The IR-4 Project

Newsletter

Vol. 40 No. 4 Oct 2009

The Use and Benefits of Reduced Risk Pesticides Since the Passage of the Food Quality Protection Act

— by Faye Aquino Viray and Robert Hollingworth, Michigan State University

The enactment of the Food Quality Protection Act (FQPA) of 1996 resulted in major regulatory changes in the registration of pesticides with special focus on the older pesticides such as organophosphates (OPs) and carbamate anticholinesterase insecticides, and the B2 carcinogenic fungicides (captan, chlorothalonil, iprodione, mancozeb and maneb). Many of the uses of these pesticides were cancelled and/or restricted because of potential health hazards and worker safety concerns. At the same time, the registration of newer Reduced-Risk (RR) pesticides was encouraged. The IR-4 program has focused on supporting the registration of RRs and OP replacements by conducting 70-80% of food use studies on such compounds since the passage of FQPA.

Despite the initiative to substitute RR pesticides for these older, toxicologically suspect compounds, there has been little public analysis of changes in pesticide use and residue levels or of changes in risk resulting from FQPA. In this study, several pesticide use databases such as the California Department of Pesticide Regulation (CA-DPR) and the CropLife Foundation (CLF) that are publicly-available were used to determine how pesticide usage has changed in the United States since FQPA. The data presented below are for usage in California from CA-DPR but they reasonably represent the less comprehensive data on national use trends from the CLF database.

The most commonly used OP and carbamate insecticides showed an overall decline in use of about 50% and 70%, respectively, from 1994 to 2006 as shown in Figure 1(see page 10). The B2 fungicides showed much less decline in use (about 10-20%; Figure 2-see page 10). Conversely, the RR insecticide and fungicide groups showed a steady increase in use over this time such that they are now central

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Update on Biopesticide Workshop - AflaSafe Approved in Nigeria

The November 2008 IR-4 Newsletter reported on "Progress on GMUS Action Items". The article focused on regulatory capacity building workshops, where IR-4's Biopesticide & Organic Support Manager, Michael Braverman, led the biopesticide portion. The workshops were held in Kenya and Nigeria in August 2008, and were funded from a grant from the United States Department of Agriculture-Foreign Agricultural Service (USDA-FAS). The theme of the biopesticide portion of the workshops was explaining the US regulation of biopesticides including biochemicals, microbials and plant incorporated protectants.

Scientists from the African Agricultural Technology Foundation (AATF) the United States Department of Agriculture-Agriculture Research Service (USDA-ARS) and the International Institute of Tropical Agriculture (IITA) have collaboratively demonstrated the ability of a natural fungus found in Nigeria to significantly reduce concentrations of aflatoxins in maize. Field trials of the biocontrol method on Nigerian stations in Zaria, Ikenne, Mokwa and Ibadan resulted in a 50 to 99 per cent reduction in aflatoxin contamination in maize. Under the biocontrol method, native strains of *Aspergillus flavus* (*A. flavus*) that do not produce aflatoxins (called atoxigenic strains) were applied in order to alter the fungal community on crops and throughout an area so that maize became less contaminated with aflatoxins.

One major concern in Africa has been these naturally occurring aflatoxins. These are natural carcinogens produced by the fungus *A. flavus* in maize, groundnuts, cassava, and yam chips. Additionally, these toxins also suppress the immune system causing humans and animals to be more susceptible to diseases. "Aflatoxins are silent killers. They undermine human health and stunt the growth of children but are often not visible on maize when purchased," said Dr Ranajit Bandyopadhyay, IITA Pathologist, during an April 2009 AATF-USDA-IITA meeting, which examined the prospects of registering this biological method to drastically reduce aflatoxin contamination in food crops.

Roadside drying of corn in Abuja, Nigeria. Uncontrolled drying conditions can exacerbate aflatoxin problems.

Dr. Peter Cotty of USDA-ARS, who collaborated with IITA on the project, said "natural populations of *A. flavus* consist of toxigenic strains that produce copious amounts of aflatoxin and atoxigenic strains that lack this capacity." He explained that competitive exclusion works by applying selected native atoxigenic strains to outcompete and exclude aflatoxin-producers during colonization of grains, thereby reducing levels of aflatoxin contamination. "There are several atoxigenic strains native to Nigeria that are useful for reducing aflatoxins."

Dr. Bandyopadhyay said, "atoxigenic strains can be directed at reducing aflatoxin contamination in several crops throughout an area simultaneously. Manipulation of the composition of fungal communities (i.e., replacing high aflatoxin-producers with their cousins that do not produce aflatoxins) so that high aflatoxin-producers are less common, is a viable approach for reduc-

Dr. Peter Cotty inspecting AflaSafe research plots.

ing aflatoxin contamination throughout all crops grown in a target area. In the long-term, this research will lead to the improvement of the health of vulnerable groups, especially women and children. This is especially important to the health of small farm families where the grain they produce is consumed directly."

During the August 2008 workshops, an aflatoxin reduction product (AF36) that IR-4 helped register in the US was used as a registration example and was compared to the IITA product under development in Africa. These discussions about the IITA strains helped familiarize the regulatory authorities with the research of Dr. Bandyopadhyay and laid the groundwork for the provisional registration of AflaSafe. In August 2009, IITA received approval for provisional registration of AflaSafe, a native atoxic *A. Flavus* strain similar to AF36, to reduce aflatoxin in Nigeria.

Bandyopadhyay said, "Several people helped in getting speedy approval of registration -- Ali Abdi (Ag Attaché from the US consulate in Lagos and USDA-FAS staff) and Uwem Udoma (from Nigeria's National Administration for Food, Drug Administration and Control, who attended the biopesticide workshops and advised on some of the documentation for the dossier) were principal among them. In this respect, IR-4, USDA-FAS and USDA-ARS were all successful in helping with the registration of the aflatoxin biocontrol agent in Nigeria."

The IR-4 Project's unique expertise is being sought by organizations throughout the world. IR-4's leadership in international capacity building fosters a spirit of cooperation with global entities by organizing international reviews, participating on CODEX and OECD committees, conducting joint field trials and engaging in other global activities. Working with minor use programs throughout the world, IR-4 conducts cooperative studies and generates data required to obtain US and international registrations for new specialty crop uses and minor uses on major crops.

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A "Teff" Crop

— by Kathryn Homa and Bill Barney

What annual grass crop is harvested for its tiny white, reddish or dark brown grain, is classified as the world's smallest grain, has become a popular item in US health food markets, and yields from 700 kg/ha to 1400 kg/ha in Montana?[1, 2, 3] Teff (*Erogrostis tef*)! Haven't heard of this crop? You're not alone. However, in Ethiopia, teff is a popular crop. There, it is used as a food staple and source of forage for livestock. To this day, teff serves as the major food source (over two-thirds of human nutrition) in Ethiopia because it is adaptable to many environmental conditions including droughts and floods[1]. This crop is also utilized for food and livestock feed in other parts of the world including India, Australia and South America. So why all the hype in the US? Besides being adaptable to many environmental conditions, teff is becoming a major health food that is on many people's grocery lists. It serves as a major source of nutrition, containing amino acids, iron, calcium, phosphorous, copper and thiamine. It is also popular as a wheat substitute, since it does not have gluten protein that damages the small intestine of gluten sensitive people.

Composed of a large crown, many tillers, fine stems, and a shallow fibrous root system, teff is morphologically and taxonomically similar to other cereal

grains including corn (sweet and field), rice, sorghum, wheat, barley, pearl and proso millet, oats, popcorn, rye, teosinte, and triticale. These cereal grains all belong to the family Poaceae (alt. Gramineae). Teff is a member of the Poaceae family. Comparable to other cereal grains such as sorghum, teff consists of a panicle inflorescence (a large, soft inflorescence similar to broom or witch grass). This inflorescence contains spikelets from which the flowers and later the seed (grain) are produced. Teff is seeded similarly to wheat (grain drill) and cultural practices are similar to other small grains such as wheat, barley, rye and oats.[1,2]

So what does a crop from Ethiopia have to do with IR-4? As a result of the increased interest and production of teff, and the lack of herbicides labeled for use on this crop in the US, IR-4 received a Project Clearance Request (PCR) from Ronda Hirnyck at the University of Idaho for the use of dicamba + 2,4-D on teff. Because teff and the other cereal grains mentioned above have similar morphologies, cultural practices, taxonomical characteristics, and pest problems, IR-4 proposed extrapolating the tolerances for wheat, barley, oats, rye and millet to tolerances for teff. Following an IR-4 ChemSAC proposal, ChemSAC approved the extrapolation of dicamba + 2,4-D from wheat, barley, oats, rye and millet to teff. However, teff will not be supported by registrants until the crop safety data has been generated and found acceptable. A petition requesting the use of dicamba and 2,4-D must still be submitted to the US Environmental Protection Agency (EPA) for review, human health risk assessments must be conducted and the required safety finding must be made before tolerances can be established.[4]

Unfortunately, a great deal of confusion has recently arisen over this crop in the US. In an effort to clear up some misleading information, this article will address some of the common myths and facts.

MYTH #1: It is okay to use 2,4-D or any other pesticide on teff.

FACT #1: There must be a specific tolerance (maximum residue limit) for a chemical on a specific crop in order for the pesticide to be used on the crop. A tolerance for the pesticide on a crop must be established by the EPA before it is used in the field. Misunderstandings of this information have lead to illegal applications in the US. There are no herbicides (except glyphosate), fungicides or insecticides labeled for use on teff. The ONLY legal herbicide

that can be applied to teff as of September 2009 is glyphosate for teff GRAIN. Currently, teff has NOT been added to 2,4-D or dicamba labels.

MYTH #2: Crop grouping currently allows for teff to be used with any pesticide that contains the words "cereal grain," "forage, fodder, and straw of cereal grains," "grass forage, fodder, and hay," "millet" or "warm season grass" on the label.

FACT #2: As of September 2009, teff is classified as a MISCELLANEOUS COMMODITY and is NOT included in Crop Group 15 (Cereal Grains), Crop Group 16 (Forage, Fodder, and Straw of Cereal Grains), or Crop Group 17 (Grass Forage, Fodder, and Hay). As mentioned before, the word "teff" has to be on the pesticide label in order for the pesticide to be used on the crop.[5] Teff was proposed and validated for Crop Group 15 Cereal Grains at the 2002 IR-4 / USDA International Crop Grouping Symposium. Crop Group 15 is scheduled to be included in a 2011 crop group submission to the EPA. However, it is important to note that even if teff is approved to be included in a revised crop group 15, use of any chemical on teff will not be legal until the EPA is petitioned to establish tolerances for a chemical, and after tolerances are established on the revised crop group 15.[4]

MYTH #3: The EPA is making it difficult to grow teff in the US.

FACT #3: EPA is authorized to establish maximum residue limits or "tolerances" for pesticide chemical residues in food under section 408 of the Federal Food, Drug and Cosmetic Act. EPA establishes pesticide tolerances only after determining that aggregate exposure to the pesticide is safe. The US Food and Drug Administration and the USDA use these tolerance limits to enforce compliance with the law. Unless tolerances on a commodity are established, a commodity is subject to seizure if pesticide residues are found.[4]

If growers are interested in use of a pesticide on teff, a Project Clearance Request should be submitted to IR-4. At that time IR-4 can submit a proposal to EPA ChemSAC. Once IR-4 has achieved approval from ChemSAC, IR-4 can then submit a petition to EPA requesting tolerances for needed pesticides. However, crop safety data may need to be produced to ensure the chemical (especially herbicides) is safe to use on teff. To date, there are petitions requesting tolerances for a chemical on teff under review at the EPA.[4]

Since there are no herbicides (other than glyphosate), fungicides or insecticides labeled for use on teff, there is a lot of research to be conducted with this crop. Tolerances are also needed for glyphosate use on teff forage and hay. From all of the information floating around, it can be difficult to sort "facts" from "myths." However, following the facts mentioned above can ensure legal applications. Further "teff" questions can be answered by Bill Barney (barney @aesop.Rutgers.edu), Kathryn Homa (homa@aesop.Rutgers .edu), Janet Fults or Rose Kachadoorian at 503.986. 4635. If you would like to submit a PCR for teff or any other crop, please visit the IR-4 website at: ir4.rutgers.edu.

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1 Stallknecht, G.F. Kenneth M. Gilbertson, and J.L. Eckhoff. "Teff: Food Crop for Humans and Animals ." Purdue University The New Crop Resource Online Program. 10 September 1997. Purdue University. 7 Oct 2008 www.hort.purdue.edu/ newcrop/proceedings1993/V2-231.html.

2 Stallknecht, Gilbert F. "Teff." Purdue University The New Crop Resource Online Program. 24 February 1998. Purdue University. 7 Oct 2008 www.hort.purdue.edu/newcrop/default.html

3 Spencer, Robert. "Teff." Government of Alberta- Agriculture and Rural Development. 06 June 2008. 14 Sept 2009. www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/crop772.

4 Madden, Barbara. US Office of Pesticide Programs, EPA.

5. Fults, Janet and Rose Kachadoorian. "Pesticide Advisory: Pesticide Use on Teff." Oregon Department of Agriculture. 17 June 2009.

Calendar of Events

October 27-29, 2009
PMC and National Research Planning Meeting
Princeton, NJ

February 2-3, 2010
Western Region Training
University of California Kearney Research & Extension Center
Parlier, CA.

We've Got Our Wo

As this issue goes to press, the priority setting processes for both the food and ornamental programs is nearing completion. While IR-4 researchers have their priorities set for the next research year, "hot pest issues" are arising throughout the country. The following are just a few "hot pest issues."

The California Farm Bureau Federation reported August 12, 2009 about a tiny new fly, no more than two or three millimeters long, that unexpectedly appeared throughout much of the state this spring. This insect threatens to menace a wide range of soft fruit crops. The newly named spotted wing drosophila (SWD) has already damaged strawberry, raspberry, blackberry, and cherry crops. And new information shows that blueberry, plums peach and grape crops are also impacted. The pest, originally called the cherry vinegar fly, has a history in Japan of damaging a long list of soft fruit crops. No one knows which crops could be vulnerable in California.

The SWD looks like other small fruit flies, except that the male has a dark spot at the tip of each wing.

This pest is particularly destructive because the female is able to puncture the tissue of soft fruits to lay her eggs inside. These eggs quickly develop and the feeding larvae form an unsightly mass inside the fruit.

The SWD is hard to manage because the pest lays a large number of eggs, completes more than 10 generations per year and can survive most climates in California.

No one knows for certain which crops this fly could damage next, but candidates include any sweet fruit with skin soft enough for the female to puncture with her ovipositor. In Japan, there were reports in the 1930s of damage to a long list of crops including grapes, peaches, plums, apples, blueberries and persimmons. Interestingly, the SWD has been inhabiting Hawaii for years with no reports of crop damage.

"It has been confirmed in 21 counties from Napa to San Diego. It looks like it has spread throughout California. I think there will be spots where it will become established well enough to cause significant damage to cherries," said Kevin Hoffman, California Department of Food and Agriculture entomologist.

On September 22, 2009, USDA-APHIS representatives reported at an Oregon Department of Agriculture SWD meeting in Salem, Oregon that the pest has been positively identified in Oregon, Washington, California, Florida and British Columbia. Although these four states have confirmed infestations, it is likely that the pest has spread into other agricultural areas. Currently their are no quarantines for interstate or inter- national trade for the SWD, as the majority of Drosophila species are considered non-pests. For more information about SWD contact: www.oregon.gov/ODA/PLANT/docs/pdf/ippm_alert_d_suzukii.pdf

The University of Maine Cooperative Extension has reported a new disease in Maine Blueberry Fields called Valdensinia leaf spot. This disease (caused by *Valdensinia heterodoxa*) causes early leaf drop in lowbush blueberries and can cause complete leaf drop in the prune year fields so that no flower buds are produced by infected stems. By June 2009, Valdensinia leaf spot caused complete defoliation in approximately 40 blueberry fields in Nova Scotia, and had been found in Quebec and New Brunswick fields. By July 15, 2009, this fungus had been located in Maine wild blueberry fields and garden plantings. Valdensinia infects all clones of lowbush blueberry.

Since the fungus produces large, heavy spores that are not carried by the wind, the fungus cannot move across large bare areas or roads without human help. This disease spreads to new areas of a field and new fields by movement of dead, infected leaves on contaminated footwear, vehicles and equip-

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ment including blueberry boxes. Moving ONE dead leaf will spread this disease. To learn more about this new disease, contact Seanna Annis at seana.annis@umit.maine.edu.

New Invasive Pest Threatens Corn Growers in Pennsylvania. The PA IPM Program recently reported on a new invasive pest found in Pennsylvania that could mean serious losses to corn growers in the state.

"Western bean cutworm (WBC) was first trapped in July 2009 and has been found recently in seven counties," says John Tooker, assistant professor of entomology at Penn State. "WBC has historically been a pest of corn and dry beans in Great Plains states, but in recent years it has been expanding its range eastward for some unknown reason," explains Tooker.

In response to the threat of this invasive pest, 30 pheromone traps were placed across the state in a joint effort of Penn State Cooperative Extension and the Pennsylvania Department of Agriculture.

According to Tooker, WBC is an important pest of field and sweet corn as well as dried bean crops. "A heavily infested corn field might have several caterpillars per ear, reducing yields by 30 to 40 percent. Therefore, this insect has the potential to be a severe pest."
For more information on the cutworm or trapping project, visit: ento.psu.edu/extension/field-crops/corn/western-bean-cutworm. You can also contact Tooker at 814.865.1895 or jft11@psu.edu.

At the 2009 IR-4 Southern Region Meeting, Jonathan Crane, Associate Center Director for the University of Florida, Institute of Food and Agricultural Sciences, discussed laurel wilt disease, a disease caused by a fungus transmitted by the red bay ambrosia beetle. The disease could threaten the Florida avocado industry if it migrates to the southern tip of Florida. The industry is very concerned and the potential economic impact could be as much as $27 million (IFAS News, 1/26/09). Laurel wilt also infects native trees including redbay and sassafras.

Mature avocado tree – Miami-Dade County *(slide 8, IR-4 Update Jonathan H. Crane and W. Reed Olszack,UF-IFAS-TREC Homestead, FL)*

David Studstill, a Biological Scientist, at the University of Florida, Institute of Food and Agricultural Sciences, discussed a plant disorder called Oedema, that is affecting greenhouse tomatoes. This disorder, which is caused by water build up in plant cells, occurs when there is a disruption of the plant's water balance. The enlarged cells push against the leaf surface and form blistered areas. When the blisters burst they rupture the leaf surface and cause dead corky tissue. The symptoms appear primarily in foliage, but the stems and petioles can also be affected.

David said, "the conditions that produce this disorder are warm, moist soil, a cool, humid atmosphere, low light intensity, and poor air circulation. Our weather from 5/17-22/09 was overcast and cloudy every day and we received about 7 inches of rainfall for the week. Also, we had high humidity conditions during the entire week. The disorder appeared literally overnight. On May 21 there was no sign of Oedema. On May 22, the plants were covered with it." IR-4's work with plant growth regulators could be helpful in managing environmental diseuses.

Oedema disease. *Picture taken by David Studstill.*

The issues discussed here are just a small example of the pressures growers face and make it clear that at IR-4, we have our work cut out for us.

Citrus Greening: A Sequel

— by John jackson, Florida Citrus Research Industry Council

Sourced with permission from the Florida Citrus Industry Research Council.

The tremendous impact of greening disease on citrus has been well documented in Florida. The very future of the industry is in doubt. Management strategies are limited, but the one practice all growers implement is management of Asian citrus psyllid, the vector of greening disease. One of the significant management costs is to kill every psyllid to keep greening from moving from tree to tree. To eliminate psyllids and reduce costs, growers tried highly mobile sprayers that deliver 1-10 gallons per acre (GPA), covering many acres per hour. Extension agents became aware of the practice and the success growers were having - satisfactory control at greatly reduced costs. Next, researchers at the University of Florida UF/IFAS confirmed that low volume applications were extremely effective in killing psyllids.

Label Dilemma

Growers immediately were caught in a difficult situation. It was clear that low volume sprays would play a major role in controlling psyllids, but there were almost no labeled products that allowed for low volume applications! The answer was to obtain 24(c) labels from the Florida Department of Agriculture (FDACS), and the IR-4 program agreed to help with the process to obtain these labels. IR-4's involvement brought experience and contacts (with EPA, researchers, manufacturers, commodity associations) to the effort. IR-4 was able to obtain the protocol for collecting and processing residue data and determined from EPA that application volumes of 2 GPA would not require a more detailed registration process. IR-4 contracted the application and collection of samples of targeted insecticides. They then did the laboratory analysis to determine residue levels and prepared a report with their findings - all in a remarkably short time.

In order for IR-4 to get involved in this project, funding was needed for contractors, lab supplies, and other expenses. The Florida Citrus Production Research Advisory Council (FCPRAC) moved quickly to approve funding for the IR-4 effort to cover costs for three products (Mustang, Micronnite, and Delegate). Chemtura paid for residue analyses for Micromite, and FMC, Chemtura, and Dow put together first class registration packages for their products. In addition, Valent, the manufacturer of Danitol, submitted a 24(c) request for a low volume label based on their own data, using the protocol and other background work from IR-4. The FDACS pesticide office was extremely cooperative and pledged to move the process along as quickly as they could. The approval process required UF/IFAS Pesticide Information Office and Entomologists to perform timely reviews. Meanwhile the Greening Task Force provided the leadership necessary to quickly move the effort forward.

The Details

UF/IFAS provided data for the low volume labels that clearly demonstrated the products were effective. All the products in this 24(c) process were already labeled for use on citrus; the new labels simply allowed for application volumes as low as 2 GPA. All trade associations (Florida Citrus Mutual, Indian River Citrus League, Gulf Growers, Peace River CGA and Highlands CGA) were strongly behind the effort, and the FCIRC provided grower support letters. In order for FDACS to issue a 24(c) label there needed to be "an enforceable statement" on the label. Since drift was a prime concern with low volume sprays, FDACS required language relative to the size of spray particles. This is a new concept to citrus growers as all previous spray applications had no label language relative to particle size. FDACS required all manufacturers' labels to limit application volume to 2 GPA and higher and a restriction on average particle size. Once the details were worked out FDACS issued 24(c) labels for Danitol, Mustang, Delegate, and Micromite.

Application Equipment

Florida citrus growers have very little experience with low volume applicators, so the USDA-ARS research team in College Station, Texas that was very

knowledgeable about low volume application equipment was contacted. Two scientists from College Station were in Florida immediately, conducting tests with various machines and most of the labeled products, field testing grower equipment and providing printouts on the particle size distribution. These data will be extremely valuable as growers and manufacturers make future modifications.

Proactive Approach

Realizing that drift is a major concern with low volume spraying, the Greening Task Force asked the Florida Automated Weather Network (FAWN) staff to work on a pesticide application tool that would assist growers on determining when to send sprayers to the field. FAWN is now developing a tool that will use actual wind speed data from a specific tower and National Weather Service (NWS) forecasted wind speed to draw an actual and predicted trace of wind speed. It is anticipated this tool will save many unnecessary trips to the grove.

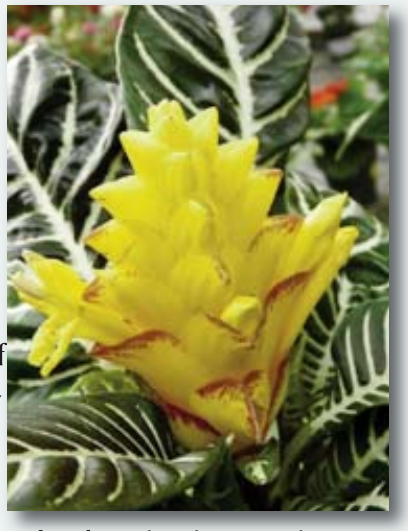
Conclusion

It was a strong team effort to accomplish what was needed to assist citrus growers in their fight against citrus greening. With the opportunity to use low volume sprays, growers should be able to reduce application costs saving $100 per acre per year. A reasonable guess as to the number of acres under psyllid management would be 400,000 to even 500,000 making the annual savings for the Florida citrus grower at least $40 million.

Spotlight on Ornamentals

— by Cristi Palmer, IR-4 Ornamental Horticulture Manager

What home would be complete without a plant or two sitting on the kitchen windowsill or a larger potted plant softening an otherwise empty corner in the living room? Foliage plants, a $630 million dollar crop in the US, enliven rooms, filter out indoor pollutants, and sequester carbon dioxide we and our pets exhale.



Zebra Plant. *Photo by Nancy Chow*

Since the Victorian era when advances in glass manufacturing produced clearer windows, we've been bringing plants inside to decorate our homes and businesses. Once a hobby of the rich, who gardened in terrariums and conservatories, keeping plants indoors is now within reach of most Americans.

The variety of plants we can bring indoors is astounding. The choices range from A to Z – African violets to Zebra plants. Each plant brings with it unique case instructions. Some foliage plants require special light or nutrient conditions, others have specific disease or insect problems. Growing foliage plants indoors oftentimes presents unique challenges since a variety of plants with vastly different environmental needs are being grown in the same location.

The IR-4 Ornamental Horticulture Program has sponsored research on some of the key pest and disease problems of foliage plants. For example, spathiphyllum and pothos are very susceptible to root rots caused by Phytophthora fungi. Dr. Dave Norman at the University of Florida has looked at 14 different products to assess which will provide the best control on these tropical plants. He has also examined many different products that manage bacterial diseases, another common problem when growing tropical foliage plants. These efforts have expanded this year with Dr. Ann Chase researching what will best manage Erwinia bacteria on two different tropical foliage crops. Foliage plants are also susceptible to scale, mealybug, and thrips – all pest problems IR-4 has researched in recent years, although not directly on foliage plants.
Look for research summaries on these pests and diseases on the IR-4 website at: ir4.rutgers.edu/ Ornamental/ ornamentalSummaryReports.cfm.

Use and Benefits of RR Pesticides Since FQPA

continued from page 1

in pest management programs for fruits and vegetables. It was estimated that approximately 50% (33-60%) of the RR pesticides registered during this time were supported by data developed by the IR-4 program.

Environmental Load

The environmental load is the rate of application (lbs/acre) of chemicals to the environment. Figure 3 shows the environmental loads (calculated as the ratio of the total lbs of pesticide applied and the total acres treated based on the CA-DPR data) for the anticholinesterase and RR insecticides, and for the B2 carcinogenic and RR fungicide groups. The RR pesticides are generally used at significantly lower application rates than the conventional compounds they are replacing, which has the effect of decreasing the amount of chemical applied to the environment.

Figure 4 shows the combined environmental loads of the new and the old pesticides grouped into insecticides and fungicides. This demonstrates the impact of the increasing use of RR compounds on the overall environmental loads of the insecticide and fungicide groups. The RR pesticides have substantially decreased the overall loads in these groups from 1994 to 2006 by 45% for the insecticides and by 54% for the fungicides.

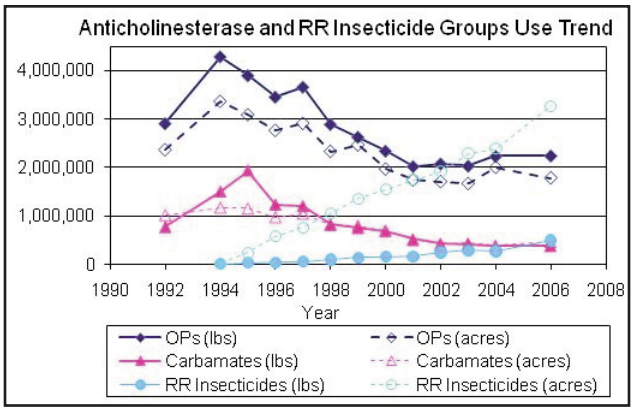


Figure 1. Acreage treated and pounds applied of the OPs, carbamates and reduced-risk insecticide groups.

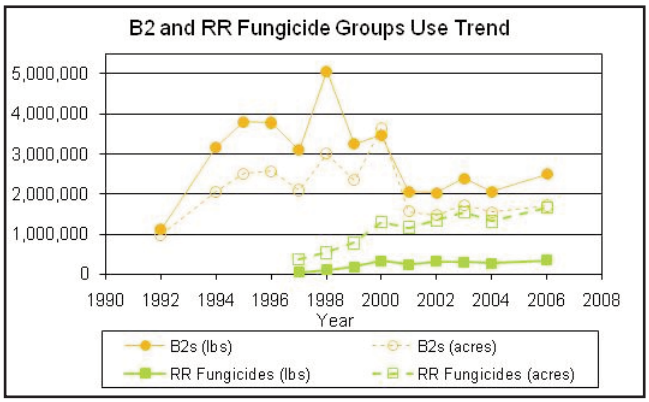


Figure 2. Acreage treated and pounds applied of the B2 carcinogenic and the reduced-risk fungicide groups

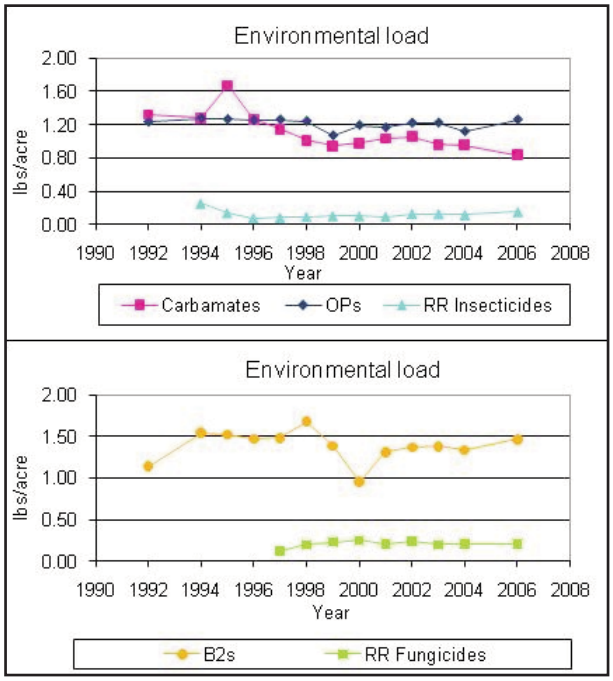


Figure 3. Environmental load of the anticholinesterase and the reduced-risk insecticides group, and the B2 carcinogenic and the reduced-risk fungicide groups.

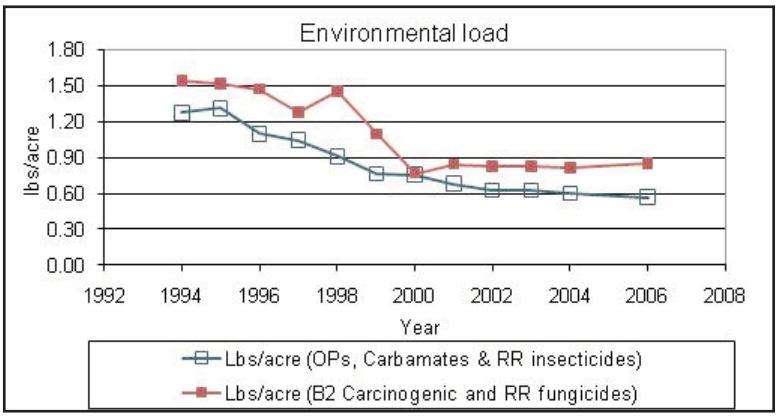
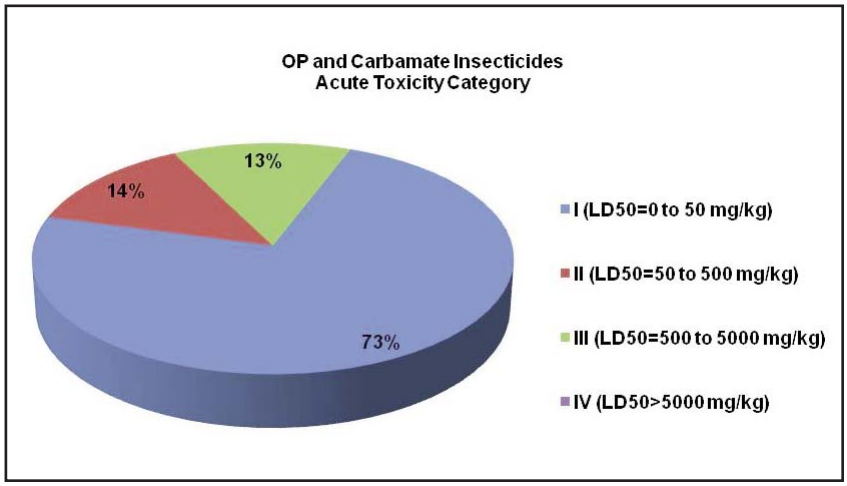


Figure 4. Overall environmental load of the insecticide and the fungicide groups.

Toxicity of Older and RR Pesticides

The main concern with the anti-cholinesterase insecticides is acute toxicity. As shown in Fig 5, 73% of these compounds most widely used in the USA fall into the highest toxicity class of EPA and none are in the safest class. By contrast, 64% of the RR insecticides fall into the highest safety class and the rest are in the next safest group III. On the other hand the major concern with B2 fungicides is potential carcinogenicity rather than acute toxicity. All of the RR fungicides included here were classified as "not likely to be carcinogenic" and they introduced no appreciable acute risk. While formal risk assessment requires knowledge of exposure levels as well as toxicity, the radical change in toxicity properties of the RR compounds coupled with their lower use rates suggests that the replacement of the older groups by the RR compounds has significantly lowered or eliminated risks to consumers, applicators and the environment.



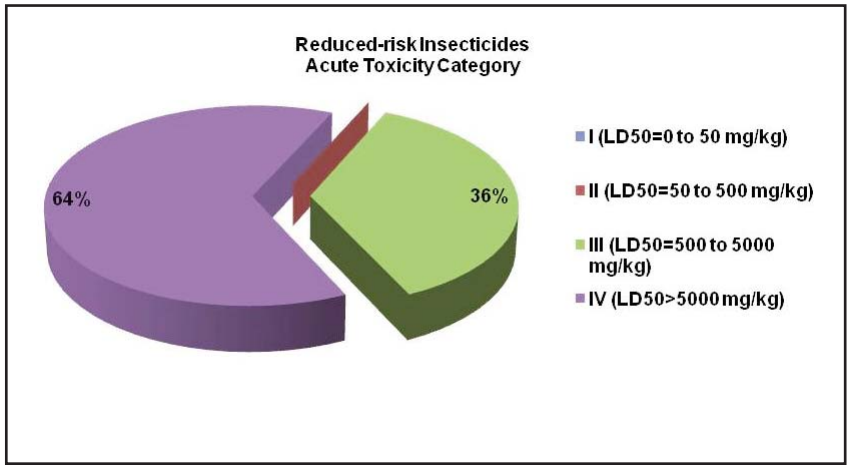


Figure 5: Comparative acute toxicities of anticholinesterase and reduced risk insecticides in this study.

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IR-4 Successes Jun-Aug 2009

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: June 3, 2009

Triflumizole

Trade Name: Procure

Crops: Leafy greens subgroup 4A (except spinach), Head and stem brassica subgroup 5A, Brassica leafy greens subgroup 5B, Cilantro leaves, Swiss chard, Turnip greens, Hop, Pineapple, Papaya, Black sapote, Canistel, Mamey sapote, Mango, Sapodilla, Star apple

PR#: 08863, 08868, 08993, 09298, 08869, 09143, 09319, 09586, 08865, 08866, 08864, 08867, 08883, 08967, 08830, 09332

Federal Register: July 8, 2009

Cyazofamid

Trade Name: Ranman

Crops: Fruiting vegetable group 8, Okra, Grape (east of the Rocky Mountains)

PR#: 08509, 08773

Pyrimethanil

Trade Name: Scala

Crops: Citrus fruit group 10 (revised tolerances to add preharvest use on lemon), Stone fruit group 12 (revised tolerance to include cherry and raise tolerance level)

Federal Register: July 10, 2009

Buprofezin

Trade Name: Applaud

Crops: Coffee, Pomegranate

PR#: 08828, 08973

Federal Register: July 10, 2009

Indoxacarb

Trade Name: Avaunt

Crops: Garden beet, Bushberry subgroup 13-07B

PR#: 08870, 07038

Federal Register: July 15, 2009

Fenamidone

Trade Name: Reason

Crops: Root vegetables except sugar beet subgroup 1B (except radish), Cilantro leaves, Turnip greens, Okra, Grape (east of the Rocky Mountains)

PR#: 07975, 08164

Federal Register: July 29, 2009

Fenpyroximate

Trade Name: Fujimite

Crops: Fruiting vegetables group 8, Okra, Melon subgroup 9A, Cucumber

PR#: 08617, 09021, 09027, 09284, 09022, 10109

Federal Register: August 13, 2009

Spinetoram

Trade Names: Delegate, Endure, Exalt, Radiant

Crops: Date, Pomegranate, Pineapple, Hop, Spice subgroup 19B, Tree nut group 14 and pistachio (revised nut tolerances to raise tolerance levels)

The IR-4 Project

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United States Department of Agriculture
National Institute of Food and Agriculture
Agricultural Research Service

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Address Service Requested