



# Agrichemical and Environmental News

A monthly report on pesticides and related environmental issues

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## WSDA Pesticide Management Division lists top issues for 1998

*Eric Bechtel, Editor of Research Publications, WSU*

Major issues in 1998 for the Washington State Department of Agriculture Pesticide Management Division include the Food Quality Protection Act (FQPA), water quality and quantity, secondary containment rule compliance, heavy metals and dioxins in fertilizers, and global competitiveness for state crops.

**FQPA:** Ted Maxwell, Registration Services program manager, says the FQPA is a major issue. Maxwell said the WSDA probably has not felt the full impact of the act, but he's seen the effects on numbers of Section 24(c) and Section 18 requests received by the department. Fewer registrants are pursuing Section 24(c) registrations, while Section 18 requests have increased. As of March 3, 1997, the department had approved seven Section 24(c) requests. As of March 3 of this year, it had approved three requests. The department had 30 Section 18 requests in 1997. As of March 3 of this year, it had received 26 Section 18 requests. Maxwell said he foresees uses and entire products vanishing because of FQPA.

**Water Quality and Quantity:** Ann Wick, program manager for Pro-

gram Development, Licensing and Recertification, considers water quality and quantity one of the biggest challenges facing the department. "Who gets it? What quality will it be? How do we maintain or improve quality? It gets into preserving salmon, restrictions on use, and endangered species. Do you have enough water flowing to ensure salmon runs? If you divert to irrigation, do you have enough for salmon? If you divert to salmon, do you have enough for power? If you can't tap into irrigation, do you have enough groundwater for crops? What if you can't get water rights to drill wells?" Wick said water degradation issues involve fertilizer management, pesticide management, and agricultural and urban runoff.

**Compliance With Secondary Containment Rules:** Implementation of secondary containment rules, designed to protect groundwater from contamination by agricultural chemicals at large storage and mixing sites, is the most critical issue facing Pesticide Management Compliance, according to Program Manager Cliff Weed. One portion of the rules became effective March 1.

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## ...Top issues

**Eric Bechtel, Editor of Research Publications, WSU**

"It's critical", Weed said, "in that a lot of people have known about this for some time, but compliance dates are now coming due." Weed said WSDA personnel will help those working toward compliance, but "will be taking a different approach toward those showing no effort to achieve compliance." (see also article on p. 3)

**Heavy Metals and Dioxins in Fertilizers:** A governor-sponsored fertilizer reform bill drafted with help from the Washington state departments of Agriculture, Ecology, Health, and Labor and Industries, is awaiting signature from the governor. The bill, Maxwell said, requires some registrants to submit information on fertilizer heavy metal content, adopts the Canadian standard for heavy metals in fertilizers, requires additional labeling, and requires Department of Ecology review of waste-derived fertilizers and micro-nutrient fertilizers prior to WSDA registration. It also directs the WSDA to study plant uptake of heavy metals and directs the Department of Ecology to determine levels of dioxins in fertilizers and soils. The bill, which would

make Washington the first state to adopt standards for heavy metals in fertilizers, has been controversial. According to Maxwell, "There have certainly been differences of opinion on whether the bill goes far enough or goes too far."

**Competing in the global market:** According to Wick, a major WSDA focus is keeping state-grown commodities competitive in a global market, while at the same time responding to constituent demands for restrictions and protection. "It costs X dollars to raise an apple in Washington. When you place restrictions on people, it costs money. That apple costs more, and it's competing against apples grown elsewhere that don't have those restrictions. We're trying to stay competitive globally. As an agency, we need to be responsive to the people of our state and their safety; however, we must also weigh the economic costs to our producers."

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## Washington's water quality rises in priority

*Cindy Moore, Water Quality Protection Manager, Washington State Department of Agriculture*

From federal agencies to local citizen groups, concern about the availability of clean Washington state water has grown due to increased groundwater contamination, dwindling salmon stocks, agricultural and urban runoff in many streams, and a general realization of limited water quantity. This mounting concern has resulted in new voluntary programs and regulatory restrictions. Regulatory agencies are focusing their attention on the agricultural industry and are making decisions that could have far-reaching effects.

One of the biggest water quality issues threatening agriculture is the listing of salmon and steelhead under the Endangered Species Act. The Snake River salmon and the Upper Columbia steelhead were recently listed in Washington state; the Upriver

Columbia Chinook will probably be next. These listings will result in the decreased availability of water for irrigation to thousands of acres of land, and could affect barge transportation of grain. As the number of endangered species increases, so do disruptions to agricultural and transportation systems.

While the National Marine Fisheries Service focuses its attention on endangered salmon and steelhead, the U.S. Environmental Protection Agency (EPA) is targeting groundwater contamination from pesticides. EPA is expected to finalize a rule this year that directs states to develop state management plans for four restricted-use pesticides. These plans are intended to allow the continued use of those pesticides important to a state's agricultural industry, while

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## ...Water quality

**Cindy Moore, water quality protection manager, Washington State Department of Agriculture**

ensuring that groundwater resources are protected from contamination. If Washington state does not write plans for atrazine, simazine, metolachlor, and alachlor, Washington growers will no longer have these products available for use, a situation that would impact some minor use crops. To ensure that sound decisions are made to protect groundwater and the vital uses of these compounds, the Washington State Department of Agriculture is gathering usage data and making plans for a public process to determine the best management strategy.

Additionally, several hundred bodies of water throughout the state exceed federal and state water quality standards. In accordance with the Clean Water Act, state or federal agencies must develop plans to manage bodies of water that do not meet

specified standards. In Washington state, many rivers suffer from increased temperatures and fecal coliform contamination. While it is understood that several industries contribute to the problem, regulatory agencies and the public are focusing anew on the agricultural industry portion of the equation, as water resources become limited.

The forecast for agriculture may get worse before it gets better; regulators will continue to scrutinize management of animal wastes, the adequacy of irrigation systems, and pesticide use. The good news, however, may be that this new focus on agriculture is resulting in public-private partnerships and the development of voluntary measures, which have the potential to be the best solution for everyone with agricultural and environmental interests.

## Deadlines approaching for compliance with state containment and mix, load site rules

Companies and individuals with large pesticide storage and mixing sites had until March 1 of this year to comply with Washington State Department of Agriculture rules designed to protect groundwater from contamination.

Rules originally adopted by the WSDA in 1993 provide for a "phase in" compliance schedule that began March 1, 1994 and extends through 1999. The compliance deadline for permanent pesticide mix/load sites is March 1, 1998. The compliance deadline for permanent fertilizer storage is March 1, 1999. Some requirements for existing facilities must be implemented within one year.

WSDA secondary containment and mix/load site rules require secondary and operational area containment at bulk pesticide and fertilizer storage facilities. They also require operational area containment of pesticides at permanent mixing and loading sites. The rules apply to many agricultural chemical dealers, commercial applicators, and public agen-

cies. Some large farms are also subject to the rules, which are designed to protect against catastrophic spills from large storage tanks and application equipment, as well as small incremental spills over time.

The following are paraphrased definitions for permanent storage facility and permanent mixing/loading sites.

### Fertilizer Storage Facility

A fertilizer permanent storage facility is a location at which liquid bulk fertilizer in excess of 500 U.S. gallons or dry bulk fertilizer in undivided quantities exceeding 50,000 pounds is stored, provided that temporary field storage is allowed. Effective March 1, 1999, "temporary field storage" shall mean a primary bulk fertilizer storage container of 10,000 gallons or less that remains in the same location for no more than 21 consecutive days in any six-month period. On or after March 1, 2004, "temporary field storage" shall mean a primary bulk fertilizer storage container of 10,000 gallons or less that remains in

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## ...Compliance

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the same location for no more than 14 consecutive days in any six-month period. Temporary field storage may be extended upon request by written permit. WSDA shall be notified in writing, upon request, of the physical location of all temporary field storage sites. The definition of "temporary field storage" does not apply until March 1, 1999, when fertilizer permanent storage facilities must be completed. Liquid bulk fertilizer storage containers directly attached to an apparatus for the purpose of fertigation are exempt.

### **Pesticide Storage Facility**

"Pesticide permanent storage facility" means a location at which liquid bulk pesticide in a single container, aggregate quantities in excess of 500 U.S. gallons, or dry bulk pesticide in undivided quantities in excess of 2,000 pounds is held in storage. This applies, provided that mini-bulk containers are exempt from this chapter and that temporary field storage of up to 2,500 gallons of bulk liquid pesticide is allowed for a period of no more than 14 consecutive days in a six-month period at any one location.

Temporary field storage may be extended upon written permit by the department, provided further that liquid bulk pesticide containers directly attached to an apparatus for the purpose of chemigation are exempt.

### **Pesticide Mix/Load Site**

"Pesticide permanent mixing/loading site" means a site (location) at which more than 300 gallons of liquid pesticide (formulated product), 3,000 pounds of dry pesticide, or at which a total of 1,500 pounds of pesticides as active ingredients are being mixed, repackaged, or transferred from one container to another within a calendar year. This applies, provided that wood preservative application systems already regulated by 40 CFR, Parts 264.570-575 and Parts 265.440-445 shall be exempt from the definition.

For more information or a copy of the new rules, contact Bill Ritter at (360) 902-2037.

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## **FQPA workshop leaves participants facing new tasks**

*Dr. Catherine Daniels, Pesticide Information Specialist, WSU*

The deputy director of the Environmental Protection Agency's Office of Pesticide Programs (OPP) shocked into silence attendees of a recent Food Quality Protection Act (FQPA) workshop when he told them the agency would NOT be issuing a call for data as the agency reviews organophosphate (OP), carbamate, and B-2 (potential carcinogens) tolerances.

Steve Johnson said the agency had sufficient data to make regulatory decisions and would proceed with the review process, although it would accept additional data if they were provided. He said default assumptions on pesticide usage would be used,

unless data were provided to show otherwise. Johnson's comments came at the beginning of a day-and-a-half-long FQPA workshop February 18-19 in St. Louis jointly sponsored by the EPA and the USDA Cooperative State Research Education and Extension Service. The workshop targeted state pesticide coordinators, IPM and National Pesticide Impact Assessment Program (NAPIAP) coordinators, pesticide section leaders in state departments of agriculture, producer groups, and registrants. Workshop attendees ranged from those extremely well versed on the FQPA and very politically involved in the process to those who were hearing about the issue in depth for the first time. ...continued on next page

## ...FQPA workshop

**Dr. Catherine Daniels, Pesticide Information Specialist, WSU**

The workshop featured both invited speakers and breakout sessions, where smaller interactive groups focused on identifying short and long-term issues and goals, developed action plans to assist growers during FQPA implementation, and recommended actions by USDA, EPA, and land grant universities.

### Speaker comments

Leonard Gianessi, of the National Center for Food and Ag Policy, a private, non-profit organization in Washington, D.C., analyzed the potential impacts of the FQPA on several crops. His presentation was a synopsis of his in-depth analysis available on the Internet at <http://piked2.agn.uiuc.edu/piap/gianessi/oppap02t.htm>.

David Crowe, of Responsible Industry for a Sound Environment (RISE), based in Washington, D.C., said it was his opinion that Congress intended the FQPA to be implemented as the reregistration process continued, that data call-ins and time limited tolerances would be used during the process to prevent a significant disruption to the U.S. food production system. He predicted a massive and bipartisan backlash from Congress, if FQPA regulation continues in its current vein.

Ken Cook, president of the Environmental Working Group, based in Washington, D.C., had exactly the opposite opinion: EPA was implementing the FQPA just as Congress had intended. Cook gave an impromptu presentation on his group's recent report "Overexposed: organophosphate insecticides in children's food". This last minute change to the agenda was prompted by earlier speaker's comments about the reports methodology and conclusions. Cook told workshop participants that the EWG report would be presented to EPA's scientific advisory panel at its March meeting.

Dan Botts, of the Florida Fruit and Vegetable Association, emphasized that industry must ensure "biological plausibility" for the use patterns remaining after tolerance reassessment. The association sent surveys to growers requesting information on alter-

natives to active ingredients currently under review, and actual product usage patterns. When compiled, this information will be provided to EPA, USDA's Office of Pest Management Policy (OPMP), and others.

Dean Zueleger voiced grower concerns and exhorted workshop participants to work with one another to avoid a situation where growers in different geographic regions would be pitted against one another in the scramble to save certain pesticide uses.

### Breakout sessions

Participants in workshop breakout sessions arrived at several group conclusions:

- Without the help of data call-ins, the previous USDA approach of proceeding with data gathering on individual active ingredients would be ineffective.
- Organizing a coherent response to the reassessment of all OP/carbamate/B-2s is massive, and will take the formation of teams to help organize grower response. Some grower organizations have already organized individual/group response plans and are in the process of gathering information.
- Duplication of effort must be avoided
- The information gathering and submission process needs to be better defined within USDA, and data needs and gaps must be identified and communicated to relevant stakeholders.
- The EPA review schedule must be clearly communicated to all parties as soon as possible.

### New duties

National Agricultural Pesticide Impact and Assessment Program (NAPIAP) representatives learned for the first time at the workshop that the USDA wants NAPIAP state liaison representatives in each state and territory to develop crop profiles for the commodities within their respective states by working with grower organizations and university extension specialists. Once developed, these profiles would be routed through the NAPIAP system to EPA. These profiles are to contain information on actual

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## ...FQPA workshop

**Dr. Catherine Daniels, Pesticide Information Specialist, WSU**

use patterns, identify key pest/pesticide combinations, and identify pesticides that are critical to IPM programs.

The amount of work needed to provide this information is daunting. There was no mention of increased funding to provide for data gathering. The deadline for tolerance review of the OP/carbamate/B-2s is still August 3, 1999. Those states with a high proportion of minor crops have more ground to cover than those states producing primarily major crops, and

they must do it in the same amount of time.

Also daunting are the actions EPA personnel could take when reviewing OP/carbamate/B-2 tolerances. These range from "only some" tolerances revoked (an active ingredient dropped, or just specific crops dropped for that active ingredient), to "many" tolerances revoked, to "all" tolerances for the OP/carbamates/B-2s. Few workshop attendees discussed "only some" scenarios; the majority left grimly discussing the "many" and "all" scenarios.

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## EPA funds initiative for FQPA projects

*Dr. Catherine Daniels, Pesticide Information Specialist, WSU*

Environmental Protection Agency headquarters in the fall of 1997 made \$800,000 in regional initiative competitive grant funds available to its regional offices for projects geared toward implementation of the Food Quality Protection Act (FQPA). Regions 4, 5, 9, and 10 each received \$200,000 and a new full-time position to perform FQPA-related activities. Goals for these initiatives include initiation or continuation of ongoing geographically and community-based partnerships in farming areas containing the greatest concentration of minor crops, and development and promotion of alternative pest management strategies for pesticides likely to be lost because of FQPA risk reduction requirements.

Region 10 (Alaska, Idaho, Oregon, and Washington) Region 10 representatives in a written statement said they will use these resources to work more closely with the farming community, as well as gain better understanding of farmers' concerns over pesticides and other agricultural or environmental issues. To accomplish this, EPA will place an agricultural professional in eastern Washington to help producers find solutions to pest management challenges that may result from pesticides lost to the FQPA's more stringent risk standards.

According to Karl Arne, pesticides expert in EPA's office of Ecosystems and Communities, focusing efforts in the agricultural community means better service delivery.

"Trying to address air and water quality concerns, or pesticide problems on a program-by-program basis just doesn't make sense," said Arne. "EPA needs to face these issues in a concerted manner. We're using a system-wide approach in many areas, and it's working. In the Columbia Plateau Agricultural Initiative, for example, we're working closely with Benton, Franklin, Grant, Adams, and Lincoln counties to address issues ranging from air quality to groundwater management. And it's bringing real results."

The new staffer hired by EPA will serve as an intermediary or liaison between the Agency and the farming community, "cross-pollinating" ideas, and concerns. The new hire will also be involved in some field demonstration projects, oversee funding to selected projects, and work with the existing agricultural research and extension. Project areas currently under consideration include: new or "next-generation" pesticides or new uses of older pesticides,

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## ...FQPA initiative

### Dr. Catherine Daniels, Pesticide Information Specialist, WSU

integrated pest management, precision application of pesticides, how cultural practices reduce pest pressure, augmentation and conservation of natural enemies, mechanical control of pests, alternative cropping systems that reduce pest pressure, and biological controls.

The position announcement is under review and the job announcement is expected to be released by April, with a summer hire date. The position will be advertised through normal EPA channels. Persons interested in applying for the position should contact Karl Arne by E-mail at: arne.karl@epamail.epa.gov or by telephone @ 206-553-2576.

Region 9 (Arizona, California, Hawaii, Nevada, Pacific Islands subject to U.S. law, & about 140 tribal nations)

Alisa Green, Pesticides and Toxics Program, said in a telephone interview that Region 9 has already been working on addressing alternatives to FQPA pesticides through regional partnerships with the California Department of Pesticide Regulation and the University of California Sustainable Agriculture Research and Education (SARE) Program. Green said no one knows at this point which active ingredients will be lost under EPA implementation of FQPA, so it is wise to work on providing alternatives to more than one chemical at a time. The SARE program focuses on moving growers from conventional agriculture to whole farm system approaches such as use of biological control, soil systems and cultural practices to manage pests. Region 9 will use its \$200,000 to provide additional funds through the SARE competitive grant program. The request for proposals is due by May 15, 1998, and is restricted to California-based individuals and institutions. The region's new hire will work with the University of California in implementation, and assist with FQPA analysis and liaison activities between industry, state, and EPA headquarters personnel. By using a currently vacant position within the region, Region 9 officials were able to advertise the position, both within and outside of the agency, in January. They expect to fill the position in early April.

Region 4 (Mississippi, Tennessee, Alabama, Georgia, Florida, Kentucky, South Carolina, North Carolina)

Richard Pont, program manager, Air, Pesticide, and Toxics Division, said in a telephone interview that his region will be waiting until the new position is filled before making final decisions on grant funding. The new hire will work with stakeholder groups in affected states and serve as a communication link between these groups and EPA. The new hire will be expected to research ongoing IPM strategies and alternative pest management scientific research and technology, and do whatever possible to assist the agricultural community in getting that type of research implemented on farms. Region 4 had earlier been unable to address implementation of whole farm systems, because it did not have a position devoted to this type of approach. Pont expects the new position to be advertised this spring and filled by this summer.

Region 5 (Illinois, Indiana, Michigan, Minnesota, Ohio, Wisconsin)

In a telephone interview, Bruce Wilkinson, environmental scientist with the Region 5 Pesticide Program Section, said Region 5 has requested that Michigan, the state with the most minor crops in the region, submit a proposal for funding FQPA activities. Wilkinson said the region's proposal is similar to that of Region 9, but it addresses needs more specific to Region 5. The new hire will be stationed in Chicago and will be involved in outreach to the agricultural community and in building coalitions. Part of the job involves appearing at grower meetings, providing FQPA updates, and acting as a communications conduit/liaison. The position description is now under review. Once the position is approved, Wilkinson expects to advertise it through the Office of Personnel Management web page and by announcements this spring to state pesticide coordinators and pesticide applicator training specialists.

# Pro-Agri-Food Initiative would enhance College of Ag programs

**Quality and Safety of Food Production Systems through Research and Extension** is the theme for the Pro-Agri-Food Initiative to be advanced for the FY 99 legislative session. This initiative represents considerable effort and input from leaders of commodity-based, agricultural organizations and representatives from designated units within the College of Agriculture and Home Economics (CAHE). If successful, this initiative will provide \$ 2.3 million for new faculty and support positions in the first year of the biennium. This will represent a significant step toward a 10-year enhancement for statewide Research and Extension programs of the College.

The initiative began to take shape more than a year ago, when a Steering Committee was formed under the leadership of Jim Barron, retired former head of the Department of Agricultural Economics. Questionnaires were mailed to a wide array of organizations affiliated with agriculture to identify areas of high priority that CAHE should address, given the resources. These issues were then compared to the CAHE five-year strategic plan to determine how well the two matched. The issues and resources that were identified were larger than could be anticipated for funding by the Legislature. By necessity, the initiative became focused on the current theme.

This initiative seeks new and vital resources to address emerging issues of major importance to the College, production agriculture industries, and residents of the state who are concerned about food quality and safety and impacts of agriculture on the environment. Federal legislation and subsequent enforcement measures will require new research and implementation of on-site educational programs. These tasks are within the proven capabilities of the Land Grant University, given the necessary resources to provide this expertise.

The Safe Drinking Water Amendment to the Clean Water Act (CWA) and the Food Quality Protection Act (FQPA) are two such federal laws that present challenges to Washington's largest agricultural industries and impact every commercial crop in the

state. Loss of currently used pesticides could affect from 60 percent of the products used on wheat to all of the products available for pest control in many minor crops. Practices such as Integrated Pest Management (IPM) depend on judicious use of pesticides in combination with many aspects of biological control. Likewise, the CWA contains water-related challenges to the dairy, livestock and farming enterprises of the state. Educational programs that implement 'best management practices' and new research expanding our knowledge base for these programs are important missions for CAHE.

An important task for CAHE will be to evaluate new herbicides and pesticides for efficacy on minor crops and to provide such data for product registration or special use permits. This effort should complement the missions of the WSU Food and Environmental Quality Lab and the Washington State Commission on Pesticide Registration.

Emphasis on food production 'systems' illustrates the importance of using holistic approaches in addressing challenges. Problem solving is often the product of multi-disciplinary efforts involving teams of scientists rather than the product of isolated individuals. The Pro-Agri-Food Initiative seeks to complement on-going teams with new team members who bring needed skills to successfully meet the new challenges of the 21<sup>st</sup> century.

This funding initiative does not meet all of the needs of the College. Complementary approaches using internal reallocation of resources to the most critical priorities of CAHE will also be required to maintain WSU as a premier Land Grant institution. Infrastructure needs, including new facilities and equipment, along with resources to maintain and improve existing structures to accommodate the needs of scientists and educators must also be addressed through long-range planning and future funding efforts.

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## Dr. Pete W. Jacoby, Associate Dean, WSU College of Agriculture and Home Economics

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### Objectives, Outcomes, and Enhanced Programs/ Resources of the Pro-Agri-Food Initiative:

#### Enhance food quality and safety from farm to table.

Develop and communicate best management practices, improve strategies for crop and live stock production to prevent contamination and food-borne illness, and improve food quality control and food preparation practices for agricultural producers, food processors and consumer

- Post-Harvest Quality of Potatoes
- Food Microbiologist
- Food Safety & Quality – Public Communications Specialist
- On-Farm Animal Health

#### Create economically viable crop and animal production systems that maintain and enhance the natural resources of soil, water, and air.

Advance, through design, demonstration, and educational programs, agricultural production systems that increase farm viability through genetic improvement programs, managing water use, and handling post-harvest waste.

- Animal Waste and Water Quality Team
  - Dairy Waste Management
  - Agricultural Waste Engineering
  - Livestock and Environmental Quality
- Cropping Systems Team
  - Integrated Cropping Systems

- Soil Fertility and Quality
- Enhance Grain Quality - New Food Products

- Rangeland Watershed/Riparian Management
- Technical Support in: Wheat Breeding, Rural/Urban Ag. Land Issues, Dryland Farming Systems, Technology Transfer for New Food Products

#### Safely protect food crops from insects, diseases and other pests.

Discover and communicate alternatives for plant protection through genetic engineering, plant breeding, biological control and integrated pest management to address the Food Quality Protection Act (FQPA). The FQPA accelerates our need to address critical pest management needs, complementing missions of the WSU Food and Environmental Quality Lab and the Washington State Commission on Pesticide Registration.

- Integrated Pest Management of Insects
  - Tree Fruit Entomology
  - Tree Fruit Diseases Control
  - Vegetable and Specialty Crop Pathology
  - Integrated Pest Management - Regional Specialist - Western Washington
  - Weed Control in Irrigated Crops
  - Technical Support in: Tree Fruits, Irrigated Crops, Horticulture
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## Lawsuit demands mandatory cholinesterase testing

A class-action lawsuit has been filed against the Washington State Department of Labor and Industries requesting that the Thurston County Superior Court order the department to enact a mandatory rule for cholinesterase medical monitoring for agricultural workers exposed to pesticides. The class-action suit brought on behalf of all agricultural workers claims that, in not enacting this rule, the department has violated the Administrative Procedure Act, the Washington Industrial Safety and Health Act (WISHA), the Equal Protection Clauses of the state and federal constitutions, as well as various civil rights statutes.

The case has been set for trial before Judge Richard A. Strophy in Thurston County Superior Court in June 1998. The class of farmworkers is represented by attorneys from Earthjustice Legal Defense Fund, Columbia Legal Services, and the Seattle firm of Heller, Ehrman, White, and McAuliffe. Labor and Industries is represented by the attorney general's office. Labor and Industries is disputing all claims made by the plaintiffs, and is currently preparing for the June trial.

*Virginia Hamilton, Washington State Department of Labor and Industries*

# Food irradiation: why and why not

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Preservation and protection of food by irradiation is a controversial subject and recently has been the subject of much media attention. Thus it might be appropriate to examine the whys and why nots of food irradiation. The 'why not' part is relatively easy: As a scientist, I have been unable to come up with any cogent or rational basis, scientific or otherwise, for opposing food irradiation. On the other hand, there are numerous 'whys' that speak to its immediate application and benefit to the public health.

Claims to the contrary notwithstanding, food irradiation offers great potential benefit to the consumer with no demonstrable risk. The technical feasibility of preservation of many foods by irradiation has been fully established. Indeed, food irradiation offers a practical, safe, and economical method of food preservation not only to the American public, but to lesser developed countries lacking readily available refrigeration and other modern preservation methods, and the levels of sanitation enjoyed in the United States.

Proper irradiation of food neither destroys nutritional quality nor adversely affects taste or texture. To this I can speak from personal experience, having eaten on more than one occasion food that had been preserved by irradiation. I could not tell by appearance, taste, or texture that the food had been subjected to radiation preservation, and I clearly suffered no ill effects. My experience was exactly the same as that of our astronauts, whose food is preserved by irradiation.

Opposition to food irradiation is in a sense *deja vu*, reminiscent of opposition to such now institutionalized public health measures as pasteurization of milk and chlorination of water. When pasteurization was first introduced, numerous objections were raised. These included claims that the nutritional quality of the milk was adversely affected through destruction of Vitamin C and other vitamins that had not yet been discovered. There was little merit in these claims, although there was a minor basis in fact. Pasteurization does in fact destroy much of the Vitamin C in milk, but milk is not a primary dietary source of this vitamin. As for vitamins not yet discovered, their discovery still awaits us. In the

meanwhile, pasteurized milk has been instrumental in virtually eliminating milk-borne diseases such as brucellosis and tuberculosis of the bones and joints in the United States and other advanced nations.

Similar objections have been raised with respect to chlorination of water. After all, so goes the argument, chlorine is a toxic element; it was even used as a war gas in World War I with great loss of life and considerable infliction of disability and suffering. Again a factual basis, but one totally irrelevant to the problem at hand; in the concentrations used for water purification, chlorine has been demonstrated to be without toxic effect to humans. Indeed, the benefits of chlorination of water are apparent even to school children and include the virtual elimination of water-borne diseases such as typhoid in the United States and other advanced nations. This single public health measure has added years to the longevity of Americans.

Which brings us back to food irradiation. For at least four decades, numerous studies have been carried out to assess the palatability and wholesomeness of irradiated food, and to determine the presence of toxic agents resulting from irradiation. These have included lifetime feeding studies in animals, in some studies through several generations, and organoleptic tests in humans. These studies have consistently shown irradiated foods to be toxicologically safe, wholesome, and palatable. That irradiation produces free radicals and small amounts of certain compounds in foods is unequivocally correct, and is often used as the scientific rationale against food irradiation. But it is also unequivocally correct that the types and amounts of compounds produced by irradiation do not impart toxic or hazardous properties to the foodstuff. Indeed, every food processing procedure, including (and perhaps especially) cooking, induces some sort of chemical change. In the case of cooking, these changes are desirable, but they may also destroy vitamins or otherwise diminish the nutritional content of the food, affect the taste, and, yes, even produce small amounts of toxic byproducts. Yet I know of no rational scientist or lay person who opposes cooking or, in the processing realm, retorting of canned food, a process that provides

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**Ronald L. Kathren, Dir. U.S. Transuranium/Uranium Registries ,WSU College of Pharmacy**


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protection against anaerobic bacterial food poisonings while at the same time cooking and inducing much chemical change in the foodstuffs so treated.

Food irradiation can not only be used as an adjunct to or in lieu of other sanitation measures, it also can be used where no other practical sanitation measures exist. It is effective against a wide variety of microorganisms associated with food poisoning illness and even death. These include the deadly *Clostridium botulinus* and species and strains of *Salmonella*, *Staphylococcus*, *Streptococcus*, *Vibrio*, *Listeria* and *Campylobacter*, to name the more prominent ones. It is also effective against *Trichina* parasites in pork, and has been demonstrated in laboratory research to control viruses such as hepatitis and poliomyelitis. Perhaps even more significantly, irradiation is an effective way to control insect pests in stored grain. Irradiation also can be used to reduce cooking time of some foods, retard sprouting in potatoes and root crops, and to delay ripening of harvested fruits and vegetables, allowing more time for marketing.

Thus, an important why in favor of food irradiation is that it has the potential to greatly reduce, if not eliminate, many of the estimated 10 or more million food poisoning cases that occur annually in the United States alone, and to save many lives in the process. Were irradiated hamburger *de rigueur*, those fast food hamburger illnesses and deaths from *E. coli* would never have occurred. And a number of persons who ate *Vibrio vulnificus*-contaminated shellfish from Florida would be alive and well today instead of dead from this virulent microbial contaminant.

In addition to providing protection against food-borne diseases, food irradiation is an effective means of retarding spoilage, thereby reducing losses of foodstuffs and making available for the table more of what we produce. Globally, losses of agricultural foodstuffs are staggering; the United Nations Food and Agricultural Organization estimates that about 25% — fully one fourth of the total worldwide food production — is lost to pests and microorganisms. Most of this loss

could be controlled by food irradiation, thereby effectively increasing the quantity of usable foodstuffs without planting any more acreage or using more artificial fertilizers. The potential economic benefit is staggering, as is the potential human benefit through increased availability of nutritionally necessary foodstuffs.

In addition to control of food-borne diseases, food irradiation can also accomplish other desirable societal and public health objectives. By increasing the shelf life of foodstuffs, irradiation can reduce the requirement for chemical additives to retard spoilage and control pests. Products sterilized by irradiation do not require refrigeration — a boon to parts of the world where refrigeration capabilities are limited or absent, and, on a more mundane level, to campers and hikers. And, reducing the need for refrigeration carries with it more subtle benefits: energy conservation because we simply will not have to manufacture or operate as much refrigeration equipment, and reduced use of potentially environmentally degrading chemicals, including chlorofluorocarbons used in refrigeration.

And so, the basic reasons supporting food irradiation: It is effective, safe, inexpensive, and like the Starship *Enterprise*, it goes where other methods cannot go. Its application brings not only large economic benefits, but enormous societal benefits through reduction or even elimination of food-borne illness, and more efficient utilization and increased supply of available foodstuffs.

Having examined the case for and against food irradiation — the why and why not — it is clear that food irradiation provides an effective means of ensuring the safety of our foodstuffs, of increasing the quantity of food available to the world, and reducing food prices to the consumer. It is safe and technologically and economically feasible. It is incomprehensible to me, and in my view at least, both scientifically and morally reprehensible that we do not utilize the full potential of food irradiation for the benefit of mankind.

# Pesticide container collection

## Schedule from Washington Pest Control Association

### Container Requirements

1. Must be rinsed, so that no residue remains.
2. Must be clean and dry, inside and out, with no apparent odor.
3. Hard plastic lids and slip-on lids must be removed.
4. Glue-on labels may remain.
5. The majority of the foil seal must be removed from the spout. A small amount of foil remaining on the container rim is acceptable.
6. Half pint, pint, quart, one and two-and-a-half gallon containers will be accepted whole.
7. Five gallon containers will be accepted whole, if the lids and bails are removed.
8. 30 gallon and 55 gallon containers are now being accepted if they are cut into pieces **no larger than 15\*18 inches** so that they will fit into the granulating machine.

**\*\*Containers that do not meet the above criteria cannot be accepted.\*\***

### Container Collection Dates

Please put these dates on your calendar! Tell others about the program. Our industry does not want pesticide containers to become a waste issue. If we take the time to clean and recycle these products, we can save money, show that the industry is responsible in its use of pesticides, and reduce inputs to the waste stream. For more information about plastic pesticide containers contact: Clarke Brown (509) 965-6809 or Steve George (509) 457-3850.

Date Time	Site	Sponsor	Contact Phone	Comments
<b>May 18 9a-3p</b>	Snipes Mountain Transfer Station (near Sunnyside)	Yakima County Solid Waste Dept.	Mark Nedrow (509) 574-2472	Cardboard accepted
<b>May 19 8:30-3</b>	Terrace Heights Landfill (near Yakima)	Yakima County Solid Waste Dept.	Mark Nedrow (509) 574-2472	Cardboard accepted
<b>May 26 8a-11a</b>	Flat Top Ranch (near Burbank)	Flat Top Ranch	Clarke Brown (509) 965-6809	
<b>May 26 1p-4p</b>	Broetje Orchards (near Prescott)	Broetje Orchards	Clarke Brown (509) 965-6809	
<b>May 27 8a-12p</b>	Western Farm Service (Pomeroy)	Western Farm Service	John Massey (509) 924-9213	
<b>May 28 8a-12p</b>	McGregor's (Walla Walla)	McGregor's	Gary Burt (509) 529-6787	
<b>June 3 8a-11a</b>	Davenport Airport	Western Farm Service	Lee Swain (509) 725-0011	
<b>June 3 1p-4p</b>	Wilbur Airport	Western Farm Service	Greg Lyva (509) 647-2441 Dennis Buddrius (509) 647-5394	

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<b>June 4 8a-12</b>	WSU Tree Fruit Station Wenatchee	North Central Fieldman & Dealers	Jeff Heats (509) 662-1539
<b>June 5 8a-12</b>	Wilbur-Ellis Quincy	Pacific NW Vegetable Association	Dale Martin (509) 787-4433 Ron Turner (509) 7873556
<b>June 9 8a-12</b>	Wilbur-Ellis Eltopia	Lower Columbia Basin Fieldmen & Dealers Assoc.	Greg Jackson (509) 545-1865 Vern Record (509) 297-4291
<b>June 10 8a-12</b>	Tom Dent Aviation Moses Lake	Columbia Basin Crop Consultants Assoc.	Tom Dent (509) 765-6926 Heath Gimmestad (509) 765-5617
<b>June 11 8a-12</b>	Wilbur-Ellis Mattawa	Wilbur-Ellis & Wolfkill Feed &Fertilizer	Al Hilliker (509) 932-4988
<b>June 16 8a-12</b>	Cenex Bruce	Bruce Dealers Assoc.	Clarke Brown (509) 965-6809
<b>June 23 8a-12</b>	Bleyhl Farm Service Sunnyside	Bleyhl Farm Service	Gary Herndon (509) 837-6261 Ted Nulliner (509) 966-2363

**If you are interested in hosting an event at your farm, business, or in a central location in your area, contact Clarke Brown at (509) 965-6809 or Steve George at (509) 457-3850.**

# PNN Update

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The PNN is operated by WSU's Pesticide Information Center for the Washington State Commission on Pesticide Registration. The PNN system is designed to distribute pesticide registration and label change information to groups representing Washington's pesticide users. The information below is a summary of the information distributed on the PNN in the past month.

Our office operates a web page called PICOL (Pesticide Information Center On-Line). This provides a label database, status on registrations, and other related information. PICOL can be accessed on URL <http://picol.cahe.wsu.edu> or call our office, (509) 372-7492, for more information.

## Federal Issues

### Label Changes

Novartis has revised the label for its fungicide Orbit. The new label includes directions for use on apricots, cherries, nectarines, peaches, plums, and prunes for growing areas west of the Rocky Mountains.

### Manufacturers' Product Cancellations

In the February 11, 1998, Federal Register, EPA announced that it had received a request from Platte Chemical to cancel the registration for its herbicide Trifluralin 4EC. This product is currently registered for use on: alfalfa, apricot, asparagus, broccoli, Brussels sprout, cabbage, carrot, cauliflower, celery, collard, dry bean, field corn, grape, green bean, hop, kale, lima bean, mint, mung bean, mustard, nectarine, non-bearing apricot, non-bearing grape, non-bearing nectarine, non-bearing peach, non-bearing plum, non-bearing prune, non-bearing walnut, okra, pea, peach, pepper, plum, potato, prune, safflower, sorghum, soybean, sugarbeet, sunflower, tomato, turnip, walnut, and wheat.

### Section 18 Crisis Exemptions

EPA has denied the Section 18 request that was submitted at the end of January for the use of Comply to control pear psylla on pears. Because Section 18's have been granted for the use on Comply on pears in previous years (1994 through 1997), WSDA is warning growers that using Comply on pears in 1998 is NOT legal, and could lead to enforcement action against the applicator. WSDA is revising the Section 18 request and will substitute an alternative product for Comply. Questions should be directed to Erik Johansen (WSDA). He can be reached on (360) 902-2078 or by e-mail at [ejohansen@agr.wa.gov](mailto:ejohansen@agr.wa.gov).

On February 25, 1998, WSDA issued a Section 18 crisis exemption for the use of Ciba-Geigy's herbicide Beacon to control weeds in Kentucky bluegrass seed. This exemption expires November 30, 1998.

### Section 18 Specific Exemptions

On January 29, 1998, the EPA granted a specific exemption (File Symbol 98-WA-03) for the use of Prowl 3.3EC to control kochia and redroot pigweed on mint. The exemption is for use on 9800 acres in Adams, Benton, Clark, Ferry, Franklin, Grant, Kittitas, Lincoln, and Yakima counties and expires 12/31/98.

### Supplemental Labels

Du Pont has issued a supplemental label (F-11) for its herbicide Lexone DF. The supplemental label provides for the use of this product to control weeds in established tomatoes.

Valent has issued a supplemental label (F-2) for its herbicide Cobra. The supplemental label provides for outdoor use of this product on conifer seedlings and conifer nurseries.

## State Issues

### Section 24c Registrations

- On February 4, 1998, WSDA issued an SLN, number WA970037, for the use of Platte Chemical's herbicide Trifluralin HF on evening primrose seed grown for export to the United Kingdom. This SLN was issued to replace WA910034 which had previously been issued for a similar use of a different product, Trifluralin 4EC.
- On February 17, 1998, WSDA issued SLN WA980001 for the use of Gowan Cryolite Bait to control black vine weevil, rough strawberry root weevil, and strawberry root weevil on the following berries: blackberry, blueberry, boysenberry, dewberry, loganberry, raspberry, strawberry, and youngberry.
- On February 12, 1998, WSDA issued revisions to two SLNs, both providing for the use of Goal 2XL on nonbearing grapes. WA970013 allows for the use of Goal 2XL for sucker control and WA970023 provides directions for use for weed control. The revisions removed the expiration date from both SLNs.

### Section 24c Cancellations

- In a December 10, 1997, letter to WSDA, Zeneca requested the cancellation of a supplemental label. The supplemental label that has been cancelled was for the use of Gramoxone Extra for preharvest vine killing and weed desiccation in potatoes.
- In the February 11, 1998, Federal Register, EPA announced that it had received a request from Rhone Poulenc to cancel the SLN WA940021. This SLN provides for the use of Sevin XLR Plus Carbaryl for fruit thinning in apples. (Note that direction for the use of this product for fruit thinning in apples has been added to the main label.)
- At Platte's request, WSDA has cancelled SLN WA910007. This SLN was previously issued for the use of Tenax to control aphids, leafhoppers, leaf miners, psyllids, flea beetle larvae, wireworms, and the reduction of flea beetle adults and early season Colorado potato beetles in white Irish potatoes.
- At Platte's request, WSDA has cancelled SLN WA930010. This SLN was previously issued for the use of Rampart 10 to control aphids on hops.

### Section 24c Revisions

- On January 27, 1998, WSDA issued a revision to SLN WA96003. This SLN had previously been issued for the use of Dimethoate 4E to control aphids and grasshoppers in phragmites reed beds in Grant county. (These reed beds constitute a portion of the wastewater treatment at a potato processing plant near Quincy, WA.) The following sections of the registration have been revised: the distribution and use statement, the precaution statement, the Federal law violation statement, the addition of a chemigation statement, the scientific name, and the section covering Worker Protection Standards.
- On January 27, 1998, WSDA issued revisions to both SLN WA940035 and WA970030. These SLNs had previously been issued for the use of Dimethoate 4E to control aphids and lygus bugs in lentils (940035) and aphids in both dry and succulent peas (WA970030). The revisions are discussed below:
  - WA940035: Revision to the distribution and use statement, the precaution statement, the directions for use, the pollinator protection statement, and the addition of a chemigation statement.

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- WA970030: Revision to the distribution and use statement, the precaution statement, the Federal law violations statement, the pollinator protection statement, the chemigation statement, and the removal of the expiration date.
  - On February 4, 1998, WSDA issued a revision to SLN WA950032. This SLN had previously been issued for the use of Micro Flo's insecticide Endosulfan 3 EC to control cabbage seedpod weevil on canola. The revision includes an expanded pollinator protection statement and the removal of the expiration date.

### **Miscellaneous Regulator Information**

The following message was received from WSDA on February 27, 1998, for distribution on the PNN:

February 27, 1998 - Distribution and/or use of American Cyanamid Pursuit Products in Washington State for use on succulent peas, dry edible peas, lentils and chickpeas.

The Washington State Department of Agriculture has had a number of inquiries regarding the legal distribution and use of American Cyanamid Pursuit products for use on succulent peas, dry edible peas, lentils and chickpeas. Distributors, dealers, growers and applicators should be advised of the following:

Pursuit Herbicide, EPA Reg. No. 241-310: This product is currently registered in the state and can be legally distributed. Applicators can legally use\* this product on succulent peas, dry edible peas, lentils, chickpeas and lima beans according to the federal supplemental label.

Pursuit DG Herbicide, EPA Reg. No. 241-350: State registration of this product was recently cancelled by the registrant. This product cannot be legally distributed in the state of Washington.

A previously registered federal supplemental label that allowed for use on succulent peas, dry edible peas, lentils, and chickpeas expired on December 31, 1996 and cannot be legally distributed, nor can this supplemental label be copied or reproduced in any manner with the intent to distribute and/or use the product according to the expired supplemental label. Product that was obtained with the supplemental label prior to December 31, 1996 may be used\* up according to the supplemental label.

PursuitW DG Herbicide, EPA Reg. No. 241-386: This product is currently registered in the state and can be legally distributed. Applicators can legally use\* this product on succulent peas, dry edible peas, lentils, chickpeas and lima beans according to the federal label.

Questions concerning these Pursuit products may be directed to Cliff Weed, Program Manager, Compliance at (360) 902-2036, or Joel Kangiser, Registration and Minor Crop Program Coordinator at (360) 902-2027.

\*Use may be restricted to specific geographic areas within the state.

# Tolerances

The Environmental Protection Agency has granted the following tolerances since the last report (March 1998). These data do not mean that labels have been registered for these uses. These pesticides must not be used until labels are registered with EPA or a state department of agriculture.

On June 12, 1996, the EPA published in the Federal Register a final rule establishing a tolerance for residues of the pesticide bifenthrin in or on the raw agricultural commodity strawberries. This rule established an effective date of June 12, 1996. The corrected date is now February 9, 1998.

<b>*Key</b>	
A = adjuvant	H = herbicide
D = dessicant	I = insecticide
D/H = dessicant, herbicide	IN = inert
F = fungicide	N = nematicide
FA = feed additive	P = pheromone
FM = fumigant	V = viricide
G = growth regulator	VR = vertebrate repellent

Type*	Chemical	Petitioner	Tolerance (ppm)	Commodity (raw)
I/F	Kaolin	Engelhard	exempt	In or on food commodities to aid in the control of insects, fungi and bacteria (food/feed use).
H	Bensulfuron methyl	El duPont de Nemours	0.05	Crayfish
			0.02	Rice
			0.3	Rice straw
F	Thiabendazole	EPA	0.1(a)	Lentils
I	Lambda-cyhalothrin	Zeneca	5	Alfalfa, forage
			6	Alfalfa, hay
			2	Aspirated grain fractions
			0.4	Brassica, head and stem subgroup
			2	Lettuce, leaf
			0.03	Poultry fat
A	Benoxacor	Novartis	0.01	When used as an inert ingredient (safener in pesticides containing metolchlor in or on raw agricultural commodities for which tolerances have been established for metolachlor.
(a) = Time limited tolerance expires 10/31/98				

# Does FQPA fallout mean major risks for minor crops?

The Food Quality Protection Act exploded on the pesticide regulatory process in August of 1996 with nary an objector's whimper. Finally the dust has settled, and analyses of the impact have been blooming like weeds following nearly a year of mind-numbing acceptance. And like thistles on a lawn, the picture is not pretty. Activists have been mobilizing on both sides of the pesticide divide. The first salvo came in February with the Environmental Working Group report about overexposure of kids to organophosphate (OP) insecticides. More quietly, but ever hopeful for a grass roots protest, the American Crop Protection Association has been circulating an informational packet intended to educate growers, commodity organizations, and congressional members about potentially adverse impacts on farming if FQPA is implemented according to current EPA proposals. Ironically, the ACPA supported the FQPA because it rescinded the Delaney Amendment, long a thorn in its side. Of course, law making is usually a compromise, and growers will reap the harvest of a regulatory process that now establishes health concerns rather than production as the chief arbiter of pesticide regulation.

## **Pesticide Police Powers**

It's time for me to add fertilizer to the field, with another analysis of the potential for the FQPA to affect pesticide availability. EPA has two methods for controlling pesticide use and availability. The agency can refuse to grant a registration or suspend one if health risks are deemed greater than negligible. Negligible has no scientific, objective definition, but lawyers and policy makers like to think of it as no greater than a one in a million chance of adverse impact in the population.

Another way to express this is to consider exposure to a carcinogenic substance. Negligible risk would be incurred if no more than one person out of a million contracted cancer as a result of exposure to the regulated substance.

The EPA may also restrict pesticides by lowering the residue tolerances. Tolerances are not safety standards, but they are set by considering potential exposure relative to the Reference Dose (RfD). For a chronic health hazard (for example, cancer), the RfD is the level of exposure to a specific pesticide that a person could receive every day over a 70-year period without experiencing appreciable risk. For an acute exposure risk, (for example worker poisoning or effects on a fetus), the RfD represents exposure in one day without significant risk.

## **FQPA Is A New Weapon in the Pesticide Wars**

Prior to the FQPA, EPA could decide about registration eligibility and tolerance setting by considering a pesticide's potential benefits to production of food or protection of public health. FQPA allows no such consideration for pesticides that are noncarcinogenic (now called threshold pesticides) and very restricted considerations of benefits for carcinogenic pesticides (now called nonthreshold pesticides).

Under the FQPA, EPA must reassess tolerances for all pesticide residues in raw and processed foods. While the reregistration process where tolerances are reassessed has always been a part of modern law, EPA will prioritize reassessments to pesticides presenting risk concerns based on existing data. The FQPA now tells

EPA what risk aspects need consideration:

- Aggregate exposure from all sources including dietary, water, and residential use;
- Cumulative effects from other pesticides with a common mode of toxicity;
- Whether infants and children are at greater risk than adults from exposure;
- Whether the pesticide produces an effect in humans similar to an effect produced by a naturally occurring estrogen and other endocrine effects (also known as an endocrine disruptor).

## **Minor Crops May Be at Major Risk from FQPA Exposure**

While minor crops represent a minor proportion of total pesticide use compared to the vast acreage of major crops like corn, soybeans, wheat, and cotton, they represent a major source of dietary exposure to residues. Minor crops are more likely to have insecticide and fungicide residues because of a combination of pest complexes, consumer disdain for blemished produce, and the need to treat closer to the time of harvest. Fruits and vegetables rely heavily on OP insecticides for pest control. These have been targeted for cumulative exposure assessments because they all affect the nervous system by inhibiting the enzyme acetylcholinesterase. Because EPA has declared dietary exposure as representing 80% of the daily exposure to residues, pesticide use on minor crops will be the most influential factor governing new exposure assessments under FQPA.

Minor crops will also suffer under FQPA exposure assessments when pesticide use includes the few prod-

**Dr. Allan S. Felsot, Environmental Toxicologist, WSU**

ucts that have both significant residential and agricultural uses. Because residential exposure of children is more important under the aggregate exposure assessment guidelines, tolerances may need to be lowered so that the sum of all exposure risks does not exceed the RfD.

**Throwing a Bone to Minor Crops**

The FQPA does have provisions that on the surface seem to take into account problems of minor crops and pesticide registrations. EPA's Implementation Plan for the FQPA recognizes that minor crop registrations produce smaller revenues for pesticide registrants than do major uses. Understandably, registrants may be reluctant to support and maintain registrations and associated tolerances for minor crops. EPA states "minor crops are very important to a healthy diet," and "minor uses are worth preserving because they are of major significance in agricultural production and public health protection." The FQPA provides the following incentives for supporting minor uses and developing new ones:

- expediting the review of data submitted in support of minor uses;
- granting time extensions for submitting data on minor uses;
- giving those who invest in data development for minor uses additional exclusive rights to use of the data to support registration;
- formal establishment of a minor use program at EPA to foster coordination with USDA and consultation with growers.

While FQPA intentions are good, EPA cannot make economic decisions for pesticide manufacturers. Marketplace realities, rather than well-meaning incentives, will likely be the final word

on minor crop registrations. The situation is particularly worrisome for pesticides having substantial uses in major crops, minor crops, and residences. If push comes to shove, how can chlorpyrifos use on about 334,000 acres of apples compete with use on about 6.8 million acres of corn, when most dietary exposure would come from apples?

**Test Driving FQPA**

Perhaps the best way to illustrate potential FQPA impacts on pesticide

use and availability in minor crops is to determine which pesticides pose greater than desired risks as defined by the new law. Apples make a good test track because they are major players among minor crops, they represent a significant proportion of dietary exposure to children (fresh apples, applesauce, apple juice), and they rely heavily on the OP insecticides subject to aggregate and cumulative exposure assessment. I've assigned the pesticides registered for use on apples to one of three

Table 1. Usage statistics for insecticides registered for apple.<sup>1</sup>

Active Ingredient	% of Planted Acres <sup>2</sup>	% of Total Pesticides Applied	% of Total Insecticides Applied	FQPA Priority Concerns <sup>3</sup>
azinphos methyl	86.16	3.12	4.79	OP
oil	81.86	51.98	79.76	
chlorpyrifos	66.99	2.46	3.78	OP/ECD
phosmet	31.26	1.90	2.92	OP
propargite	31.09	1.24	1.91	C
methomyl	27.97	0.58	0.89	CB/ECD
endosulfan	27.86	0.86	1.33	ECD
methyl parathion	25.49	0.79	1.21	OP/ECD
oxamyl	24.54	0.27	0.42	CB
dimethoate	17.51	0.41	0.62	OP/ECD
esfenvalerate	15.67	0.01	0.02	
formetanate HCL	14.98	0.36	0.56	
permethrin	14.37	0.05	0.08	C
malathion	11.04	0.29	0.44	OP/ECD
BT	10.67	0.00	0.00	
methoxychlor	10.52	0.28	0.43	ECD
diazinon	6.00	0.20	0.30	OP
fenbutatin oxide	5.88	0.09	0.14	
dicofol	5.70	0.18	0.28	C/ECD
methidathion	3.46	0.05	0.08	OP
ethion	0.80	0.02	0.03	OP
mevinphos	0.32	0.00	0.01	OP (cancelled)
fenvalerate	0.23	0.00	0.01	
fenamiphos	0.08	0.00	0.01	OP
TOTAL		65.18	100.00	

<sup>1</sup> Amounts used based on the USGS database developed for the Pesticide National Synthesis Project (<http://watr.wr.usgs.gov/pnsp/crop/>), which was updated July, 1997  
<sup>2</sup> Total apple acreage planted was 497,903 (Gianessi, L. P, 1997, National Center for Food Agricultural Policy, Wash., DC.)  
<sup>3</sup> FQPA risk prioritization: OP= organophosphate; CB = carbamate; C = carcinogen (based on EPA revised list,1997); ECD = endocrine disruptor (based on Keith, L. 1998)

## ...FQPA fallout

Active Ingredient	% of Planted Acres	% of Total Pesticides Applied	% of Total Fungicides Applied	FQPA Priority Concerns
myclobutanil	59.00	0.28	0.90	
captan	51.66	8.51	27.16	C
mancozeb	42.35	4.52	14.43	C/ECD
fenarimol	38.17	0.10	0.32	
streptomycin	28.23	0.34	1.08	
sulfur	26.15	9.18	29.29	
dodine	20.17	0.68	2.16	
thiophanate methyl	20.02	0.40	1.26	
ziram	19.93	2.56	8.15	ECD
copper	14.00	0.79	2.53	
metiram	13.90	2.31	7.37	C/ECD
benomyl	12.66	0.19	0.62	C/ECD
triadimefon	12.64	0.04	0.13	C
oxythioquinox	11.84	0.10	0.31	C
thiram	6.05	0.53	1.68	
triforine	1.37	0.01	0.04	
dinocap	1.35	0.02	0.07	
metalaxyl	1.09	0.06	0.19	
maneb	0.69	0.04	0.12	C/ECD
oxytetracycline	0.51	0.00	0.00	
ferbam	0.39	0.04	0.13	
methyl bromide	0.17	0.64	2.06	
TOTAL		31.34	100.00	

categories of FQPA concerns — OP or carbamate (CB) insecticide, carcinogen (C), and endocrine disruptor (ECD). For each major category of pesticide use (i.e., insecticide, fungicide, herbicide, and plant growth regulator), I've listed in descending order the percentage of planted acres treated with a registered active ingredient and the reason for FQPA targeting (Tables 1-4). To further the perspective of the relative importance of the targeted and nontargeted chemicals, I've also calculated percentages of total apple pesticides used and the percentage used by use category.

Insecticides account for 65% and fungicides 9% of all pesticide usage on apples (Table 1 and 2). The FQPA will most closely scrutinize insecticides. Of the 24 insecticides covered in the U.S. Geological Survey pesticide usage database, 17 are targeted. Six chemicals are targeted because they are endocrine disruptors in addition to being an OP, CB, or C. Carbaryl, listed separately in Table 4 because of its extensive use as a blossom thinner rather than as an apple insecticide, is marked as a CB, C, and ECD. Of the 22 fungicides and 13 herbicides listed (Table 2 and 3), 12 are listed as carcinogens. Five of these are also tagged as endocrine disruptors.

Ironically, apple growers use a lot of certified organic pesticides — 52% of total pounds used includes different types of oils and sulfur. The use in pounds of these two products is so great that it obscures the importance of the other compounds. For example, azinphos-methyl (Guthion) accounts for 3% of total pounds of apple pesticides, but it is applied to 86% of the acres. Such widespread use indicates that growers rely heavily on this

Active Ingredient	% of Planted Acres	% of Total Pesticides Applied	% of Total Herbicides Applied	FQPA Priority Concerns
glyphosate	26.52	0.47	20.62	
paraquat	26.05	0.28	12.27	
simazine	20.21	0.43	18.90	C/ECD
2,4-D	17.14	0.27	11.90	ECD
diuron	11.35	0.24	10.64	
terbacil	8.27	0.11	5.03	
norflurazon	6.18	0.12	5.23	
oryzalin	5.38	0.16	7.07	C
oxyfluorfen	4.81	0.14	6.13	C
dichlobenil	1.07	0.04	1.77	C
napropamide	0.33	0.01	0.37	
sethoxydim	0.18	0.00	0.03	
pronamide	0.13	0.00	0.04	C
TOTAL		2.27	100.00	

**Dr. Allan S. Felsot, Environmental Toxicologist, WSU**

Table 4. Usage statistics for plant growth regulators registered for apple.

Active Ingredient	% of Planted Acres	% of Total Pesticides Applied	% of Total Plant Growth Regulators Applied	FQPA Priority Concerns
NAA	39.27	0.04	3.39	
carbaryl	38.61	1.06	87.20	CB/C
cytokinins	21.24	0.01	0.98	
gibberellic acid	18.07	0.01	0.85	
NAD	10.27	0.01	1.23	
ethephon	6.15	0.08	6.34	
TOTAL		1.21	100.00	

While sulfur dominates pounds of fungicides used, captan, labeled by EPA as a carcinogen, is used on more than 50% of the acreage. Mancozeb, listed as a carcinogen and believed to be an endocrine disruptor, is used on 42% of the acreage. Loss of these two compounds would mean even greater reliance on sulfur, myclobutanil, fenarimol, or others, but the spectrum of diseases controlled is not necessarily the same. Thus, for fungicides even more so than insecticides, one chemical does not automatically substitute for another. Furthermore, University of California researchers have ranked sulfur as the biggest health problem for workers, probably because of the ability of sulfur to cause dermal irritation.

**Light at the End of the Tunnel?**

If, in fact, the apple industry faces loss of its most important insecticides, the EPA Implementation Plan does promote new ideas for lowering the risk to maintain use. One suggestion is to limit uses to targeted applications only in conjunction with an integrated pest management (IPM) program. This idea is probably of little comfort, considering that most Washington apple growers already use some form of pest scouting and economic thresholds, the mainstays of IPM. Another possibility is limiting the number of applications that can be made within certain time intervals, either seasonally and annually. However, if the alternative products are less effective against the most serious pests, growers will suffer the effects of reduced marketing quality.

FQPA recognizes the importance of safer or "reduced-risk" pesticides, and EPA has supported expedited review of these pesticides so that they can quickly replace older, riskier chemicals.

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Table 5. Certified organic pesticides registered for apple (based on PICOL listings).

Active Ingredient	Formulations	Active Ingredient	Formulations
<b>Insecticides</b>		<b>Fungicides</b>	
azadirachtin	Azatin, Neemazad, Trilogy	Ampelomyces quisqualis	AQ-10
Bacillus thuringiensis (B.t.)	Biobit, Cutlass, Foray, Dipel	calcium polysulfide	Lime Sulfur
Beauveria bassiana	Botanigard, Mycotrol	copper hydroxide	Kocide, Blue Shield, NuCop
codling moth sex pheromone	Isomate-C	copper metallic	Cooke Kop-R-Spray
cryolite	Prokil	copper oleate	Ferti-Lome
delta endotoxin (B.t.)	MVP Bioinsecticide	copper sulfate	Basic Copper
garlic oil/powder	Envirepel, Guardian, Y-Guard	sulfur	Ben-Sul, Cavalry, Ftoxi, Shield-Brite, Thiolux
mineral oil	Supreme		
oil/petroleum distillates	Clean Crop, Stylet, Sunspray	<b>Herbicides</b>	
poly-D-glucosamine	Clandosan	ammonium thiosulfate	Spurge
potassium laurate	M-Pede		
potassium oleate	Natural Guard	<b>Plant Growth Regulators</b>	
Pseudomonas fluorescens	Match, Blightban	cytokinin	WFS Cascade
pyrethrins	Py-Rin	gibberellic acid	Accel, Promalin
rotenone	Natural Guard, Pyrelin	hydroxypropionic acid	Propel
ryanodine	Ryan		
sabadilla	Sabadilla		
soap	Concem		

product, largely for codling moth control, because alternatives are considered less effective. Loss of azinphos-methyl, chlorpyrifos, phosmet, and methyl parathion would have adverse impacts on growers not only because of heavy reliance. These chemicals are not necessarily

substitutes for each other; each has a particular spectrum of pests that it controls best. Furthermore, with so many insecticides considered prioritized risks, few alternatives exist should the organophosphate registrations be dropped.

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Of the 12 new conventional compounds EPA registered during 1997, only four were considered “reduced risk.” None was labeled for apples. Biological pesticides derived from microorganisms or plant extracts would likely fall into the reduced risk category. Sixteen new active ingredients were registered during 1997, but only AVG, a plant growth regulator, was registered on apples.

Thus far, currently registered synthetic pesticides have not been judged as “reduced risk.” However, any currently registered pesticide that is also certified for organic production, can be considered “reduced risk”. Thus, a number of “reduced risk” pesticides are already labeled for apples (Table 5). Whether any of these will substitute for currently registered conventional products has to be assessed on a case-by-case basis. The big question is one of availability. Can enough pyrethrins, for example, be manufactured to address minor crop needs?

Ironically, pyrethrins themselves have a minor problem. They work adequately under field conditions only when synergized with piperonyl butoxide (PBO). Although essentially non-toxic to insects, PBO has been labeled a carcinogen by EPA.

### **Cross Your Fingers**

Despite the above analysis, I cannot predict what will happen to the availability of FQPA “risky” pesticides once they go through the tolerance reassessment process. Perhaps nothing, or perhaps we won’t use organophosphates any more. I am sure of one thing: American industry has always risen to the challenge of providing us with the tools we need. After all, isn’t necessity the mother of invention? Perhaps. But in a global economy, where regulatory perspectives differ from those in the United States, mother demands a profit.