The IR-4 Project
Providing Safe and Effective Pest Management Solutions for Specialty Crop Growers

Newsletter

Vol. 36 No. 2 April 2005

Did You Know

IR-4 Receives Award for Biopesticide Registration Efforts

The IR-4 Project was recognized for its assistance in the registration of AF36 by Mr. Larry Antilla, Director of the Arizona Cotton Research and Protection Council, on March 2, 2005. An individual award was presented to Dr. Michael Braverman in addition to an award presented to Dr. Robert Holm on behalf of the IR-4 Project. The awards were presented at the 61st annual meeting of the Arizona Cotton Research and Protection Council in Casa Grande, Arizona.

AF36 was discovered and developed by Dr. Peter Cotty of USDA-ARS in Tucson, Arizona. Most fungi known as *Aspergillus flavus* cause the production of a toxin known as aflatoxin. AF36 is an isolate of the naturally occurring organism *Aspergillus flavus* that does not produce aflatoxin. When AF36 is applied in cotton fields it displaces the toxin producing *Aspergillus flavus* present in the soil, thereby reducing the presence of the mycotoxin in cotton seed and the environment.

The Arizona Cotton Research and Protection Council, a growers organization, manufactures, and distributes AF36 to fellow growers in Arizona and Texas. The registration has also been expanded into the Imperial Valley region of California. IR-4 is primarily involved in specialty crops, but is also involved in minor uses on major crops. For this project, IR-4 developed the registration package and was a consultant to the Arizona Cotton Research and Protection Council in their petition submission to EPA. There are currently no conventional products used to manage the aflatoxin producing fungi, therefore, this biopesticide represents a new tool for growers.

Information Exchange

What is a PCR — Project Clearance Request?

by Stephen Flanagan, Western Region Assistant Field Coordinator

Google PCR and what do you get? Among roughly nine million other items, you'll get a treatise on Polymerase Chain Reactions — the integral technology of modern genetic research. But wait… we're aggies and though a few of us may have lab rat, gene jockey heritage buried deep in our curricula vitae, chances are when we talk about PCR's it's not this one.

The IR-4 version of a PCR is the starting block for an IR-4 specialty crop project. In our case, PCR refers to Project Clearance Request and is submitted by either specialty crop growers, extension experts, or commodity groups. So, we're *continued on page 3*

Inside this issue...

Clearances December 2004-February 2005

Product: Thiamethoxam (I)
Trade Name: ACTARA, PLATINUM, CRUISER
Crops: Vegetable, root, except sugar beet, subgroup 1B, Potato,Vegetable, legume, group 6, Mustard, Bushberry subgroup 13B, Juneberry, Lingonberry, and Salal, Cranberry, Strawberry, Mint, Borage, Crambe, Flax, Rapeseed, and Safflower,
Federal Register: January 5, 2005
PR#: 7051, 7362, 7428, 7467, 7468,7590, 7615, 7617, 7675, 7676, 7677, 7678, 7679, 7754,7989, 8026, 8618, 8642, 8893

Product: Abamectin (Avermectin) (I)
Trade Name: AGRIMEK
Crops: Vegetable, leafy, except brassica, group 4, Herbs, subgroup 19A (except chives), Avocado
Federal Register: February 16, 2005
PR#:2550, 3114, 4014, 6755, 7198, 7270

High Tech: For Computer Geeks and Farmers Alike

When you look at Ray Ratto from Ratto Brothers Farms, and IR-4 Commodity Liaison Committee member, you see a well tanned man who knows his way around an ag field. But what you don't see is the technology involved in producing successful produce for the American Family. Ratto Bros. Greens Farm, located in Modesto, CA grows, kale, radicchio, butter lettuce, mustard greens, cabbage (red and green), baby bok choi, celery root, watermelon, leeks and other edible crops. Their produce is delivered to chain stores and terminal markets throughout the United States.

Ray Ratto of Ratto Bros. Farm

The nine Ratto Bros. ranches comprise 1,000 acres where Ray grows as many as three or four crops a year on each acre. The most remarkable thing about this is that Ray knows exactly what crop *(see photos below)* is being grown, where it is being grown, when it was planted, the pest management application dates and formulations, the projected harvest date and where it was sold. He keeps track of this on a computer program that he had a hand in developing, and has a "hard copy" of the data in blue notebooks in his truck. He also maintains the data for many years after harvest in his office.

Ray began keeping track of his 2000 yearly site IDs, as required by California Department Pesticide Regulation (CDPR), in 1994 using an Off The Shelf (OTS) program but he redesigned the data into a Visual Basic Planning program when the OTS program became limited in its ability to manage the data. But the technology doesn't end here.

Getting out of the truck and walking into a huge garage type area, you notice 2 vast stainless steel machines, a Hydro-Cooler and a new one million dollar Hydro-Vac system that is being set up. That is when Ray begins talking about atmospheric pressure and the need to take the Hydro-Vac system at 3.7 torrs of vacuum. Ray purchased the new Hydro-Vac system to keep up with his competition. The system cools the harvested produce as soon as it is harvested. Ray explained, "With a Hydro-cooler, you won't get the vegetables in the middle of the pallet cooled; the Hydro-Vac can. When you harvest the vegetables, you must cool them right away because every hour you lose in cooling is equivalent to a day's loss of post harvest shelf life. Then they must be stored in a temperature controlled environment until they are shipped." After harvest is where

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The new Hydro-Vac Machine ,left, is being installed and checked by engineers

PCR *continued from page 1*

not gene jocks but our work does provide important tools which keep American growers competitive and equipped in the challenging world of agricultural pest management.

Why submit a PCR? No, it's not about advancing the far reaches of genetic research, but it is about letting your specialty crop needs be known to the IR-4 program. Growing lemon grass in Florida, endive in California, snap beans in New York, mustard greens in Louisiana or potatoes in Wisconsin? Each of these specialty crops, and a host of others, has pest control problems that can be addressed with an IR-4 project. Furthermore, IR-4 cannot start a project without one.

How does someone submit a PCR? Well… simply jump on the web to ir4.rutgers.edu. Once at the IR-4 web site, follow the links to Food Crops, and then select Submit Request. If you managed this navigation sequence, you should have arrived at this address: ir4.rutgers.edu/Docs/FOODRequestForm.htm and be looking at something like the picture below.

The online form presented here collects three types of information in order to start an IR-4 project, which are: **1)** who's making the request, **2)** what chemical is necessary, for what crop, with a given use pattern, and **3)** what performance data are available to support the request. The performance data piece of information is critical for your request to be seriously considered by IR-4.

This information is captured by the IR-4 data folks and a project number is assigned to a particular project, e.g. 09427 for Carfentrazone-ethyl (the herbicide Aim) a request made for use on mint by Washington mint growers. This project is now categorized as "under evaluation" and subsequent to the manufacturer's approval, this project can be discussed and prioritized at the IR-4 Food Use Workshop.

The project still needs support at the Food Use Workshop before it will be initiated by IR-4, but submitting a PCR obligates IR-4 to at least consider it. Without a PCR, the project will not be initiated within IR-4, and unless the manufacturer pursues the requested labeling themselves, the use would not be registered. Likewise, requests without performance data or with inadequate data are rarely given a high IR-4 research priority.

Well defined PCRs, which clearly delineate the need and use pattern for a project, and provide efficacy and phytotoxicity data, are most likely to be prioritized for project initiation. The time and money involved in the registration process behooves all of us to carefully consider the merits of various projects before embarking on the registration journey, to ensure that it is the best solution for the pest management need.

Preparing your request with supporting data and specific use instructions and then using the online submission form will streamline the PCR process. However, a PCR can also be submitted in writing. Contact your Regional Field Coordinator for clarification of this process, the PCR forms, or to discuss the details and merits of given projects. Edith Lurvey in the Northeast, Charlie Meister in the South, Satoru Miyazaki in the North Central and Becky Sisco in the West *(contact information on back page)* can assist you with preparing to submit your PCR request.

The IR-4 Newsletter
Vol 36. No.2 April 2005

The IR-4 Newsletter is published quarterly for distribution to cooperators in our partner State/Federal/Industry research units, State and Federal officials, private interest 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-CSREES and USDA-ARS in cooperation with the State Agricultural Experiment Stations. New Jersey Agricultural Experiment Station Publication No. P-27200-05-02, supported by state, U.S. Hatch Act, and other U.S. Department of Agriculture funds.

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The Life of a Study: Acetamiprid/Strawberry

The IR-4 Newsletter will be following a study throughout its 30-month life in order to give our audience a better understanding of all phases involved in a study. IR-4 Study Director, Ken Samoil will be working closely with the editor in providing facts and information as well as partnering in writing this series that follows the acetamiprid study on strawberries. This study was chosen because it can be tracked in all regions and ARS.

Part III — Quality Assurance, another Protocol Deviation, and the Analysis of Samples

In parallel - and occasionally intersecting - lines of activity, the QA professionals of IR-4 and in Canada work to "assure IR-4 Management" that all in-life operations, raw data and reports are GLP-compliant. This is another sub-set of processes that go into the life of a study.

IR-4 research tasks are daunting, since the Study Director is remote from operations in the field and laboratory. A monitoring QA Officer is assigned to each IR-4 Magnitude of Residue (MOR) study, providing some consistency and familiarity with the data as the study progresses. In this trial, several "critical phase" field inspections were conducted, which provided valuable insight into field operations for the Study Director. Inspections in the laboratory, and audits of all field and laboratory raw data will occur later in the process and two final report audits will be conducted by two different auditors.

By using various databases, QA can log and summarize information, such as the time between audit presentation to the Study Director and the receipt of responses. Since QA must remain outside the sphere of study conduct, they are not allowed to pursue corrective actions. A wide variety of "people skills," as well as large investments in personal and professional time, along with administrative support, are needed to link participants in the common cause of specialty crop protection.

Since the last installment of this series, one more protocol deviation form was received from a field cooperator. This one resulted from a sprayer output calibration being conducted with only one replicate (one spray), whereas three replicates are required to establish the sprayer output used in application calculations.

The treated and untreated strawberry samples from the field trials were received frozen and intact at the analytical laboratory, the National Food Safety and Toxicology Center at Michigan State University, between May 25th and October 30th, 2004. Each sample was assigned a unique laboratory ID number and then stored in a freezer at temperatures below -15° C. Prior to analysis, strawberry samples were ground in dry ice in a food chopper and sub-sampled into 16-oz. bottles. Using the working method that had been approved by the Study Director, the analysts extracted and analyzed sub-samples from all of the treated samples and at least one untreated sample per field trial. Some of the untreated samples had trace amounts of apparent acetamiprid residue, but the level was never greater than 7% of the limit of quantitation established in this study. (The "limit of quantitation" is a calculated level above which residue results are considered reliable. Lower levels may be detected; however, substances other than the pesticide under analysis produce small peaks in the chromatograms that may be confused with pesticide residues.) Such low levels of apparent residue do not compromise the results of the residue analysis.

The residues found in samples collected one day after the last application were in the range 0.04-0.25 parts per million (ppm). In the samples collected from the California decline trial, the mean residues (average of two samples) were 0.23 ppm at 1 day preharvest interval (PHI); 0.19 ppm at 3 days PHI; 0.15 ppm at 5 days PHI; and 0.09 ppm at 9 days PHI; thus demonstrating the rate of decline of acetamiprid residues in treated strawberries prior to freezing. The concurrent recoveries from untreated strawberries fortified with acetamiprid and extracted on the analysis dates of the treated strawberries were at least 88%, confirming that the working method was still providing reliable results. A storage stability study was conducted as part of this study. Untreated strawberries were fortified with acetamiprid at 0.1003 ppm and stored frozen for 148 days before extraction and analysis, and yielded acetamiprid recoveries of 87-89%. The longest interval between sampling in the field and extraction in the laboratory of any of the treated strawberries was 109 days, so the results of the storage stability study confirm that the acetamiprid residues in the treated strawberries from the field trials did not significantly degrade in frozen storage.

An Analytical Summary Report (ASR) was prepared, completed on December 2nd, 2004, and submitted to the Study Director. The ASR included tables of the method validation results and the results described above, along with a description of the working method, a residue sample inventory and history, information on the analytical reference substance used to fortify samples, a subset of the chromatograms produced in this study from which the recoveries and residues were determined, and other information needed to confirm that the analytical work was scientifically sound and met GLP requirements. *IR-4 QA Officer, Kathryn Hackett-Fields contributed to this article.*

Phytophthora capsici: Workshop and Discussion

photo by Christian A. Wyenandt

According to Mohammad Babadoost, University of Illinois, Department of Crop Sciences, "Phytophthora blight, caused by the oomycete,

photo by Mary Hausbeck

Phytophthora capsici, has become one of the most serious threats to production of cucurbits and peppers, both in the United States and worldwide. It can strike cucurbit plants at any stage of growth and the infection usually appears first in low areas of the fields where the soil remains wet for longer periods of time. The pathogen infects seedlings, vines, leaves, and fruit, and at present, no single method provides adequate control of *Phytophthora capsici* on cucurbits." So it was a likely choice to be selected at the 2004 IR-4 Food Use Workshop for a new fungicide "Pilot Performance Project" which will be administered through IR-4.

In order to determine the project strategy, a Workshop and Discussion of *Phytophthora capsici* was organized by IR-4 Plant Pathology Coordinator, Dave Thompson, and Southern Region Field Research Coordinator, Charles Meister. The Workshop was held on February 5th, 2005 in Little Rock, Arkansas in conjunction with the Southern Association of Agricultural Scientists, which includes the Southern Division of the American Phytopathological Society. The day-long workshop and discussion was attended by 28 US scientists and represented industry, university extension, research, and the USDA/ARS.

The group talked about the basic biology of the pathogen and agreed that further study is needed. Disease development is an interaction between pathogen, plant, fungicide, and time for the plant to respond. Because the pathogen can remain dormant in the soil for years, the strategy of crop rotation may not be a useful tool, except to grow a non-susceptible crop. Many of the scientists shared that they have found resistance very helpful in bell peppers, but there is no resistance in non-bell peppers. In discussing strategies, the scientists agreed that a fungicide must be applied at the right time and to the site of the infection, which could be the crown, foliage or fruit depending on the crop. Crown rot in peppers doesn't necessarily have to come in through the roots, but the base of the plant needs to remain dry to minimize disease development.

Because efficacy work has been conducted in different ways, the group felt that IR-4 should write standard protocols and a standardized evaluation system should be developed using the Area Under the Disease Progress Curve (AUDPC) to compare treatments. The group also suggested the program include phosphorous acid generators and/or Actigard® before transplanting and agreed that mefenoxam may not be useable at this stage due to resistance concerns. In the foliar/fruit rot phase, dimethomorph and zoxamide should be evaluated. Dimethomorph has been an anomaly as it works for some researchers but not for others. A list of suggested chemicals and treatments was initiated at the workshop and will be developed during review of the draft protocols. Dave was assigned the task of drafting one protocol for pepper crops and one for cucurbits, which were reviewed and modified with everyone's input. The protocols are available from Dave at dthompson@aesop.rutgers.edu or 732.932.9575 ext. 613.

The workshop was successful in strategizing the IR-4 Pilot Performance Program. Through a combination of industry, commodity, and IR-4 funding, at least eight efficacy trials will be funded in the 2005 growing season; four pepper and four cucumber. The presentations and discussion resulted in many comparisons and ideas that will likely lead to further investigation. IR-4 thanks all of the presenters and attendees, and extends a special thanks to Arvesta Corporation for providing refreshments.

Workshop participants gather for a group photo.

Strategic Planning: Driving the Futu

"We have a choice to be drivers of our own future or be driven by it." This was the challenge IR-4 Administrative Advisor Chair, Gary Lemme, gave during his welcome address to the IR-4 Strategic Planning Conference attendees. The purpose of the conference, held in Alexandria, VA on February 15th and 16th , 2005, was for IR-4 researchers and stakeholders to help in defining the direction IR-4 should take during the strategic planning period (2006-2008). More than 120 people who are affiliated with regulatory agencies, the agrichemical industry, the United States Department of Agriculture (USDA), commodities, and land grant universities attended.

The first day set the tone for the second day's break-out discussions. Speakers from all facets involved in pest management were invited to provide informational presentations on their role and vision for the future and how they feel IR-4 can fill a need or improve its own infrastructure to meet the needs of the target audience: consumers and growers.

Mint Industry Research Council Executive Director and Chair of the IR-4 Commodity Liaison Committee, Rocky Lundy, opened the informational part of the program by giving the audience a profile of the typical specialty crop grower. He stated, "These growers are high risk managers who are usually gamblers that don't have the perks of major crop growers and are always on the offense due to foreign competition. To them, IR-4 is the only show in town for helping them find solutions to pests." He went on to commend IR-4 as a model program that the "folks on the hill" recognize as a quality program.

IR-4 Executive Director, Bob Holm, talked about "IR-4 As We Know It" and boasted IR-4's success, which focuses on partnerships as a key ingredient. "Chemical companies are beginning to work with IR-4 early on in the development stage of new chemical products because they recognize the value of the IR-4 relationship with the Environmental Protection Agency (EPA), which is evidenced in IR-4's research petitions that represent over 50% of EPA's workplan." Bob also talked about IR-4 being instrumental in saving growers an estimated $7.5 billion in economic loss avoidance by supporting Section 18 Emergency Use Exemptions.

The USDA's Special Assistant of Pest Management Policy, Burleson Smith, gave a presentation on the "Future of Pest Management Research within the USDA." He pointed out that for the time being, we are seeing new products in the pipeline under development, but he believes that will slow down. Burleson stated there will be more pressure from environmental groups and the need to focus on endangered species will become more of a concern. He also stated "Congressional mandates are significant to our planning and thinking, as exampled by the Food Quality Protection Act (FQPA), and we will need to recognize that international mandates such as the Montreal Protocol will also continue to be an issue." Other important factors that affect pest management research within the USDA will be emerging pests and new technologies (genomics). When asked the question, "With imported produce, what are priorities in terms of security," Burleson responded, "From the standpoint of the EPA and FDA, residue limits will be looked at to avoid barriers of trade."

Burleson Smith discusses the future of Pest Management Research

Eldon Ortman, Purdue University, talked about the need for Land Grant Universities to find ways to develop new economic opportunities. In the wake of the President's F.Y. 2006 budget recommendation, which proposes to cut the Hatch Act funds by 50% and eliminate this funding entirely in F.Y. 2007, Eldon explained the need for there to be more discovery research and implementation of that research in order for land grant universities to grow. He talked about trends in higher education that support faculty in their efforts to obtain patents and commercially own their inventions. He suggested the roadmap regarding agricultural research should include targeting economics and the environment. Eldon also discussed the results of a recent IPM research survey, and offered his email address (eortman@purdue.edu) to those seeking more information.

The three "Ps" of collaboration are people, people, people, according to Ralph Otto from the USDA/CSREES when he talked about "Opportunities for Collaboration between IR-4 and other USDA Pest Management Programs." He stated to the audience that collaboration is now more of a requirement rather than an opportunity and reiterated that IR-4's strength lies in these collaborative efforts. He encouraged the group to also promote, promote, promote by sending congratulatory letters to Congressmen and continue to lean on USDA colleagues.

Tom Holt, from BASF, and Dirk Drost, from Syngenta Crop Protection, discussed new pests, pest resistance and new chemical crop protection technology. Tom talked about shifts in glyphosate weed resistance and that insect control will

re of IR-4

be a real challenge because of the over-use of neonicotinoid and pyrethroid insecticides. Tom talked about the threat to the US legume vegetable crops due to the introduction of Asian Soybean Rust. He stated, "It is critical that we make strides in providing tools to combat these pests." When asked, "What do you see as far as the crop protection industry and IR-4's involvement with genetics and genomics," Dirk responded, "I think it will take a continued relationship with universities to take this route to market." When asked, "Are companies thinking ahead for CODEX tolerances," his response was, "Yes, Syngenta is."

"The cost to develop a biopesticide is $2 to 10 million versus the cost to develop a synthetic product of $100 to 200 million," stated Olav Messerschmidt from the Biopesticide Industry Alliance. Olav conceded the biopesticide market is relatively small at only $600 million but remarked that it is growing and the number one state using biopesticides is California. When asked, "How can Ag Experiment Stations get more involved in biopesticide research," Olav responded, "Biopesticides are not a stand-alone application. A change in mindset at the University level would be helpful."

"The Ornamental Horticulture industry is growing at a faster rate than any other segment of agriculture," stated Marc Teffeau of the American Nursery and Landscape Association, "and IR-4 is somewhat of an enigma with their growers." He stated his concern over the President's budget proposing to cut funding for the land grant system. "In this industry, appearance is everything and efficacy is critical too." Marc encouraged the group to give the Ornamental Horticulture Program a fair representation when discussing this in the strategic plan and stated that the ANLA will continue to support IR-4. He also commented that the ANLA only had "so many political chits to spend" and they are willing to spend them if they feel they are a valued partner of IR-4.

Jim Jones, Director, EPA Office of Pesticide Programs, talked about the three strengths of IR-4 as: 1) making a point to work with stakeholders 2) focusing on continuous improvement and 3) focusing on reduced risk chemistries, and stated that "IR-4 provides a model for other agencies and public health products." He encouraged the group to continue its efforts in taking a lead role in International harmonization for global Maximum Residue Levels (MRLs), and also lead in figuring out simplified field trial variability such that 25 countries don't need their own field trial requirements. Jim also discussed endangered species as an emerging regulatory challenge at EPA and was not sure IR-4 had a role in this but felt that IR-4 did have a role in select agents, e.g. soybean rust, that affect US food security. Jim concluded his talk by saying, "Without a doubt, this is the most productive stakeholder relationship we have."

On day two, attendees worked in break-out groups to discuss the status of IR-4 and compose recommended strategies for the future.

The first day concluded with a panel discussion on Potential New Minor Use Needs. The panelists included: Kurt Getsinger from US Army Corp of Engineers, who discussed Aquatic Herbicides; William Opp from the American Mosquitio Control Association, who discussed Public Health issues; Leonard Gianessi of CropLife America who discussed Ag-Biotechnology and Sue Popple, from the United Kingdom Pesticide Safety Directorate, who discussed International Harmonization of standards.

Following the day of information gathering, the group got to work. They spent over four hours answering questions in a break-out discussion format. Each discussion group consisted of 6 to10 people representing various stakeholders. There was a total of 15 discussion groups and each group was given a set of topic questions to answer. The topic questions pertained to: Existing IR-4 Programs, Potential New Research Areas and Accountability and Partnerships. The questions posed to each group were randomized in order to provide adequate discussion for each topic. The information was gathered and compiled into bullet points and the group met in its entirety to discuss the results. Most people felt the exercise was beneficial and appreciated being able to contribute to IR-4's planning. The final outcome, a 2006 to 2008 Strategic Plan, will be available in the Fall of 2005 after thorough review and discussion by the Project Management Committee.

Strategic Planning: Gazing Back and Looking Forward

Past recommendations received from the strategic planning process have helped moved IR-4 forward. A look at some of the recommendations from the 2001 to 2005 Strategic Plan shows the impact of stakeholder involvement.

One of the clearest recommendations from the 2001to 2005 Strategic Plan was to accelerate the registration of newer, reduced risk chemistries. This focus resulted in 80% of IR-4 projects being conducted on reduced risk chemistries. In

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Hops: A Specialty Crop Worth Brewing

by Ann George, Washington Hops Commission Administrator

Only a few ingredients are needed to make beer: barley malt, unmalted grain such as corn or rice, hops, yeast, and water. The brewing value of hops is found in the unique flavors and other properties which come from resins and oils inside the hop lupulin glands.

The two largest hop producers in the world are the U.S. and Germany. In the US, the hop industry is unique and very small, with fewer than 75 growers producing nearly 30% of the world's supply. Commercial production is limited to the Northwest, and over 60% of the crop is exported to some 60 countries annually. In 2004, the U.S. grew enough hops to flavor approximately 11 billion gallons of beer.

Hop plants are either male or female, producing annual climbing stems from a perennial crown and rootstock. The stem grows in a clockwise direction around its support (as it follows the sun) and may reach a total height of 25 feet or more in a single growing season. The stem dies back to the crown after the hop cones (flowers) mature. The mature hop cone contains numerous lupulin glands, which contain the important brewing constituents of alpha acids, beta acids, and essential oils.

The commercial hop is a female plant with flowers that appear as burrs on the side arms, which develop into hop cones. Male plants do not produce hop cones, only pollen which causes seeds to be produced in the

cones. Hops are vegetatively propagated, with new yards established by planting rhizomes, or potted plants started in a greenhouse from softwood cuttings.

The cost of establishing a hop yard is $4,300 per acre, and includes land preparation, trellis, roots, and irrigation system. Production costs for an established hop yard are $3,900 to $4,220 per acre. With an average farm-gate value of $1.90 per lb., the total U.S. production value for 2004 was $104.8 million. The U.S. hop industry employs approximately 4,000 full and part-time workers, and contributes heavily to local economies.

"The Basics" of Hop Farming

Mechanical pruning, using tractor-drawn equipment with spinning steel

"fingers," begins in March and removes debris from the prior season. Chemical pruning is done in April, to remove early growth and allow more even emergence for training, which is the practice of wrapping hop shoots in a clockwise direction around the twine. Training time during May is one of the most critical factors in determining yield, due to the relationship between plant height and day length, which affects flowering. Hop plants grow rapidly, forming long sidearms and an abundance of heavy foliage.

Irrigation begins in late spring, with hop fields requiring approximately 30 inches of water during a normal growing season. Cultivation or mowing during the season keeps weeds between the rows under control. Within the row, chemical herbicides are necessary for weed control. Weeds in hop yards can reduce yields, interfere with irrigation, serve as hosts for insects and plant pathogens, and impede harvest.

The annual harvest begins in late August, and progresses through late September. Harvest begins in the field as the hop vines are mechanically cut at the ground and at the overhead support wires, and fall into a trailer or truck bed. The hop-laden vines are transported to stationary picking machines on each farm which are capable of picking 8 acres in a single 10-12 hour shift.

Vines are stripped of their hop cones and leaves, which are sent through a series of cleaning devices to remove leaves and other debris. The stripped vines and other debris are chopped and spread back onto fields, to improve the soil. Cleaned cones are immediately transported by conveyor belt to the hop kilns, where hot air (140 degrees Fahrenheit) is forced indirectly through the bed of green hops. Drying requires about 9 hours, reducing the hops to 30% of the green weight, with 8 to 9% moisture content. After cooling, the hops are compressed into 200 pound bales, wrapped in burlap or plastic bale cloth and subjected to quality inspection. At this point the crop leaves individual farm operations and is transported to cold storage warehouses.

The Hop Industry and IR-4

The U.S. hop industry has an aggressive plant protection research

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Special Recognition and Thanks

IR-4 Executive Director, Bob Holm, right, presents CSREES National Program Leader, James Parochetti, a Special Recognition Award in appreciation of his 17 years of service to the IR-4 program.

On February 16, 2005, during the Strategic Planning Conference, IR-4 Executive Director, Bob Holm presented a Special Recognition Award to James Parochetti who had been the IR-4 National Program Leader for CSREES since 1987.

The award, which reads, "During his 17 years of working with IR-4, the program grew considerably in budget, productivity and significance," and reflects the accomplishment and dedication Jim provided to IR-4. Even though his official time allotment for IR-4 at CSREES was 25%, Jim supported the program with enthusiasm and vigor.

In 2002, Jim played a major role in coordinating the National Research Support Project (NRSP)-4 Program Review. He led throughout the process by working with the Project Management Committee and Nancy Ragsdale, USDA-ARS National Program Leader, to set the objectives of the review. He was also instrumental in recruiting Review Panel candidates and put together a blue ribbon panel. He spent considerable time communicating with the panel and IR-4 and set the tone for the review where IR-4 received highly positive feedback. Jim also worked to make sure the Review Report was published in a timely manner.

IR-4 extends its thanks to Jim's support as he moves on to other ventures within CSREES including the Aquatic Herbicides Working Group.

Planning

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addition, these studies are now completed within a 30-month timeline. Another 2001 to 2005 recommendation suggested IR-4 help in speeding the access of the new and safer chemistries to the specialty crop grower. This resulted in IR-4 establishing partnerships with the crop protection industry and EPA in assuring these chemistries reach specialty crop growers. A third strong recommendation from the 2001to 2005 Strategic Plan focused on the need for stronger Regional Labs, Field Research Centers and ARS Facilities. This too has been initiated by the Project Management Committee setting aside $250,000 annually (in all but one year) to upgrade lab and field equipment.

A look forward 2006 to 2008

IR-4 stakeholders were just as committed in providing input for this round of strategic planning discussions.

Recommendations regarding existing programs and budgets included maintaining funding for the Food Use program at current levels and investigating the possibility of conducting fewer trials, expanding global harmonization and expanding crop grouping. Stakeholders also suggested that "C" priorities be dropped. In an effort to increase funding, stakeholders suggested IR-4 ask commodity groups to support IR-4 trials through a dollar for dollar match.

Stakeholders also recommended better communication tools be developed to keep them informed. They would like IR-4 to make the website more user or public friendly, continue in the production of high quality program literature, and suggested developing new literature that describes the qualitative value of environmental protection resulting from reduced risk compounds.

When asked for ways to involve more stakeholders in IR-4, the group suggested providing additional funding for State Liaison Representatives and organizing National Annual Meetings. IR-4 was also encouraged to take advantage of Integrated Pest Management (IPM) expertise in measuring IPM and economic impact analysis to growers.

Venturing into the new research area, Aquatic Weed Control was encouraged with the strong stipulation that separate, sustainable funding be obtained for this area. Stakeholders also felt IR-4 should take a leadership role in the management of invasive species in regard to Homeland Security, as well as lead in setting global requirements, definitions, eco-zones, and harmonization of data. IR-4 was cautioned to not get involved with mosquito and public health pest control at this time but revisit this area in the next round of strategic planning discussions.

Many recommendations were received and will be reviewed and discussed by the PMC this summer resulting in a 2006 to 2008 Strategic Plan, which will be posted to the IR-4 website at www.ir4.rutgers.edu.

QA Planning: Determining Inspections for 2005

by Tammy White, IR- QA Manager and Kathryn Hackett-Fields, IR-4 QA Officer

The IR-4 Regional Quality Assurance (QA) Coordinators, the Canadian QA Manager and two Headquarters QA staff met in Davis, CA on March 15-16, 2005 to conduct the annual QA planning meeting. The meeting resulted in a 2005 QA inspectional plan and specific trials were identified to receive in-life inspections during the field conduct phase. Of the 674 field residue trials being conducted in 2005, 141 will be scheduled to receive an in-life inspection (additional trials will also be inspected in Canada, by the Canadian QA program). But, how does QA decide which trials to target?

The process is very straightforward. It begins by identifying which IR-4 test sites have the fewest number of trials, and selecting projects from them first. As we then move to those cooperators with three to four trials, we will select trials from studies that have not been selected previously. We then move to the test sites that are conducting five to six trials and repeat the process.

The underlying logic is to schedule inspections so that every study being worked on by IR-4 will receive at least one inspection while the trials are in the field. All studies will receive in-life lab inspections during the analytical phase. Emphasis is also given to monitoring special project trials, new cooperators (to provide assistance as needed) and to observe the personnel at a trial site performing non-routine procedures (various types of applications, greenhouse trials and harvests, etc.). Several of the trial sites may be scheduled for two to three field inspections per season, while other, higher volume test sites may be scheduled for four or more inspections.

The QA planning meeting was also an opportunity for the QA Unit Coordinators and full time QA staff to review the workload distribution schedule, the 2005 EPA final report submission plan, the IR-4 JustWrite electronic records capture program, and to discuss various QA observations to formulate consensus on recently encountered findings.

As you can see, a lot of work and planning goes into this annual meeting. We want to thank Martin Beran and Jim McFarland for taking care of the many "hospitality" details. On Tuesday evening, we had a rare chance to relax and get to know each other as people, not just co-workers, when Jim McFarland opened his home to us. Many thanks go out to Jim and his family.

In a series of future articles, the QA Unit will extend a similar opportunity to newsletter readers. Topics planned include: QA Officer profiles, the "hows" of auditing and inspecting, the challenges we deal with and how we maintain our professional skills as the years bring new study types, equipment, technologies and staff members. We hope you will enjoy getting to know more about the IR-4 QA Unit members and our Canadian counterparts.

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A QA Update

The IR-4 QAU is updating our QA inspection checklists and SOPs. In accordance with the recommendations from the QA peer review, we will be making available our draft SOPs and checklist revisions for comment. The draft SOPs and checklists will be posted to a special location on the IR-4 website. IR-4 QA participants, Regional Field and Laboratory Coordinators, Field Research Directors and Laboratory Research Directors will be provided a url link that will take them to the draft documents. They will be asked to provide their comments or questions to the attention of Tammy White at IR-4 HQ by April 29, 2005. It is the IR-4 QA Unit's intention to have the final versions of the SOPs and checklists to the IR-4 PMC in advance of the July 2005 meeting. We hope to implement the revised QA checklists and SOPs by August 1, 2005.

IR-4's 2005 Ornamental Research Plan Set

by Jerry Baron, IR-4 Associate Director

IR-4 has approved its plan for 2005 field research in the Ornamental Horticulture area. Funding will focus on Super A Priorities that were established at the Ornamental Horticulture Workshop which was held in November 2004 in Orlando, Florida. Here stakeholders identified on Scale and Mealybug management the top priority in the Insect Section, Phytophthora management in the Disease Section and select crop safety trials with the herbicides pendimethalin, s-metolachlor and isoxaben / trifluralin on various herbaceous perennials and the herbicide quinoclamine on greenhouse plants. Potential research requests for $660,000 were received. Unfortunately, only $400,000 was budgeted. Of this $400,000, $80,000 was slated for the Northeast Region, $70,000 for the North Central Region, $100,000 for the Southern Region and $150,000 for the Western Region. Super A Priority Insect and Disease management projects are charted right. In addition to these, there is extensive IR-4 funded work with testing crop safety of herbicide on various plant species. The cooperators for this phase of IR-4 sponsored research are J. Altland (OR), J. Ahrens (CT), E. Beste (MD), R. Boydston (WA), L. Case (OH), R. Chandra (WV), Y. Chen (LA), J. Derr (VA), B. Fraelich (GA), T. Freiberger (NJ) C. Gilliam (AL), M. Hausbeck (MI), J. Klett (CO), K. Lehnart (MD), H. Lieth (CA), J. Neal (NC), M. Reding (OH), A. Senesac, A. Simmons (SC), R. Smith (CA), B. Stamps (FL), and D. Williams (IL).

Thanks to the fine efforts and cooperation by Edith Lurvey, Satoru Miyazaki, Charlie Meister, Becky Sisco and Paul Schwartz for lining up researchers for the 2005 field program.

Target Pest	Test Plant	Researcher
Mealybug (Madiera, Citrus)	Coleus	R. Oetting, GA
Mealybug (Pink hibiscus, Striped)	Coleus, Agloanema	L. Osborne, FL
Mealybug (TBD)	Acuba	S. Ludwig, TX
Mealybug (TBD)	Pothos	T. Davis, MI
Mealybug (Grape)	Taxus	D. Nielsen, OH
Mealybug (Citrus)	Nursery plants	K. Robb, CA
Mealybug (Phorimium, Obscure)	New Zealand Flax,azalea	J. Bethke, CA
Mealybug (Citrus)	Roses (Orlando)	M. Parrella, CA
Scale (Cottony Cushion, Florida Wax, False Oleander)	TBD	S. Ludwig, TX
Scale (Elongate Hemlock)	Frazier Fir	R. Cowles, CT
Scale (Fletcher)	Taxus	T. Davis, MI
Scale (Pine Needle, Oystershell, Euonymus)	Taxus	D. Nielson, OH
Scale (Euonymus)	Euonymus	T. Freiberger, NJ
Phytophthora (P. cactorum)	Salvia	G. Grove, WA
Phytophthora (P. cinnamomi)	Rhododendron	G. Chastagner, WA
Phytophthora (P. parasitica)	TBD	K. Evans, UT
Phytophthora (P. cinnamomi)	Azalea	M. Benson, NC
Phytophthora (P.parasitica)	Spathiphyllum	D. Norman, FL
Phytophthora (P. palmivora)	Liriope	J. Strandberg, FL
Phytophthora (TBD)	TBD	M. Hausbeck, MI
Phytophthora (P. cinnamomi)	Azalea	A. Pennucci, NH
Phytophthora (P. ramorum)	Rhododendron	G. Chastagner, WA
Phytophthora (P. citrocola)	Rhododendron	R. Regan, OR
Phytophthora (TBD)	TBD	M. Hausbeck, MI
Phytophthora (P. cinnamomi)	Azelea	C. Becker, NY

High Tech

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Ratto Bros. is different, because they complete the cooling and storing process all in one location. But the technology doesn't end there either.

A computerized equipment scheduler is located in a back room off the storage area. The computer system, which Ray monitors, automatically diverts power from one area of the farm to another when needed. A computer screen displays a schematic of the power inputs and diversions. But the technology doesn't end here.

Ray monitors the equipment scheduler.

A visit to the upstairs office completes the technology cycle. Ray's brother, David and cousin Frank sit at computer terminals wearing headsets as they speak to their customers and scan their sales. They are also responsible for providing the human resource services for the 200-350 people employed at Ratto Bros. Ray explains that this really is the control center of the operation and praises their efforts.

Frank Ratto manages the sales and distribution of Ratto Bros. Produce

When Ray went to college for Ag Management, he never dreamed he'd become a computer geek. But learning and staying abreast of new technology has helped him grow the business and stay competitive and successful.

Calendar of Events

Aug. 22-24, 2005 Southern Region Regional Meeting: South Padre Island, TX contact Robin Adkins 352-392-1978 x 400

Sept. 13-15, 2005 IR-4 Food Use Workshop: Marriott, San Diego, CA Contact Cheryl Ferrazoli 732.932.9575 x 601

Oct. 13-15, 2005 IR-4 Ornamental Workshop: Hotel TBD, Charleston, SC Contact Cheryl Ferrazoli 732.932.9575 x 601

Hops

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program that seeks a more effective, safer, and economic means to prevent pest and disease damage to the crop. It also supports ongoing research activities to develop cost-effective Integrated Pest Management strategies.

Hop powdery mildew was first reported in the Pacific Northwest hop growing area during 1997, and is a critical plant protection issue. Other serious threats to hops are hop aphids, two-spotted spider mites and downy mildew is a menace for several hop varieties. Without reliable control programs, these major pests and diseases can completely destroy the crop. Several other pests and diseases require periodic control efforts; they include various lepidopteran species, garden symphylan, root weevils, and others.

IR-4 has played a critical role during the past twenty years in supporting Section 18 Emergency Exemptions and facilitating the registration of nearly two dozen important insecticides, fungicides and herbicides for hops. Over 90% of the pesticides currently used by U.S. hop growers are the direct result of IR-4 registration efforts.

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The IR-4 Project
Providing Safe and Effective Pest Management Solutions for Specialty Crop Growers

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Agricultural Research Service USDA

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

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