportunities to collect caddisflies in Mongolia, Russia, Guyana, and throughout the United States.

I enjoy sharing my love of entomology and biology with others through teaching. I have presented lectures on phylogenetics software in Rutgers classes and have taught in an invited workshop at the 14th International Symposium on Trichoptera in Vladivostok, Russia on the preservation and analysis of DNA and RNA in caddisflies. I'm currently collecting and preparing materials for a course this summer on Trichoptera taxonomy and DNA barcoding to be co-taught with my adviser, Dr. Karl Kjer.

The concept of this award is to recognize outstanding achievements by NJ students in the field of entomology, based on applicants' research accomplishments, academic and teaching achievement, papers and seminars presented, involvement in departmental affairs, and other independent entomological activities. Professors Compton and Markle were long-time employees with IR-4 and made lasting contributions to its programs.

The IR-4 Newsletter Vol 44 No. 2 Spring 2013

The IR-4 Newsletter is published quarterly for distribution to cooperators in our partner State/Federal/Industry research units, State and Federal officials, commodity groups, and private citizens. Material from the IR-4 Newsletter may be reproduced with credit to the publication. Major funding for IR-4 is provided by USDA-NIFA and USDA-ARS in cooperation with the State Agricultural Experiment Stations. New Jersey Agricultural Experiment Station Publication No.P-27200-13-02, supported by state, US Hatch Act, and other USDA funds.

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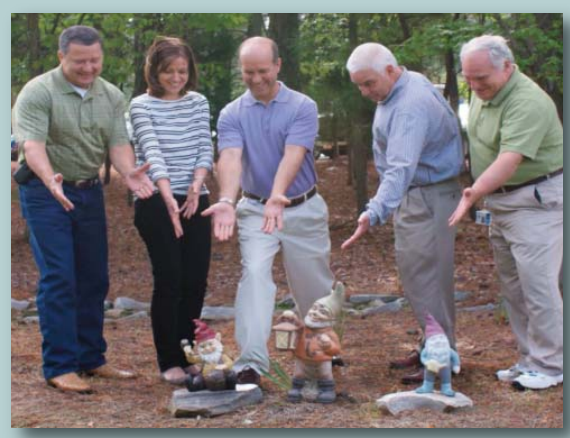
Special Dedication & Tolerances



BASF acknowledges IR-4 with a special Gnome for their garden. L - R, Tommy Wofford, BASF's IR-4 Coordinator, Charlotte Sanson, Registration Group Manager; Craig Kleppe, Registration Manager; Ted Bardinelli, Biology Project Leader, fungicides & John (Bubba) Harden, Biology Project Leader, herbicides.

Gnome Dedication

BASF acknowledged IR-4's 50 years of service to specialty crop agriculture by dedicating a new gnome to the existing gnome garden in North Carolina. This gnome was also dedicated to Ag Canada's Pest Management Centre for their 10th anniversary. The history of the BASF Gnome Garden started several years ago when the first gnome was dedicated to IR-4's efforts on pendimethalin registrations. A second gnome was given to honor IR-4 when the second wave of pendimethalin registrations were received. Now the third gnome joins his friends. Many thanks to BASF for this kind acknowledgement.

IR-4 Successes Feb. - Apr. 2013

The trade names listed below are provided as a means to identify the chemical for which a tolerance has been established. A trade name listed here may not be the name of the product on which the new food use(s) will be registered. Only labeled products may be used on a food crop. Be sure to obtain current information about usage regulations and examine a current product label before applying any chemical.

Federal Register: Feb. 6, 2013, Thiacloprid,
Trade Name: Calypso, **Crops:** Stone fruit group 12-12 (separate subgroup tolerances) **PR#:** 07811, 07812, 08038

Federal Register: Mar. 6, 2013 Fenpyrazamine,
Trade Name: These uses have not yet been registered; no trade name has been established, **Crops:** Bushberry subgroup 13-07B, Caneberry subgroup 13-07A, Ginseng, Pistachio
PR#: 09445, 09444, 09453, 09452

Federal Register: Mar. 27, 2013 Emamectin benzoate,
Trade Name: Proclaim, **Crops:** Cucurbit vegetables group 9
PR#: 06987, 08939, 08940, 08941

Federal Register: Mar. 29, 2013 Clothianidin,
Trade Name: Arena, **Crop:** Tea, Pepper (higher tolerance than previously established in order to support shorter PHI)
PR#: 10876

Federal Register: Apr. 5, 2013 Flumioxazin,
Trade Name: Chateau, Valor, **Crops:** Globe artichoke, Cabbage, Chinese napa cabbage (tight-headed varieties), Olive, Pomegranate, Prickly pear cactus
PR#: 09815, 09519, 08670, 08671, 08647

The IR-4 Project

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• University of Florida • Michigan State University

USDA United States Department of Agriculture
National Institute of Food and Agriculture
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Major funding for IR-4 is provided by Special Research Grants and Hatch Act Funds from USDA-NIFA , in cooperation with the State Agricultural Experiment Stations, and USDA-ARS.

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